IB ECONOMICS
PAPER 3 WORKSHEETS PACK

55 QUANTITATIVE WORKSHEETS PACK FOR PAPER 3

Tanusankar Chakraborty & Monami Goswami

Level7 Education

Introduction

55 Quantitative Worksheets Pack for IB Economics Paper 3 is a learning and teaching resource for students and teachers following the IB Economics (HL) course. The 55 worksheets cover all the major topics which can be examined in the Paper 3 examination. Most of the first 45 worksheets are also suitable for SL students preparing for Paper 2 of the course. The last ten worksheets include the Paper 3 policy recommendation questions (AO3). These should be marked with reference to the rubrics on pages 65 - 66 of the guide.

These are instant and relevant resources that you can incorporate straight into your schemes of work. Use them as starters or plenaries, quizzes, revision exercises, assessments, exam skills worksheets, or leave as classwork during times of teacher absences (such as when attending staff CPD and training courses). The worksheets are particularly useful for end-of-unit assessments and self-study practise prior to the final exams. Each worksheet is accompanied with fully explained answers for teachers, but these can be shared with students as appropriate. Teachers are encouraged to use their professional judgement in the allocation of the marks for each question.

About the authors

Monami Goswami is from India and has worked in 3 countries in various teaching positions. Currently, she teaches DP Economics and MYP Mathematics at the Canadian International School of Beijing. She has a Master's degree in Economics and a Bachelor's degree in Mathematics. She has taught a variety of curricula, including PYP, British National Primary Curriculum, ICSE, AP, A Level and IB DP in India, the UAE, and China. Monami is also an IB Examiner and Moderator for DP Economics. She completed her second Master's degree in April 2022 from the University of New Brunswick, Canada. She is excited about her latest career move to an international school in Malaysia.

Tanusankar Chakraborty hails from a small university town, about 50 km away from Kolkata, India. He has taught IB Economics since 2005 at leading international schools in India, the UAE, and China. He has held the position of Department Head, Model United Nations Director, Extended Essay Coordinator, and Diploma Programme Coordinator in different IB World Schools. Tanu is an IB Consultant, Authorization Visit Leader, IB Reader, IB course reader, IB Moderator, and Team Leader. He is also an experienced IB Workshop Leader, having led workshops in Business Management, Economics, CAS, the Extended Essay and Approaches to Teaching and Learning. Tanu is co-author of *Economics for the IB Diploma*, published by Hodder Education and endorsed by the IB.

55 Quantitative Worksheets Pack for IB DP Economics Paper 3
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Worksheet 1
1.1 Circular flow of income (1)

1) With the aid of a suitable diagram, illustrate the two-sector circular flow of income model. *[4 marks]*

2) State the **three** leakages into and **three** injections from a circular flow of a nation. *[6 marks]*

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3) The following table shows the national income statistics for three countries: A, B and C. Complete the missing figures. All figures are expressed as USD billion. *[9 marks]*

Country	Tax revenues	Government expenditure	Budget deficit/surplus
A	13,298		1,324
B	8,756		- 3,567
C		7,000	- 324

Country	Imports	Exports	Trade deficit/surplus
A	1,543	1,734	
B	1,243		2
C	978	900	

Country	Net investment (investment – saving)
A	
B	
C	

4) Explain **two** possible effects of situations when the total injections and total withdraws in an economy are not balanced. *[4 marks]*

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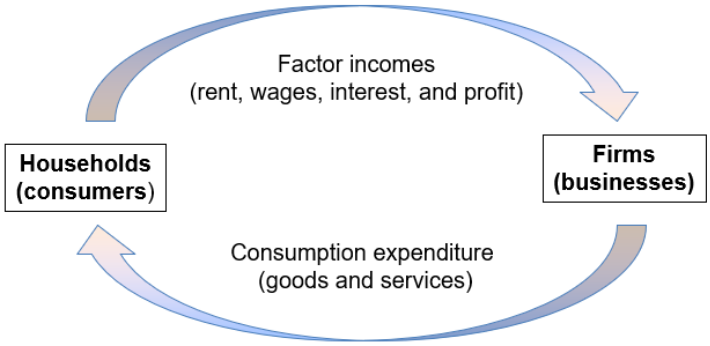
Worksheet 1
1.1 Circular flow of income (1)

Answers

1) With the aid of a suitable diagram, illustrate the two-sector circular flow of income model. *[4 marks]*



2) State the **three** leakages into and **three** injections from a circular flow of a nation. *[6 marks]*

Injections: Investment (I), government spending (G), and export income (X).
Leakages: Saving (S), taxes (T), and spending on imports (M).

3) The following table shows the national income statistics for three countries: A, B and C. Complete the missing figures. All figures are expressed as USD billion. *[9 marks]*

Country	Tax revenues	Government expenditure	Budget deficit/surplus
A	13,298	11,974	1,324
B	8,756	12,323	-3,567
C	6,676	7,000	-324

Country	Imports	Exports	Trade deficit/surplus
A	1,543	1,734	-191
B	1,243	1,241	2
C	978	900	78

Country	Net investment (investment – saving)
A	-1,133
B	3,565
C	246

Note: The circular flow of income for a nation is said to be in equilibrium (or balanced) when the sum of withdrawal (W) equals the sum of injections (J), i.e. W = J.

4) Explain **two** possible effects of situations when the total injections and total withdraws in an economy are not balanced. *[4 marks]*

In a circular flow of income for a country, if leakages (combination of saving, taxes, and spending on imports) are more than the injections (the sum of investment, government spending and export income), then the size of the economy would shrink. In other words, the economy will contract if W > J.

By contrast, if the value of injections is greater than that of leakages, i.e. J > W, then the economy will grow, ceteris paribus.

Worksheet 2
1.1 The production possibility curve (1)

1) Define the term *opportunity cost.* *[2 marks]*

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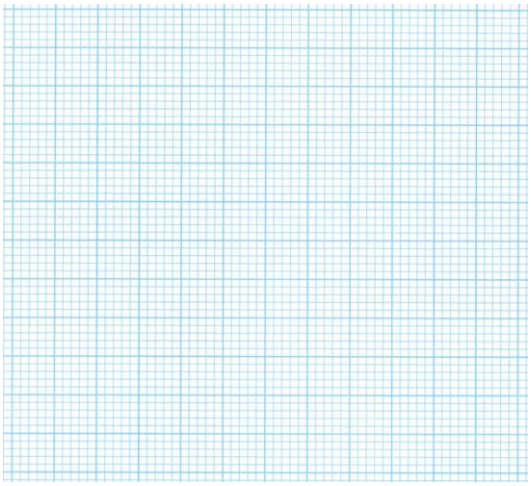
2) A country can produce the following combination of goods using all the resources it has available. Draw a production possibility curve (PPC) from the following information for the country. *[2 marks]*

Point	Consumer goods	Capital goods
A	100	0
B	50	5
C	0	10



3) State **two** conditions/assumptions necessary when drawing a PPC diagram. *[2 marks]*

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4) Calculate the number of consumer goods that need to be sacrificed from point A in the PPC diagram above in order to produce 5 units of capital goods. *[1 mark]*

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5) State the opportunity cost in each of the following situations: *[3 marks]*

i. Andre's parents have offered him two options as presents for his birthday – either a pair of wireless headphones or a pair of sunglasses. Both items are priced at $150. He chooses the sunglasses.

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ii. Beth decides to spend three hours working overtime rather than watching her favourite Netflix show. She earns $8 per hour.

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iii. Carla spends an hour studying instead of spending time socialising with her friends.

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Worksheet 2
1.1 The production possibility curve (1)

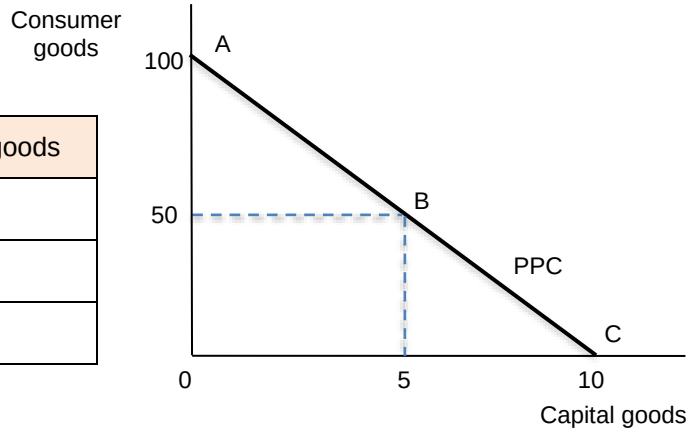
Answers

1) Define the term *opportunity cost.* *[2 marks]*

Opportunity cost represents the potential benefits that a decision maker (such as an individual, investor, or firm) misses out on when choosing one alternative over another.

2) A country can produce the following combination of goods using all the resources it has available. Draw a production possibility curve (PPC) from the following information for the country. *[2 marks]*

Point	Consumer goods	Capital goods
A	100	0
B	50	5
C	0	10



3) State **two** conditions/assumptions necessary when drawing a PPC diagram. *[2 marks]*

Assumptions of the model include: (1) resources are used to produce one or both of only two goods or services, (2) the same resources can be used to produce either or both of the two goods/services in question, with the factor resources being perfectly mobile, (3) technology and production techniques do not change, and (4) all resources are used in an efficient way.

4) Calculate the number of consumer goods that need to be sacrificed from point A in the PPC diagram above in order to produce 5 units of capital goods. *[1 mark]*

(100 – 50) = 50 consumer goods need to be sacrificed in order for the economy to be able to produce 5 units of capital goods (shown by the movement from point A to B).

5) State the opportunity cost in each of the following situations: *[3 marks]*

i. Andre's parents have offered him two options as presents for his birthday – either a pair of wireless headphones or a pair of sunglasses. Both items are priced at $150. He chooses the sunglasses.

The opportunity cost is the value to Andre of the option he sacrificed by choosing the sunglasses, i.e. the utility from the wireless headphones.

ii. Beth decides to spend three hours working overtime rather than watching her favourite Netflix show. She earns $8 per hour.

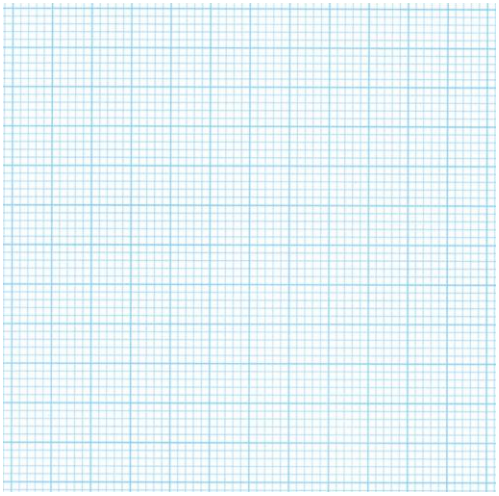
The opportunity cost is the enjoyment Beth would have received had she chosen to watch her favourite Netflix show. *How much she earns per hour in this case is not directly relevant.*

iii. Carla spends an hour studying instead of spending time socialising with her friends.

The opportunity cost to Carla is the enjoyment of socialising and networking with her friends. This includes the physical and emotional connection with her friends.

Worksheet 3
1.1 The production possibility curve (2)

1. Use the data in the table below to construct a production possibility curve (PPC) for an economy that can allocate resources between an upcoming general election and healthcare. All figures are in $ billion. *[2 marks]*



Election	Healthcare
30	0
20	10
15	15
10	20
0	30

2. With the use of the information above, explain how the PPC model can help demonstrate the following:

i. Opportunity cost *[2 marks]*

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ii. Scarcity *[2 marks]*

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iii. Economic growth *[2 marks]*

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iv. Economic development *[2 marks]*

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v. Efficiency *[2 marks]*

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vi. Inefficiency *[2 marks]*

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3. Explain why a production possibility curve (PPC) is generally drawn as convex to the origin. *[2 marks]*

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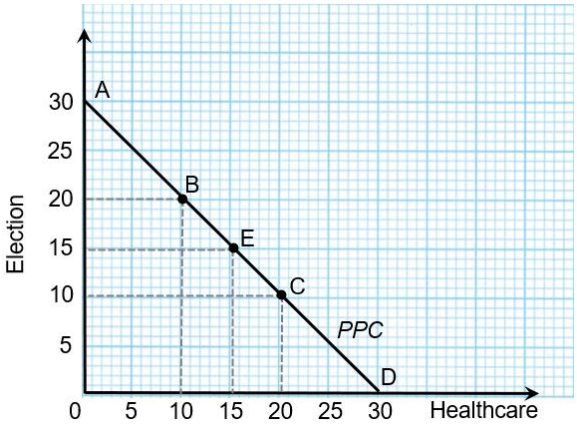
Worksheet 3
1.1 The production possibility curve (2)

Answers

1. Use the data in the table below to construct a production possibility curve (PPC) for an economy that can allocate resources between an upcoming general election and healthcare. All figures are in $ billion. *[2 marks]*

Election	Healthcare
30	0
20	10
15	15
10	20
0	30



2. With the use of the information above, explain how the PPC model can help demonstrate the following:

i. Opportunity cost *[2 marks]*

The government needs to forgo its budget for funding the general election in order to invest more on healthcare or vice-versa. From the PPC diagram above, it is evident that if the economy is at point E, (representing $15 billion spending on both for the election and healthcare) and wants to move to point C for more investment in healthcare, then $5bn (15 - 10 = 5) needs to be sacrificed from the allocation of funds for the general election.

ii. Scarcity *[2 marks]*

The government has finite resources ($30 billion) so cannot spend beyond this amount of money. Hence, the combination of spending will be limited as shown by the PPC, so the economy will not be able to expand beyond the line illustrated by the PPC.

iii. Economic growth *[2 marks]*

Economic growth is possible when the allocation of election funds and/or healthcare increases without decreasing the allocation for the other item. It is possible if the PPC shifts outwards to the right.

vi. Economic development *[2 marks]*

Since an increase in the allocation of resources for the election will not directly improve the wellbeing of the public, economic development can only be achieved when the allocation of healthcare increases without decreasing the allocation for the election. This would be shown by a rightwards shift of the PPC.

v. Efficiency *[2 marks]*

Allocative efficiency means that the particular mix of products a society produces represents the combination that society most desires. Productive efficiency means that, given the available inputs and technology, it is impossible to produce more of one good without decreasing the quantity of another good produced. All choices along the PPC, such as points A, B, C, D, and E, display productive efficiency.

vi. Inefficiency

Any point inside the PPC and not on the PPC would represent economic inefficiency as the allocation of funds for either the general election or healthcare could have been increased further with the same input and technology.

3. Explain why a production possibility curve (PPC) is generally drawn as convex to the origin. *[2 marks]*

In order for the economy to allocate more money for healthcare, it must give up some of the resources it is currently using to fund the general election. If the economy starts investing more in healthcare, it will consequently need to divert resources from the election. Also, the economy must cut healthcare spending by a small amount in comparison to the increase in funding in election. The law of increasing opportunity costs holds that as an economy moves along its production possibilities curve in the direction of producing more of a particular good, the opportunity cost of additional units of that good will increase. This is illustrated by the PPC being drawn convex to the origin.

Worksheet 4
1.1 The production possibility curve (3)

1) Define the term *production possibility curve.* *[2 marks]*

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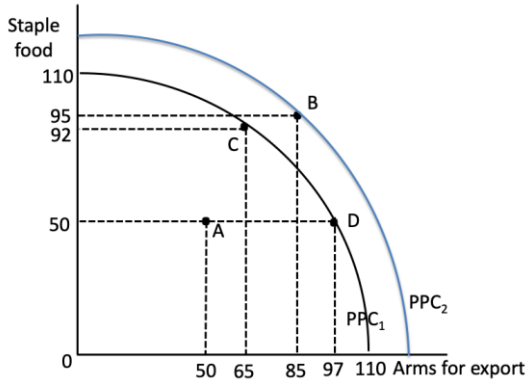
2) Using the grids below, draw production possibility curves to show increasing opportunity costs (Grid A) **and** constant opportunity costs (Grid B). *[4 marks]*

Grid A

Grid B

3) Country X produces staple food and/or arms for exporting to other nations. Using the graph below, answer the following question:



i. Explain why point A is undesirable for Country X. *[2 marks]*

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ii. Explain why Country X would want to move from point A to point C or point D. *[2 marks]*

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iii. Explain **one** way that Country X could get to point B. *[2 marks]*

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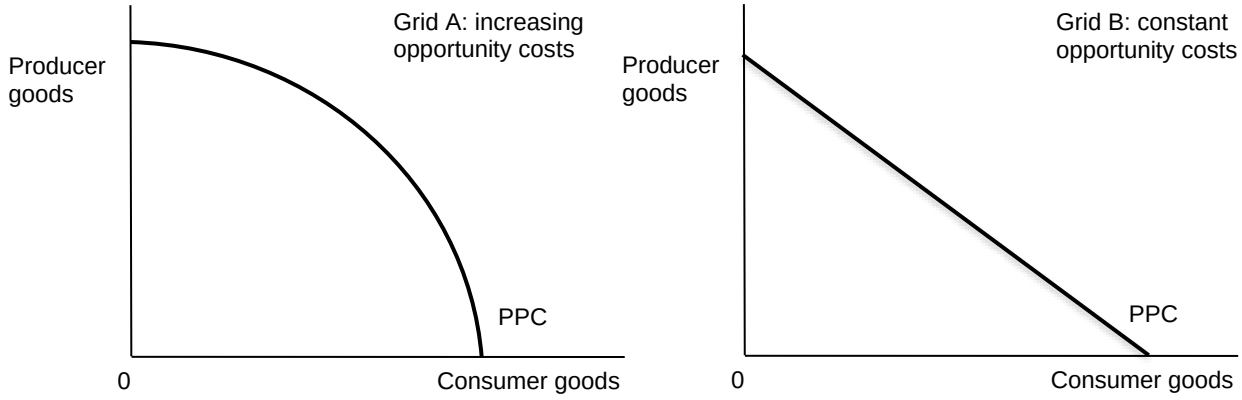
Worksheet 4
1.1 The production possibility curve (3)

Answers

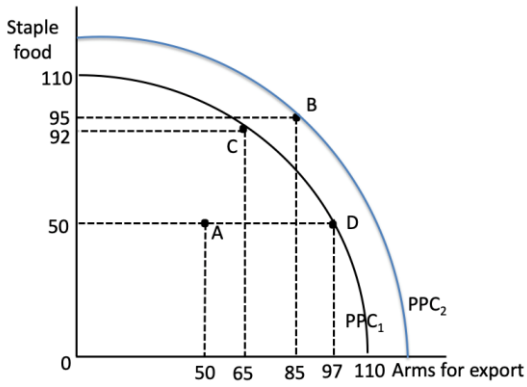
1) Define the term *production possibility curve*. *[2 marks]*

The production possibility curve (PPC) is a graph that shows all of the different combinations of output that can be produced given current resources and state of technology.

2) Using the grids below, draw production possibility curves to show increasing opportunity costs (Grid A) **and** constant opportunity costs (Grid B). *[4 marks]*



3) Country X produces staple food and/or arms for exporting to other nations. Using the graph below, answer the following question:



i. Explain why point A is undesirable for Country X. *[2 marks]*

At point A, Country X produces 50 units of staple food and 50 units of arms for export. There are, however, unemployed resources. An increase in the use of unused factors of production would lead to further production of staple food and/or arms for export. Hence, point A indicates underutilization of resources.

ii. Explain why Country X would want to move from point A to point C or point D. *[2 marks]*

At point C, Country X produces 92 units of staple food and 65 units of arms for export (an improvement from point A). At point D, however, Country X still produces 50 units of staple food but 97 units of arms for export. Moving from point C to D enables Country X to produce more arms and fewer staple food. All things being equal, a move to point C would increase the output of both products, so is likely to be beneficial to the country's development.

iii. Explain **one** way that Country X could get to point B. [2 marks]

A production possibility curve is drawn assuming that all the economy's resources are fully employed and are used efficiently. The PPC of the country could be shifted outwards if the country achieves technological progress or finds more efficient/innovative ways to produce goods/services in the long run. A gain in productivity could also help Country X to achieve economic growth, indicated by an increase in the production of both staple food products and arms (point B).

Worksheet 5
2.3 Competitive market equilibrium

1) Define the term *producer surplus*. *[2 marks]*

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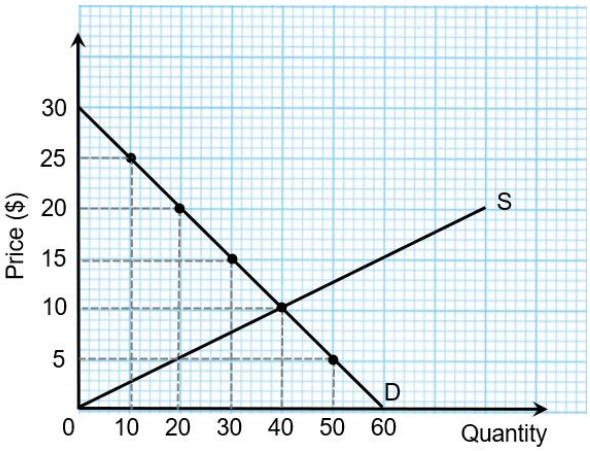

2) Referring to the diagram to the left, identify the equilibrium market price and quantity. *[2 marks]*

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3) Calculate the value of consumer surplus at the market equilibrium price. *[2 marks]*

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4) Calculate the value of producer surplus at the market equilibrium price. *[2 marks]*

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5) Use the above diagram and your answers from Questions 3 **and** 4 to suggest why the consumer surplus is larger than the producer surplus. *[2 marks]*

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6) Calculate the excess demand or supply if the price is set at $5. *[2 marks]*

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7) Use the diagram above to explain whether consumer surplus would be maximized at the market equilibrium position. *[4 marks]*

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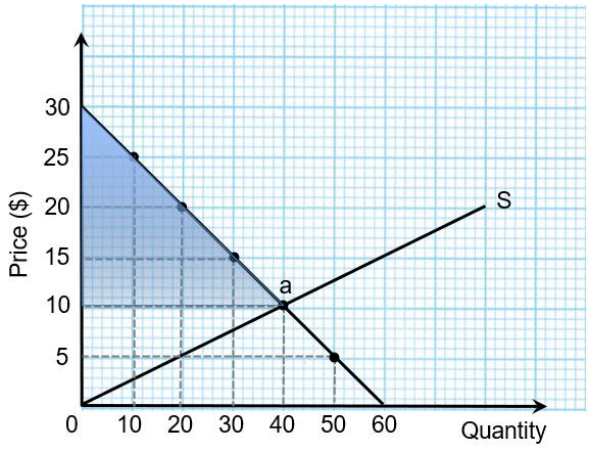
Worksheet 5
2.3 Competitive market equilibrium

Answers

1) Define the term *producer surplus*. *[2 marks]*

Producer surplus refers to the additional utility enjoyed by producers or suppliers when the price of their good or service sold in the market is higher than the price which they are willing and able to sell it for.

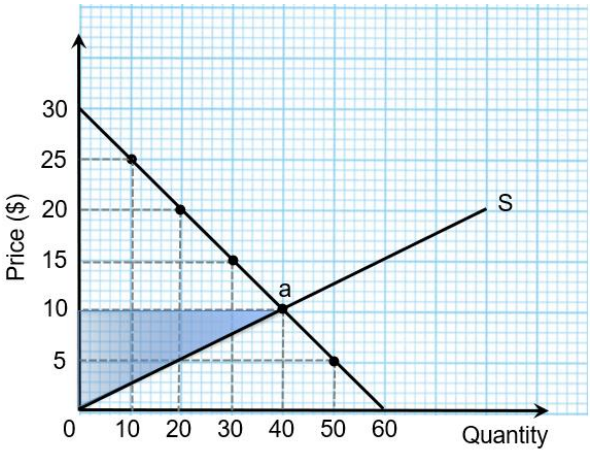


2) Referring to the diagram to the left, identify the equilibrium market price and quantity. *[2 marks]*

Market equilibrium occurs when the quantity demanded equals the quantity supplied, i.e. $Q_d = Q_s$ or at point a in the diagram. Here, equilibrium occurs at a price of $10 and quantity of 40 units.

3) Calculate the value of consumer surplus at the market equilibrium price. *[2 marks]*

At the market equilibrium, consumer surplus is the area of the shaded area (the triangle below the demand curve and above the market price of $10). Consumer surplus = [(30 – 10) × 40] / 2 = $400.



4) Calculate the value of producer surplus at the market equilibrium price. *[2 marks]*

At the market equilibrium, producer surplus is the area of the shaded area (the triangle above the supply curve and below the market price of $10). Producer surplus = [(10 – 0) × 40] / 2 = $200.

5) Use the above diagram and your answers from Questions 3 **and** 4 to suggest why the consumer surplus is larger than the producer surplus. *[2 marks]*

The diagram shows that consumers are willing and able to pay up to $40 for the product, i.e. $30 more than the market equilibrium price of $10. However, producers are only able to receive up to $10 more than the lowest price that they are willing and able to supply at. Hence, the area of consumer surplus ($400) is larger than the area of producer surplus ($200) for 40 units of output.

6) Calculate the excess demand or supply if the price is set at $5. *[2 marks]*

- At $5, Qd = 50 units, whereas Qs = 20 units.
- Hence, Qd > Qs by 30 units.
- This means there is excess demand of 30 units at $5.

7) Use the diagram above to explain whether consumer surplus would be maximized at the market equilibrium position. *[4 marks]*

Consumer surplus is <u>not</u> maximized at the market equilibrium position as consumer surplus is higher if the price is lower. Consumer surplus is maximized at P = 0 (free of charge) at a value of ($30 × 60 units) / 2 = $900. Similarly, consumer surplus will fall if the price increases above the equilibrium towards $30, as both price and quantity traded will fall.

Worksheet 6
2.5 Price elasticity of demand (1)

1) Define the term *price elasticity of demand* (PED). *[2 marks]*

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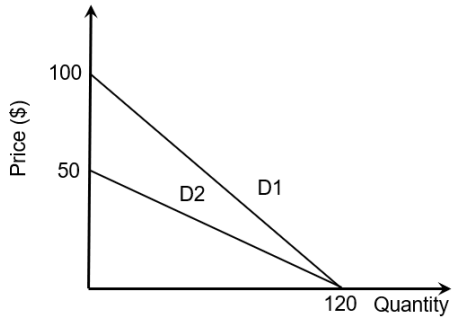
2) A and B are demand curves. Suggest why neither is more price elastic than the other. *[2 marks]*



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3) If the price of Bluetooth speakers falls from $100 to $80, calculate the percentage change in the price. *[1 mark]*

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4) If the price of Bluetooth speakers rises from $80 to $100, calculate the percentage change in the price. *[1 mark]*

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5) If the quantity of Bluetooth speakers demanded increased from 2,000 units to 2,800 units per month, calculate the percentage change in quantity demanded. *[1 mark]*

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6) If the quantity of Bluetooth speakers demanded fell from 2,800 units to 2,000 units, calculate the percentage change in the quantity demanded. *[1 mark]*

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7) Given the change in price in Q4 and the change in quantity demanded in Q6, calculate the price elasticity of demand for Bluetooth speakers, and comment on the value. *[3 marks]*

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Worksheet 6
2.5 Price elasticity of demand (1)

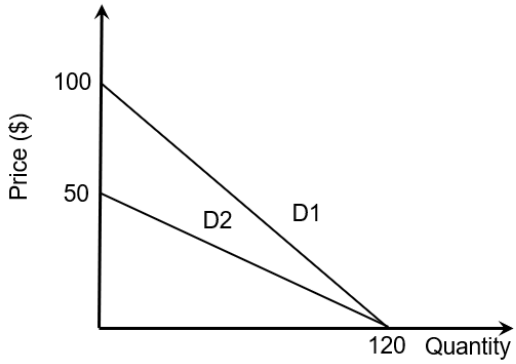
Answers

1) Define the term *price elasticity of demand* (PED). *[2 marks]*

Price elasticity of demand (PED) is a measure of the extent to which quantity demanded of a product is responsive to a change in the price of the product.

The formula for calculating PED is:
Percentage change in quantity demanded ÷ Percentage change in price *or* PED = %△Qd / %△P.

2) A and B are demand curves. Suggest why neither is more price elastic than the other. *[2 marks]*



As both demand curves intersect both the y-axis and x-axis, it means that both D1 and D2 display the full range of PED values (from 0 to infinity). Therefore, neither demand curve can be said to be more elastic or inelastic than the other.

Note: it is a common misconception is that a steeper demand curve means that PED is less price elastic. When economists say that a steeper demand curve is less price elastic, it is because the curve does not reach any of the axes, so only the sections of the demand curve shown can be said to be price inelastic.

3) If the price of Bluetooth speakers falls from $100 to $80, calculate the percentage change in the price. *[1 mark]*

- %△P = [(New price – Old price) / Old price] × 100
- %△P = [(80 – 100) / 100] × 100% = -20%, i.e. the price of Bluetooth speakers has fallen by 20%.

4) If the price of Bluetooth speakers increases from $80 to $100, calculate the percentage change in the price. *[1 mark]*

- %△P = [(New price – Old price) / Old price] × 100
- %△P = [(100 – 80) / 80] × 100% = +25%, i.e. the price of Bluetooth speakers has increased by 25%.

5) If the quantity of Bluetooth speakers demanded increased from 2,000 units to 2,800 units per month, calculate the percentage change in quantity demanded. *[1 mark]*

- %△Qd = [(New quantity demanded – Old quantity demanded) / Old quantity demanded] × 100%
- %△Qd = [(2,800 – 2,000) / 2,000] × 100% = +40%

6) If the quantity of Bluetooth speakers demanded fell from 2,800 units to 2,000 units, calculate the percentage change in the quantity demanded. *[1 mark]*

- %△Qd = [(New quantity demanded – Old quantity demanded) / Old quantity demanded] × 100%
- %△Qd = [(2,000 – 2,800) / 2,800] × 100% = -28.57%

7) Given the change in price in Q4 and the change in quantity demanded in Q6, calculate the price elasticity of demand for Bluetooth speakers, and comment on the value. *[3 marks]*

- PED = %△Qd / %△P
- PED = -28.57% / +25% = -1.14

- As PED is (-)1.14, the demand for Bluetooth speakers is price elastic (PED > 1.0).

Worksheet 7
2.5 Price elasticity of demand (2)

1) define the term *price inelastic demand*. *[2 marks]*

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2) When the price of apples increases from $5 per kg to $6 per kg, it is notices that the quantity demanded falls from 2,000 units to 1,500 units per week. Calculate the PED and comment your answer. *[3 marks]*

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3) 3)When the price of organic plant food fell from $20 to $18 per bottle, the quantity demanded increased from 80 to 90 bottles per week. Calculate the PED and comment on your answer. *[3 marks]*

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4) Suppose the average price of Lamborghini supercars increases from $900,000 to $1,100,000, but the quantity demanded does not change at all. Calculate the PED and comment on your answer. *[3 marks]*

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5) The price of watches falls from $300 to $250 each, resulting in an increase in quantity demanded from 85 to 95 watches per month. Calculate the value of PED and comment on your answer. *[4 marks]*

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6) Suggest why the value of PED is expressed as a negative value. *[2 marks]*

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7) Suggest why the value of PED varies along a linear demand curve. *[2 marks]*

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Worksheet 7
2.5 Price elasticity of demand (2)

Answers

1) Define the term *price inelastic demand*. *[2 marks]*

Price inelastic demand means that the quantity demanded for a particular good or service is relatively unresponsive to changes in the price of the product. This is likely due to the lack of close substitutes being available.

2) When the price of apples increases from $5 per kg to $6 per kg, it is notices that the quantity demanded falls from 2,000 units to 1,500 units per week. Calculate the PED and comment your answer. *[3 marks]*

- PED = %△Qd / %△P
- PED = [(New demand – Old demand) / Old demand] × 100% ÷ [(New price – Old price) / Old price] × 100%
- PED = [(1,500 – 2,000) / 2,000] × 100% ÷ [(6 – 5) / 5] × 100% = -25% / 20% = -1.25
- The value (PED > 1.0) suggests the demand for apples is highly price elastic, possibly due to the availability of close substitute products such as oranges following the 20% price increase.

3) When the price of organic plant food fell from $20 to $18 per bottle, the quantity demanded increased from 80 to 90 bottles per week. Calculate the PED and comment on your answer. *[3 marks]*

- PED = %△Qd / %△P
- PED = [(New demand – Old demand) / Old demand] × 100% ÷ [(New price – Old price) / Old price] × 100%
- PED = [(90 – 80) / 80] × 100% ÷ [(18 – 20) / 20] × 100% = +12.5% / -10% = -1.25
- The value (PED > 1.0) suggests the demand for organic plant food is highly price elastic, so the 10% price reduction has attracted a relatively large increase in the quantity demanded (a rise of 12.5%).

4) Suppose the average price of the latest iPhone increases from $950 to $1,000 but the quantity demanded does not change at all. Calculate the PED and comment on your answer. *[3 marks]*

- PED = %△Qd / %△P
- PED = 0 ÷ [(1,000 – 950) / 950] × 100% = 0% / 5.26% = 0.0
- The value (PED = 0) suggests the demand for the latest iPhone is perfectly price inelastic, so the 5.26% price increase has no impact on the quantity demanded (perhaps due to a strong degree of brand loyalty).

5) The price of watches falls from $300 to $250 each, resulting in an increase in quantity demanded from 85 to 95 watches per month. Calculate the value of PED and comment on your answer. *[4 marks]*

- PED = %△Qd / %△P
- %△Qd = (95 – 85) / 85 = +11.76%
- %△P = (250 – 300) / 300 = -16.67%
- PED = +11.76% / -16.67% = -0.7
- The value (PED = 0.7) suggests the demand for the watches is price inelastic (customers are not highly responsive to the reduction in price). The fall in price (16.67%) has led to a smaller than proportional increase (11.76%) in the quantity demanded.

6) Suggest why the value of PED is expressed as a negative value. *[2 marks]*

PED has a negative value (or negative coefficient) due to the law of demand. This rule states that an increase in the price of a good or service (positive change) causes a fall in the quantity demanded (negative change), and vice versa, ceteris paribus.

7) Suggest why the value of PED varies along a linear demand curve. *[2 marks]*

A demand curve shows the different levels of consumer demand at different price levels, i.e. quantity demanded falls as the price rises, ceteris paribus. At higher prices (along the same linear demand curve), quantity demanded contracts at a faster rate as the price now accounts for a greater proportion of household income. Hence, consumers eventually seek alternative products, so demand is more price elastic at higher prices along the (same/linear) demand curve. The opposite is true for lower prices.

Worksheet 8
2.5 Income elasticity of demand (YED)

1) Define the term *income elasticity of demand* (YED). *[2 marks]*

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2) Using relevant examples, distinguish between a normal good and an inferior good. *[4 marks]*

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3) Suppose the YED value for supermarket own-label wines is -0.7 and there is a 5% fall in average real incomes. Determine the impact of this on the sales of the product. *[2 marks]*

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4) Suppose there has been an increase in average real incomes of 5% over the past year and YED in the private housing market is +2.5. Determine the impact of this on sales in the market. *[2 marks]*

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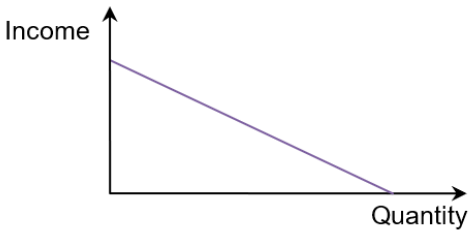
5) With reference to the diagram, determine what the Engel curve suggests about the product. *[2 marks]*



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6) Explain **two** ways that firms might be able to make use of estimates of the income elasticity of demand (YED) for the goods and/or services that they sell. *[4 marks]*

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Worksheet 8
2.5 Income elasticity of demand (YED)

Answers

1) Define the term *income elasticity of demand* (YED). *[2 marks]*

Income elasticity of demand (YED) measures the extent to which the quantity demanded (Qd) of a product is responsive to a change in consumers' real income (Y). The formula for calculating YED is %△Qd / %△Y.

2) Using relevant examples, distinguish between a normal good and an inferior good. *[4 marks]*

A normal good is defined as a good or service where an increase in real consumer income leads to an increase in the quantity demanded, ceteris paribus. This applies to both necessity products (such as rice or bread in many parts of the world) and luxury products (such as sports cars and designer clothing). An inferior good is a good or service where an increase in real consumer income leads to a fall in the quantity demanded, ceteris paribus. This is because consumers substitute the inferior good for more superior goods as their real incomes rise, such as canned meat for fresh-cut meat products. The difference between these is the opposite behaviour of consumers' spending when their real income changes.

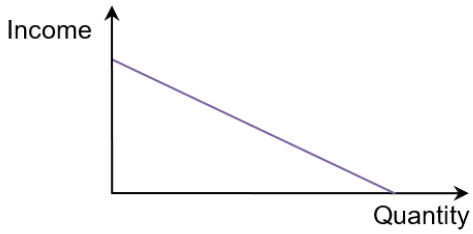
3) Suppose the YED value for supermarket own-label wines is -0.7 and there is a 5% fall in average real incomes. Determine the impact of this on the sales of the product. *[2 marks]*

- YED is %△Qd / %△Y
- YED = -0.7 = x / -5%
- Hence, the percentage change in quantity demanded (sales volume) = **+3.5%**

4) Suppose there has been an increase in average real incomes of 2.5% over the past year and YED in the private housing market is +2.5. Determine the impact of this on sales in the market. *[2 marks]*

- YED is %△Qd / %△Y
- YED = +2.5 = x / +2.5%
- Hence, the percentage change in quantity demanded (sales transactions of private housing) = **+6.25%**

5) With reference to the diagram, determine what the Engel curve suggests about the product. *[2 marks]*



- This Engel curve shows that as income levels fall, the quantity demanded increases, ceteris paribus.
- Hence, the diagram depicts the situation for an inferior good or service.

6) Explain **two** ways that firms might be able to make use of estimates of the income elasticity of demand (YED) for the goods and/or services that they sell. *[4 marks]*

Possible answers could include an explanation of any two of the following points:

- If average real incomes in an economy rises during the year, firms will prefer to focus on supplying goods and services that have a YED value of at least 1.0 (income elastic products) in order to gain from the proportionately higher consumer spending.
- Alternatively, during an economic downturn (recession or slump), when average real incomes fall, firms will prefer to increase the supply of inferior goods, i.e. products that experience an increase in quantity demanded when average real incomes fall.
- Knowing the value of YED for a firm's products also helps the firm to decide whether to increase or reduce price following a change in real incomes. For example, if real incomes fall (during a recession) and YED is positive, cutting prices can help to compensate for the fall in quantity demanded (due to the fall in real incomes).
- Firms can also make sales forecasts from YED values of how demand for their goods and services would be affected if governments changed income tax rates (which effectively alters average real disposable incomes).

Worksheet 9
2.6 Price elasticity of supply (1)

1) Define the term *price elasticity of supply* (PES). *[2 marks]*

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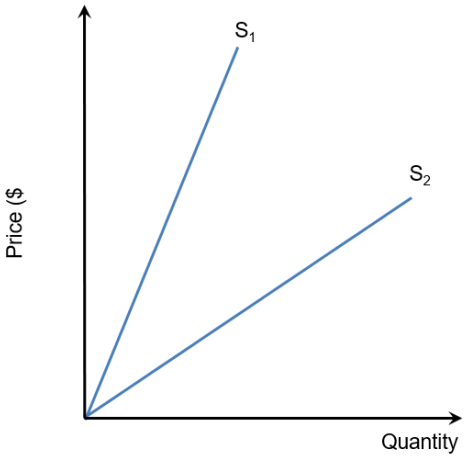

2) Suggest why the two supply curves shown below have the same PES value. *[2 marks]*

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3) The price of luxury watches falls from $3,000 to $2,500 which results in quantity supplied falling from 100 units to 85 units per month. Calculate the value of PES and comment on the result. *[4 marks]*

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4) Suggest why housing (house building) tends to have a low PES value. *[2 marks]*

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5) Suggest why a mass car manufacturer such as Toyota or Volkswagen might have a high PES value. *[4 marks]*

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6) Suggest why the PES of non-prescription medicines, such as paracetamol, is likely to be highly price elastic. *[2 marks]*

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Worksheet 9
2.6 Price elasticity of supply (1)

Answers

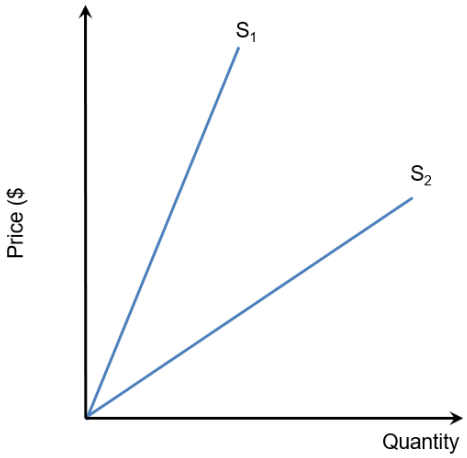
1) Define the term *price elasticity of supply* (PES). *[2 marks]*

Price elasticity of supply (PES) measures the extent to which the quantity supplied of a product is responsive to a change in the product's price. It is calculated by using the formula PES = %△Qs / %△P.

2) Suggest why the two supply curves shown below have the same PES value. *[2 marks]*

Any supply curve that starts at the original has a PES value of 1.0, i.e. unitary elasticity. Hence, supply curves S_1 and S_2 have the same PES value. In particular, the supply curves are perfectly responsive to price changes.

Essentially, unit elastic supply (as shown by S_1 and S_2) is depicted as a linear upwards sloping supply curve that starts from the origin.



3) The price of luxury watches falls from $3,000 to $2,500 which results in quantity supplied falling from 100 units to 85 units per month. Calculate the value of PES and comment on the result. *[4 marks]*

- PES = %△Qs / %△P
- %△Qs = (85 – 100) / 100 = 15%
- %△P = (2,500 – 3,000) / 3,000 = 16.67%
- PES = 15 / 16.67 = 0.899 or 0.9
- Hence, the supply of the luxury watches is relatively price inelastic. This is because quantity supplied is not highly responsive to the change in price. The fall in price (16.67%) led to a smaller than proportional fall (15%) in the quantity supplied.

4) Suggest why housing (house building) tends to have a low PES value. *[2 marks]*

It takes a relatively long time to transfer the four factors of production to the supply of housing. For example, it can take several years to complete a housing project. Hence, any increase in the price of housing will not change the supply of housing, at least within a short period of time. Supply is therefore price inelastic (a low PES value).

5) Suggest why a mass car manufacturer such as Toyota or Volkswagen might have a high PES value. *[4 marks]*

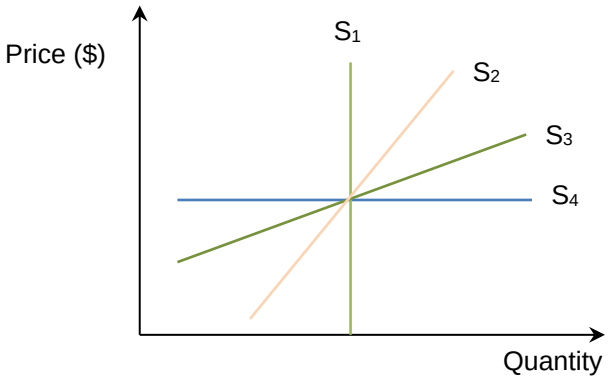
Mass car manufacturers such as Toyota and Volkswagen are able to produce a vast volume of cars, based on their sales forecasts. As the two of the world's largest carmakers, Toyota and VW are able to exploit mass production technologies and adjust supply relatively easily in response to changes in market price. Their large production plants and facilities also mean that they are able to make the most of any spare capacity in their production plants to increase output if market prices increase.

6) Suggest why the PES of non-prescription medicines, such as paracetamol, is likely to be highly price elastic. *[2 marks]*

The supply of non-prescriptive (generic) health products such as paracetamol is likely to be mass produced using automated technologies. This means the output of the medicines can be changed with relative ease in order to meet changes in the market price of the product. Hence, supply is highly responsive to changes in price, i.e. price elastic.

Worksheet 10
2.6 Price elasticity of supply (2)

1) Suggest which of the following supply curves represents the long run position for a product. *[2 marks]*



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2) Explain **two** factors that can affect the PES value of fresh fruits and vegetables. *[4 marks]*

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3) Suppose the price of bananas increases from $5 per kg to $6 per kilogram, which results in the quantity supplied increasing from 120 kilos to 150 kilos per week. Calculate the value of PES and comment on your result. *[2 marks]*

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4) Suppose the PES for Chanel handbags is +0.75 and the luxury fashion company increases the average price of its handbags by 15%. Calculate the percentage change in the quantity supplied. *[2 marks]*

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5) Suggest why the supply of Chanel handbags is relatively low (at +0.75 in Question 4 above). *[2 marks]*

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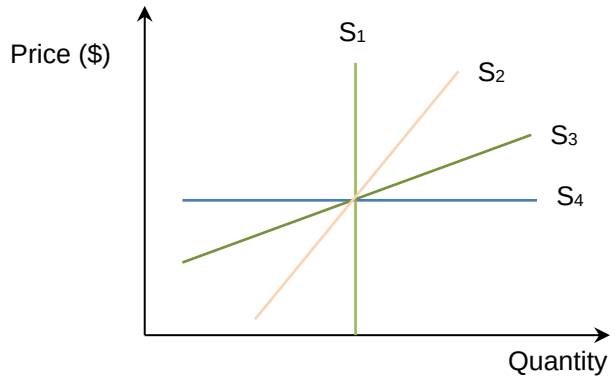
Worksheet 10
2.6 Price elasticity of supply (2)

Answers

1) Suggest which of the following supply curves represents the long run position for a product. *[2 marks]*



Supply curve S_4 represents the long run position (where PES is infinite). This is because no factors of production are fixed in the long run, so firms can respond perfectly to any changes in demand, without price having to play a factor in determining the quantity supplied.

2) Explain **two** factors that can affect the PES value of fresh fruits and vegetables. *[4 marks]*

Possible responses could include an explanation of the following points: the weather (such as droughts or floods will cause production delays), the use of pesticides and other technologies to influence supply, natural disasters, government subsidies, spare capacity in the production process (including the availability of arable land).

3) Suppose the price of bananas increases from $5 per kg to $6 per kilogram, which results in the quantity supplied increasing from 120 kilos to 150 kilos per week. Calculate the value of PES and comment on your result. *[3 marks]*

- PES = %△Qs / %△P
- PES = [(150 – 120) / 120] × 100% ÷ [(6 – 5) / 5] × 100%
- PES = 25% / 20% = +1.25
- Hence, the PES of banana is relatively price elastic as the price change (20%) has caused quantity supplied to increase by a greater proportion (25%).

4) Suppose the PES for Chanel handbags is +0.75 and the luxury fashion company increases the average price of its handbags by 15%. Calculate the percentage change in the quantity supplied. *[2 marks]*

- PES = %△Qs / %△P
- +0.75 = %△Qs / %△P
- +0.75 = %△Qs / 15%
- Hence, %△Qs = 11.25%

5) Suggest why the supply of Chanel handbags is relatively low (at +0.75 in Question 4 above). *[2 marks]*

Chanel handbags are high-end luxury products, so will not be supplied in large quantities. As such, they are likely to be hand-made / hand-stitched using labour-intensive production methods. Despite the price rising by 15% (in Question 4), the quantity supplied can only increase by a disproportionate amount (11.25%) due to the time lags involved in the production of luxury handbags.

Worksheet 11
2.5 Elasticity – PED, YED and PES

1) Outline why the value of price elasticity of demand (PED) varies along a linear demand curve. *[2 marks]*

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2) Calculate the price elasticity of demand for canned peas if the price is reduced from $0.40 to $0.35, resulting in the quantity demanded increasing by 20%, and comment on your finding. *[2 marks]*

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3) Using appropriate examples, and with reference to income elasticity of demand (YED), distinguish between necessity goods and luxury goods. *[4 marks]*

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4) With reference to the diagram, determine what the Engel curve suggests about the product. *[2 marks]*

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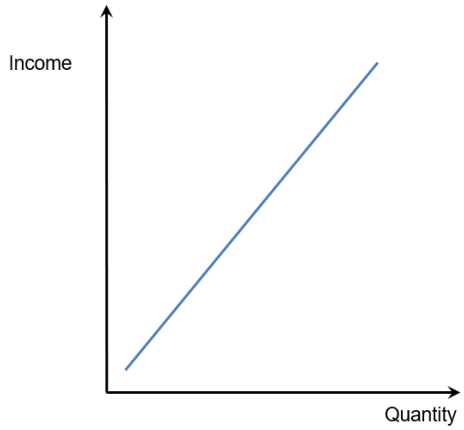

5) Suppose that when people's real income increases by 10%, the demand for education increases by 13%. Suggest what kind of product education would be classified as. *[2 marks]*

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6) Suppose average real income increases from $2,000 to $2,400 per month and the demand for organic fruits increases from 10kg to 14kg per month. Calculate the income elasticity of demand (YED) for organic fruits and comment on your findings. *[3 marks]*

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7) Explain why it might be difficult to classify economy class airline travel as either an inferior good or as a normal good. *[3 marks]*

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Worksheet 11
2.5 Elasticity – PED, YED and PES

Answers

1) Outline why the value of price elasticity of demand (PED) varies along a linear demand curve. *[2 marks]*

A demand curve shows the different levels of consumer demand at different prices, i.e. quantity demanded falls as the prices rise, ceteris paribus. At higher prices (on the same linear demand curve), the quantity demanded falls at a faster rate as price now accounts for a greater proportion of consumers' real income. Hence, consumes eventually seek alternatives (substitutes) meaning that demand is more price elastic at higher prices along the same/linear demand curve.

2) Calculate the price elasticity of demand for canned peas if the price is reduced from $0.40 to $0.35, resulting in the quantity demanded increasing by 20%, and comment on your finding. *[2 marks]*

- %△P = (0.35 – 0.4) / 0.4 = -12.5%
- The percentage fall in price is 12.5%, so the PED = +20% / -12.5% = - 1.6
- This means that the demand for canned peas is highly price elastic, i.e. a reduction in price (12.5%) has caused the quantity demanded to increase by a greater proportion (20%).

3) Using appropriate examples, and with reference to income elasticity of demand (YED), distinguish between necessity goods and luxury goods. *[4 marks]*

- The value of YED for necessities is between 0 and 1. This is because a change in real income will not cause a greater than proportional change in spending on necessity products, such as staple food items, mobile phone services, or Wi-Fi service fees. In other words, the spending on essential goods and services is largely independent of the level of real consumer income.
- By contrast, luxury goods have a YED > 1, i.e. the demand for luxury foods is highly income elastic. An increase in real income is likely to cause the demand for luxury goods and services to increase by a proportionately larger amount.

4) With reference to the diagram, determine what the Engel curve suggests about the product. *[2 marks]*

The upwards sloping Engel curve depicted in the diagram represents a normal good, i.e. as real income levels rise, so too does the quantity demanded. This would apply to the case of both necessity goods and luxury (superior) goods.

5) Suppose that when people's real income increases by 10%, the demand for education increases by 13%. Suggest what kind of product education would be classified as. *[2 marks]*

In this case, education is considered as a normal good because the percentage change in quantity of education demanded (13%) is proportionately more than the percentage increase in real income (10%).

6) Suppose average real income increases from $2,000 to $2,300 per month and the demand for organic fruits increases from 10kg to 13kg per month. Calculate the income elasticity of demand (YED) for organic fruits and comment on your findings. *[3 marks]*

- YED = %△Qd / %Y
- YED = [(13 – 10) / 10] × 100% ÷ [(2,300 – 2,000) / 2,000] × 100%
- YED = 30% / 15% = **+2.0**, i.e. the demand for organic fruits is highly income elastic.

7) Explain why it might be difficult to classify economy class air travel as either an inferior good or as a normal good. *[3 marks]*

Air travel may be considered by most people as a luxury good, especially as it tends to take up a large proportion of consumers' incomes. However, economy class air travel can be (relatively) cheap, especially those offered by low budget airlines. By contrast, only those on relatively high incomes who are willing to pay can travel on business class or first class (superior services). Over time and in theory, as real incomes rise, some people are likely to switch from economy to business class air travel (replacing inferior air travel with luxury or superior air travel).

Worksheet 12
2.5 Elasticity and Total revenue

1) define the term *total revenue (TR).* *[2 marks]*

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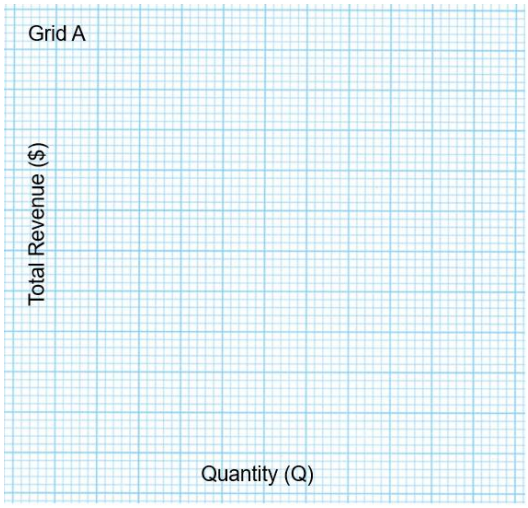
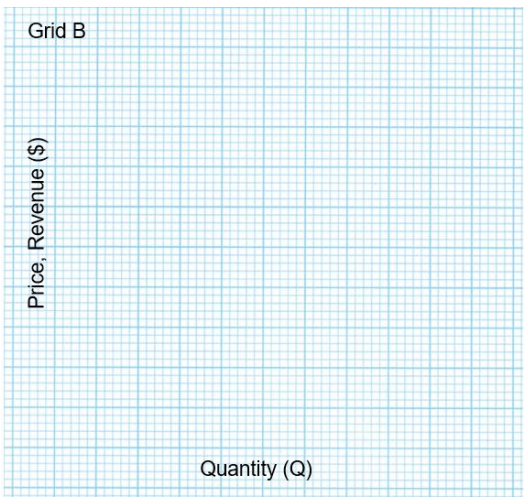
2) The table below shows the price and quantity demanded of Product X produced by Firm Y. Determine the total revenue of the product at each price level. *[2 marks]*

Price	Quantity demanded (units sold)	TR ($)
0	500	
10	450	
20	400	
30	350	
40	300	
50	250	
60	200	
70	150	
80	100	
90	50	
100	0	

3) Plot the total revenue curve in Grid A and the demand curve of Product X in Grid B. *[4 marks]*





4) Determine the price of Product X which would yield the highest revenue for Firm Y. *[2 marks]*

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5) Describe what happens to total revenue if the price elasticity of demand (PED) of Product X is 1. *[2 marks]*

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6) Calculate the price elasticity of demand (PED) if the price changes from $80 to $70 and from $40 to $30. *[3 marks]*

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7) Comment on your answers in Question 6. *[2 marks]*

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Worksheet 12
2.5 Elasticity and Total revenue

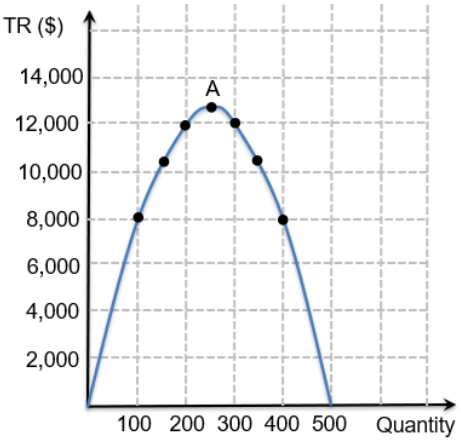
Answers

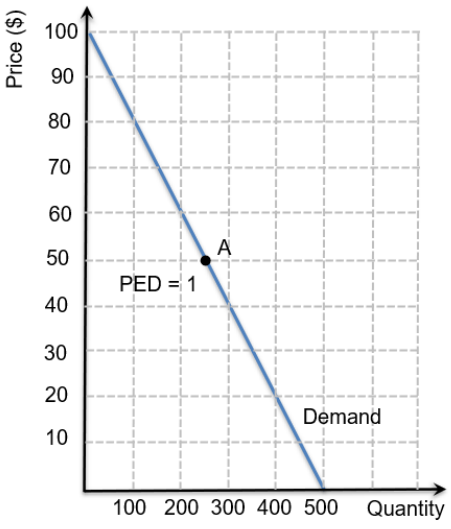
1) Define the term *total revenue (TR).* *[2 marks]*

Total revenue is the amount of money that a firm earns by selling its goods and/or services over a given period of time. It is calculated by the formula Total Revenue = Price × Quantity sold, or TR = P × Q.

2) The table below shows the price and quantity demanded of Product X produced by Firm Y. Determine the total revenue of the product at each price level. *[2 marks]*

Price	Quantity demanded (units sold)	TR ($)
0	500	0
10	450	4,500
20	400	8,000
30	350	10,500
40	300	12,000
50	250	12,500
60	200	12,000
70	150	10,500
80	100	8,000
90	50	4,500
100	0	0





3) Plot the total revenue curve in Grid A and the demand curve of Product X in Grid B *[4 marks]*

See diagram to the left.

4) Determine the price of Product X which would yield the highest revenue for Firm Y. *[2 marks]*

From the table above, it is clear that TR is maximized ($12,500) when Firm Y sets the price of Product X at $50.

5) Describe what happens to total revenue if the price elasticity of demand (PED) of Product X is 1. *[2 marks]*

Point A on Grid B shows the situation when PED = 1. It is the mid-point along the linear demand curve for Product X. Total revenue is maximized (as seen in Grid A) when the price elasticity of Product X is 1 (as seen in Grid B).

6) Calculate the price elasticity of demand (PED) if the price changes from $80 to $70 and from $40 to $30. *[3 marks]*

- From $80 to $70: PED = [(150 – 100) /100] / [(70 – 80) / 80] = +50% / -12.5% = -4.0
- From $40 to $30: PED = [(350 – 300) /300] / [(30 – 40) / 40] = +16.67% / -25% = -0.67

7) Comment on your answers in Question 6. *[2 marks]*

The PED of Product X is not constant across all prices along the given demand curve. The PED value changes from being highly price elastic (-4.0) to being relatively price inelastic (-0.66), i.e. the PED falls in value when price falls along a demand curve. The upper part of the demand curve (to the left of the mid-point shown by point A) is price elastic and TR falls with an increase in price (shown in Grid A). However, the lower part of the demand curve (to the right of point A) is price inelastic so with an increase in price, the TR decreases.

Worksheet 13
2.5 The Engel curve

1) Distinguish between *normal goods* and *inferior goods*. *[2 marks]*

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2) Define the term *Engel curve*. *[2 marks]*

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3) Use the information below to calculate the value of income elasticity of demand (YED) and determine the type of good (inferior, necessity, or luxury) in each case.

   i) Consumers visit the cinema more regularly (from 8 to 10) per year as their annual salaries have increased by 30%. *[2 marks]*

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   ii) Japanese travellers decide to visit Thailand twice in 2021, as opposed to the single visit they made in 2020, after having received an extra 5% increase in real incomes. *[2 marks]*

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   iii) The demand for Blu-ray DVD players fell by 300,000 in 2021, from a total of 1.8 million in 2020, even though the average income rose by 2.5%. *[2 marks]*

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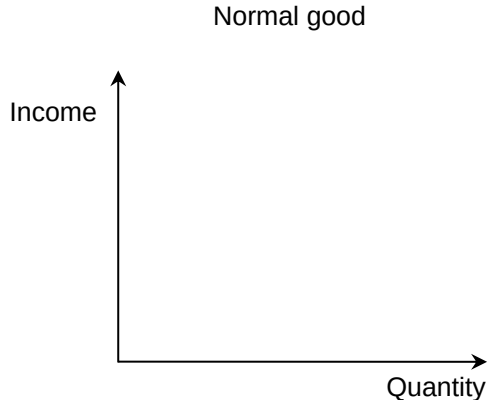
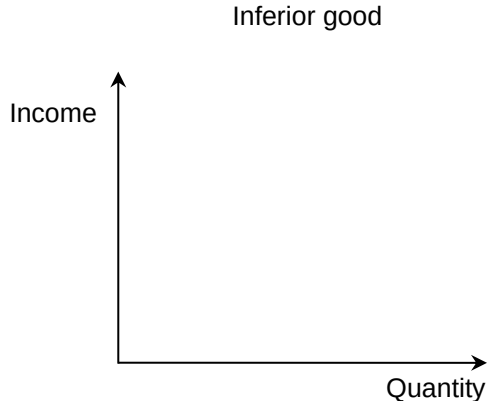
4) Using the axes below, draw Engel curves for (a) a normal good, and (b) an inferior good. *[2 marks]*





Worksheet 13
2.5 The Engel curve

Answers

1) Distinguish between *normal goods* and *inferior goods*. *[2 marks]*

A **normal good** is a product that experiences an increase in its demand due to a rise in consumers' real income. In other words, if there is an increase in wages or salaries, the demand for normal goods increases, *ceteris paribus*. An **inferior good** is an economic term that describes a product whose demand drops when people's real incomes rise. This occurs when a product has more costly substitutes that tend to see an increase in demand as incomes and the economy improve.

2) Define the term *Engel curve*. *[2 marks]*

An Engel curve describes how household expenditure on a particular good or service varies with household income (see Question 4 for the diagrammatic representations).

3) Use the information below to calculate the value of income elasticity of demand (YED) and determine the type of good (inferior, necessity, or luxury) in each case.

i) Consumers visit the cinema more regularly (from 8 to 10 times) per year as their annual salaries have increased by 30%. *[2 marks]*

- YED = [(10 – 8) / 8] × 100% ÷ 30% = 25% / 30% = **0.83**
- Hence, visits to the cinema/movie theatre are considered as a necessity product in this case.

ii) Japanese travellers decide to visit Thailand twice in 2021, as opposed to the single visit they made in 2020, after having received an extra 5% increase in real incomes. *[2 marks]*

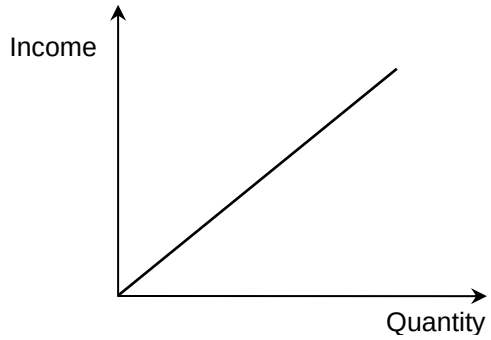
- YED = [(2 – 1) / 1] × 100% ÷ 5% = 100% / 5% = **20**
- Holidaying in Thailand is therefore a highly luxurious product in this case.

iii) The demand for Blu-ray DVD players fell by 300,000 in 2021, from a total of 1.8 million in 2020, even though the average income rose by 2.5%. *[2 marks]*

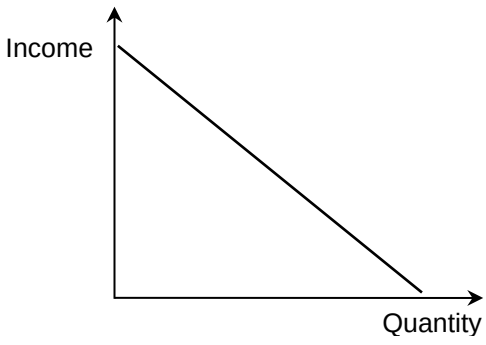
- YED = (-)300,000 / 1,800,000 × 100% ÷ 2.5% = (-)16.66% / 2.5% = **-6.67**
- Hence, Blu-ray DVD players are inferior goods in this case.

4) Using the axes below, draw Engel curves for (a) a normal good, and (b) an inferior good. *[2 marks]*

Normal good



Inferior good



Worksheet 14
2.7 Taxation (1)

1) define the term *specific tax*. *[2 marks]*

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2) Plot the demand and supply curves from the following schedule. *[3 marks]*

3) Plot the new supply curve when a per unit tax of $15 is implemented. *[1 mark]*

Price ($)	Quantity demanded	Price ($)	Quantity supplied
0	30	5	0
30	0	25	30

4) Following the imposition of the tax, the price increases to $18 and quantity demand contracts to 12 units. Calculate the value of consumer surplus before **and** after the tax has been imposed, and comment on your result. *[4 marks]*

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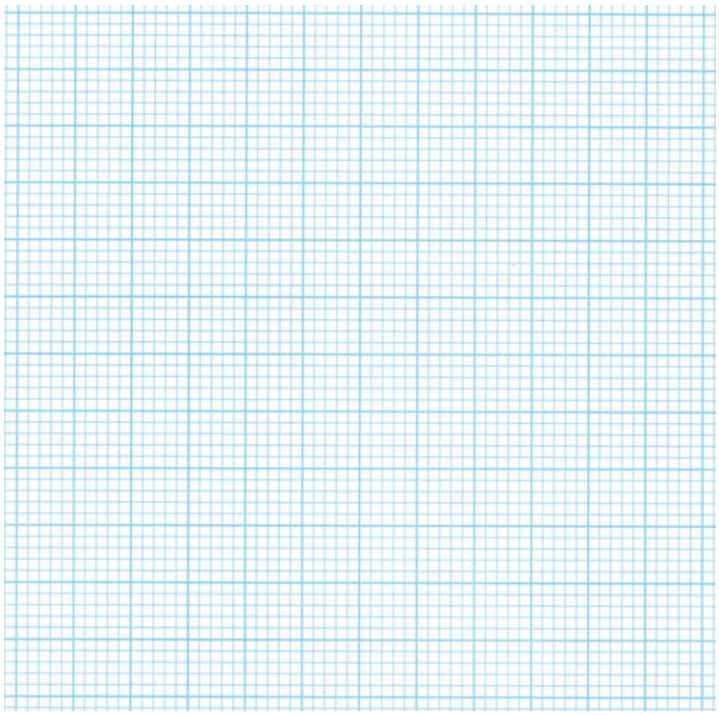

5) Calculate the value of producer surplus before **and** after the tax has been imposed, and comment on your result. *[4 marks]*

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6) Calculate the value of the tax revenue from the imposition of the per unit tax. *[2 marks]*

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Worksheet 14
2.7 Taxation (1)

Answers

1) Define the term *specific tax*. *[2 marks]*

A specific tax is a per unit tax, involving the imposition of a fixed amount of duty on each product sold, such as $5 per packet of cigarettes.

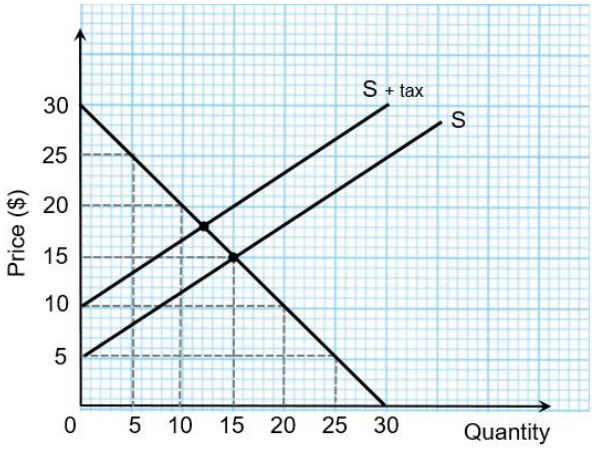
2) Plot the demand and supply curves from the following schedule. *[3 marks]*

Price ($)	Quantity demanded	Price ($)	Quantity supplied
0	30	5	0
30	0	25	30

See graph.

3) Plot the new supply curve following the imposition of a $5 per unit tax. *[1 mark]*

See graph.



4) Following the imposition of the tax, the price increases to $18 and quantity demand contracts to 12 units. Calculate the value of consumer surplus before **and** after the tax has been imposed, and comment on your result. *[4 marks]*

- At $15 (original market price), consumer surplus = [(30 – 15) × 15] / 2 = $112.50.
- At $18 (after the tax is imposed) consumer surplus = [(30 – 18) × 12] / 2 = $72.
- Hence, the tax has reduced consumer surplus by $40.5 (from $112.50 to $72).

5) Calculate the value of producer surplus before **and** after the tax has been imposed, and comment on your result. *[4 marks]*

- At $15 (original market price), producer surplus = [(15 – 5) × 15] / 2 = $75.
- At $18 (after the tax is imposed) producer surplus = [(18 – 10) × 12] / 2 = $48.
- Hence, the tax has reduced producer surplus by $27 (from $75 to $48).
- In this case, the producer surplus has fallen as firms do not benefit from the price increasing (from $15 to $18) as a part of this goes to the government (due to the $5 per unit tax).

6) Calculate the value of the tax revenue from the imposition of the per unit tax. *[2 marks]*

- Tax revenue = Per unit tax × Quantity traded
- Tax revenue = $5 × 12 = $60.

Worksheet 15
2.7 Taxation (2)

1) define the term *indirect tax.* *[2 marks]*

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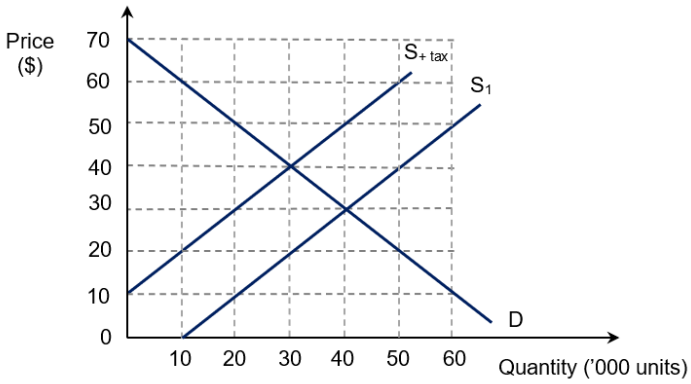
2) Refer to the graph below and answer the questions that follow.



i. Calculate the total tax revenue collected by the government from the imposition of the tax. *[2 marks]*

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ii. Calculate the incidence of tax paid by consumers. *[2 marks]*

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iii. Calculate the change in consumer spending following the imposition of the indirect tax. *[2 marks]*

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iv. From your answer in Question 2 iii, comment on the value of price elasticity of demand (PED) for the product. *[2 marks]*

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v. Calculate the welfare loss resulting from the imposition of the tax. *[2 marks]*

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vi. Calculate the value of producer surplus after the imposition of the tax. *[2 marks]*

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vii. Calculate the change in the value of consumer surplus after the tax has been imposed. *[2 marks]*

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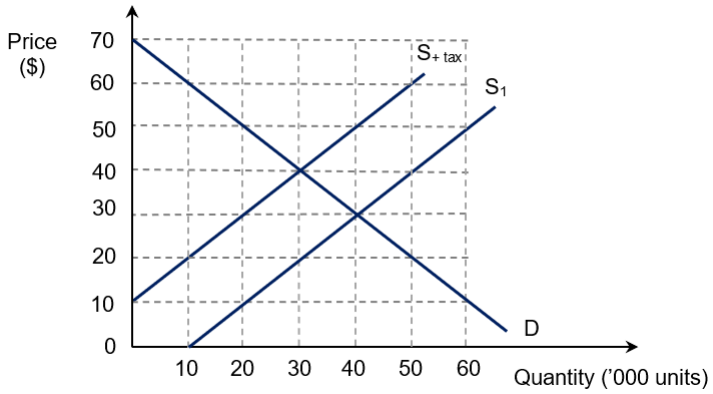
Answers

1) Define the term *indirect tax.* *[2 marks]*

An indirect tax is a government levy or charge on expenditure. It is imposed on the purchase of certain goods and services.

2) Refer to the graph below and answer the questions that follow.



i. Calculate the total tax revenue collected by the government from the imposition of the tax. *[2 marks]*

- Per unit tax = $40 – $20 (the vertical distance between the two supply curves) = $20
- Quantity traded after imposition of the tax = 30,000 units
- Hence, total tax revenue = 30,000 × $20 = **$600,000**

ii. Calculate the incidence of tax paid by consumers. *[2 marks]*

- Consumers used to pay $30 but now pay $40, i.e. an extra $10 per unit
- Equilibrium quantity is now 30,000 units
- Therefore, the total tax burden imposed on consumers = 30,000 × $10 = $300,000

iii. Calculate the change in consumer spending following the imposition of the indirect tax. *[2 marks]*

- Consumers used to spend $30 × 40,000 units = $120,000
- They now spend $40 × 30,000 units = $120,000
- Hence, there is no change in total consumer spending after imposition of the indirect tax.

iv. From your answer in Question 2 iii, comment on the value of price elasticity of demand (PED) for the product. *[2 marks]*

The PED value is 1.0 because the change in price following the imposition of the tax (from $30 to $40) has not caused consumers to change the total amount of spending on the product ($120,000).

v. Calculate the welfare loss resulting from the imposition of the tax. *[2 marks]*

- The welfare loss is the fall in the value of social surplus (consumer surplus + producer surplus) in relation to the pre-tax price of $30
- It is equal to the triangular area [($40 – $20) × (40,000 – 30,000] / 2
- Welfare loss = ($20 × 10,000) / 2 = $100,000.

vi. Calculate the value of producer surplus after the imposition of the tax. *[2 marks]*

- Producer surplus is the difference between what suppliers receive ($20 after imposition of the tax) above the price they are willing and able to supply.
- The new producer surplus is shown by the triangular area above the supply curve, under the horizontal price they receive ($20).
- Hence, producer surplus = ($20 × 10,000) + [($20 – $0) × (30,000 – 10,000)] / 2 = $200,000 + $200,000 = $400,000.

vii. Calculate the change in the value of consumer surplus after the tax has been imposed. *[2 marks]*

- Original consumer surplus = [($70 – $30) × 40,000] / 2 = $800,000
- Consumer surplus after imposition of the indirect tax = [($70 – $40) × 30,000] / 2 = $450,000
- Hence, the change in consumer surplus = $450,000 – $800,000 = -$350,000.

Worksheet 16
2.7 Subsidies (1)

1) Consider the following demand and supply curves for educational textbooks (quantity in thousands). State the equilibrium price and the quantity from the diagram. *[2 marks]*

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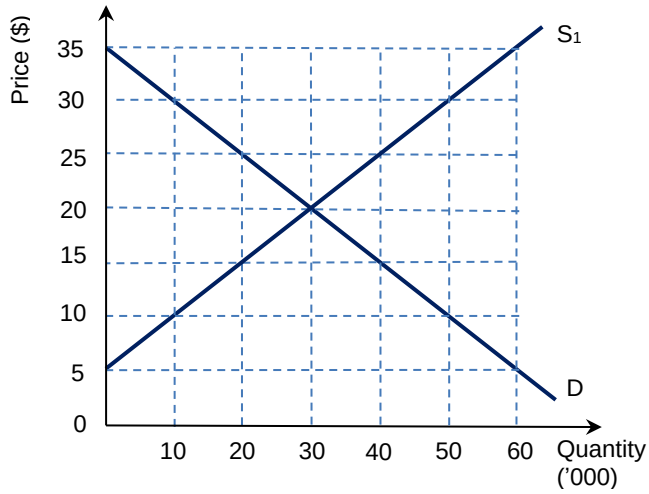

2) Suppose the government decides to offer a per-unit subsidy of $10. Plot this in the diagram. *[2 marks]*

3) Calculate the new consumer surplus after the subsidy has been implemented **and** the change in consumer surplus. *[4 marks]*

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4) Calculate the new producer surplus after the subsidy has been implemented **and** the change in producer surplus. *[4 marks]*

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5) calculate the cost of the subsidy to the government. *[2 marks]*

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6) Calculate the value of the welfare loss **and** indicate the area in the diagram above. *[3 marks]*

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7) Explain the meaning of welfare loss in the case of a subsidy. *[2 marks]*

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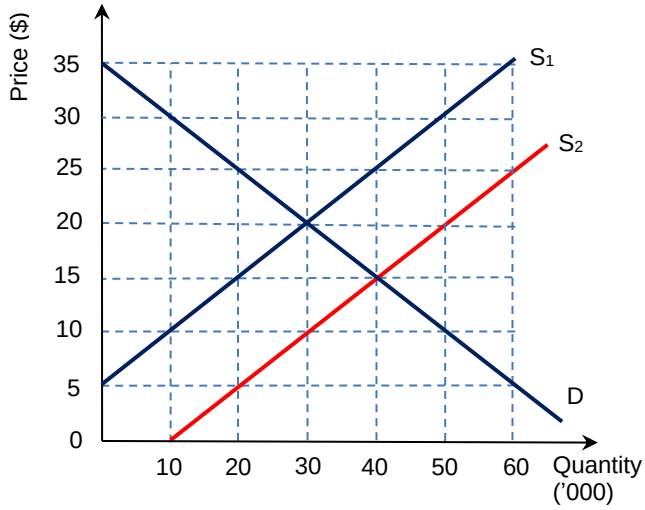
Worksheet 16
2.7 Subsidies (1)

Answers

1) Consider the following demand and supply curves for educational textbooks (quantity in thousands). State the equilibrium price and the quantity from the diagram. *[2 marks]*

Equilibrium price = $20 and equilibrium quantity = 30,000 units

2) Suppose the government decides to offer a per-unit subsidy of $10. Plot this in the diagram. *[2 marks]*



3) Calculate the new consumer surplus after the subsidy has been implemented **and** the change in consumer surplus. *[4 marks]*

- Consumer surplus before the subsidy = [(35 – 20) × 30,000] / 2 = $225,000
- Consumer surplus after the subsidy = [(35 – 15) × 40,000] / 2 = $400,000
- After the subsidy is implemented, consumer surplus increases by $400,000 – $225,000 = **$175,000**

4) Calculate the new producer surplus after the subsidy has been implemented **and** the change in producer surplus. *[4 marks]*

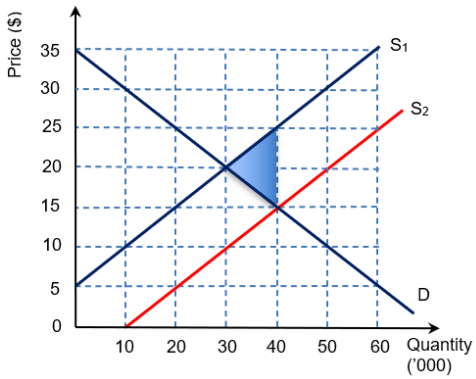
- Producer surplus before subsidy = [(20 – 5) × 30,000] / 2 = $225,000
- Producer surplus after subsidy = [(25 – 5) × 40,000] / 2 = $400,000
- After the subsidy has been implemented, producer surplus has increased by $400,000 – $225,000 = **$175,000**

5) Calculate the cost of the subsidy to the government. *[2 marks]*

- Subsidy = Per unit subsidy × Quantity sold = ($25 – $15) × 40,000
- Subsidy = $10 × 40,000 = **$400,000**

6) Calculate the value of the welfare loss **and** indicate the area in the diagram. *[3 marks]*

- Welfare loss = Subsidy – (Gain in consumer surplus + Gain in producer surplus)
- Welfare loss = $400,000 – ($175,000 + $175,000) = **$50,000**



7) Explain the meaning of welfare loss in the case of a subsidy. *[2 marks]*

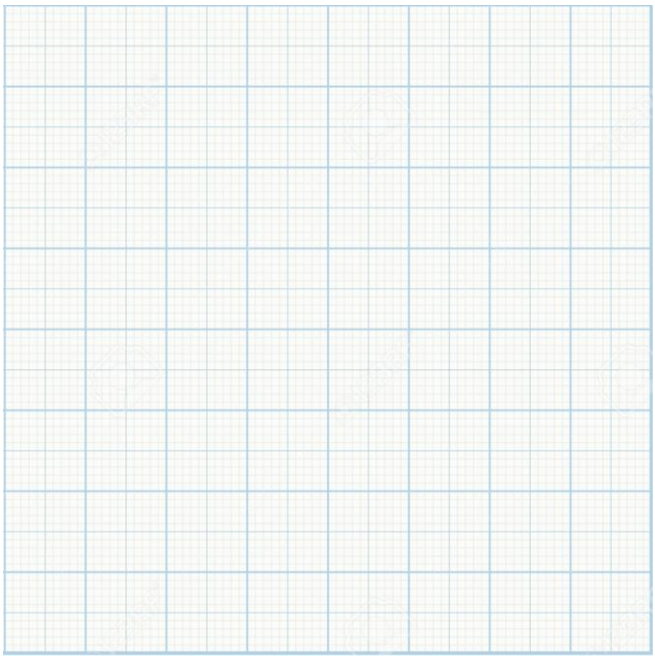
A welfare loss in the case of a subsidy means that the surplus gained (from consumers paying a lower price and firms receiving the producer subsidy) is less than the value spent on the subsidy by the government, resulting in a welfare loss.

Top Tip: The welfare loss is not necessarily expressed as a monetary value even though the subsidy is a monetary figure. This is because when consumers gain consumer surplus, they just gain utility/happiness from buying something cheaper than they were willing and able to pay and do not actually gain any money in the process. Hence, the welfare loss can be described as the value that expresses the loss in economic efficiency.

Worksheet 17
2.7 Subsidies (2)

1) Use the demand and supply schedules for calculators below to plot the demand and supply curves. *[4 marks]*

Price ($)	Quantity demanded ('000)	Price ($)	Quantity supplied ('000)
20	0	5	0
12.5	15	12.5	15



2) Describe the excess supply of calculators if a price ceiling of $15 is imposed. *[2 marks]*

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3) Calculate the excess demand of calculators if the price ceiling is set at $10. *[2 marks]*

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4) Calculate the change in producer surplus if the price ceiling is set at $10. *[3 marks]*

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5) Calculate the excess supply of calculators if a price floor is set at $19. *[2 marks]*

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6) Calculate how much the government would have to spend in order to purchase the excess supply. *[2 marks]*

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7) Show the area of welfare loss in the diagram above. *[1 mark]*

8) Calculate the loss in community surplus following government intervention with a price floor set at $19. *[2 marks]*

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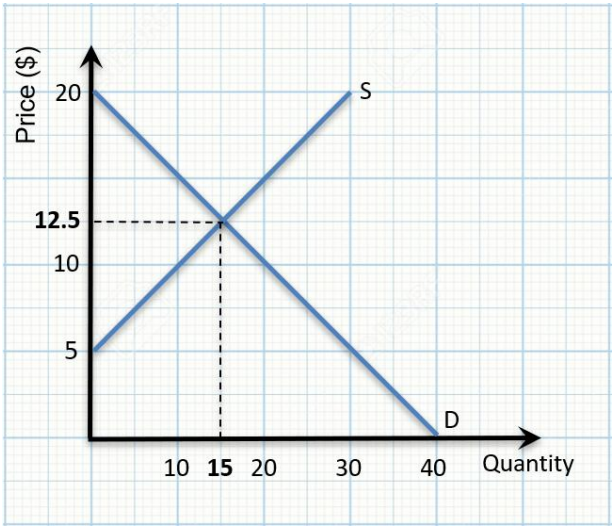
Answers

1) Use the demand and supply schedules for calculators below to plot the demand and supply curves. *[4 marks]*



Price ($)	Quantity demanded ('000)	Price ($)	Quantity supplied ('000)
20	0	5	0
12.5	15	12.5	15

2) Describe the excess supply of calculators if a price ceiling of $15 is imposed. *[2 marks]*

Excess supply would be 0, i.e. there is no excess supply. This is because the price ceiling ($15) would be set *above* the market equilibrium ($12.5). A price ceiling is the *maximum* price that firms can legally charge, but this would not be effective as a form of intervention in the case of the market (equilibrium) price being lower.

3) Calculate the excess demand of calculators if the price ceiling is set at $10 *[2 marks]*

- When Price = $10, Q_d = 40,000 and Q_s = 10,000
- Excess demand = 20,000 – 10,000 = **10,000** calculators

4) Calculate the change in producer surplus if the price ceiling is set at $10. *[3 marks]*

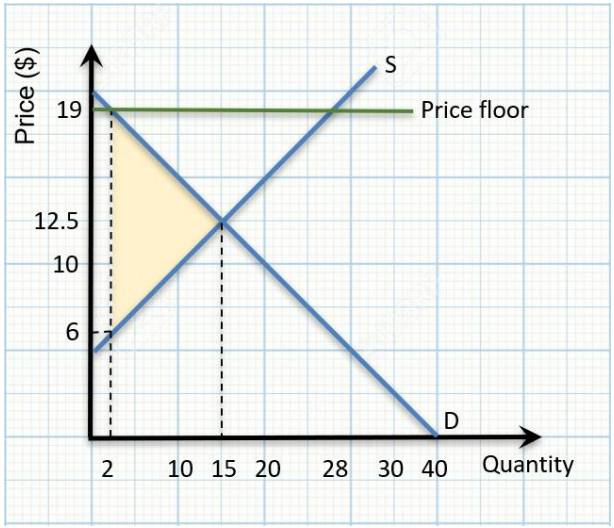
- When P = $12.5, producer surplus = [(12.5 – 5) × 15,000] / 2 = $56,250
- When P = $10, producer surplus = [(10 – 5) × 10,000] / 2 = $25,000
- Change in producer surplus = 25,000 – 56,250 = -31,250
- Hence, producer surplus *falls* by **$31,250**

5) Calculate the excess supply of calculators if a price floor is set at $19. *[2 marks]*

- When price = $19, Q_d = 2,000 and Q_s = 28,000
- Excess supply = 28,000 – 2,000 = **26,000** calculators

6) Calculate how much the government would have to spend in order to purchase the excess supply. *[2 marks]*

- Money spent by government = Price at price floor × Excess supply
- Money spent by government = $19 × 26,000 = **$494,000**



7) Show the area of welfare loss in the diagram above. *[1 mark]*

See shaded area (the welfare loss to society following the imposition of the price floor, which reduces both consumer and producer surplus).

8) Calculate the loss in community surplus following government intervention with a price floor set at $19. *[2 marks]*

- Welfare loss = [(19 – 6) × (15 – 2)] / 2
- ($13 × 13,000) / 2 = **$84,500**

Worksheet 18
2.8 Market Failure – Negative Externalities

1) Define the term *negative externalities of production*. *[2 marks]*

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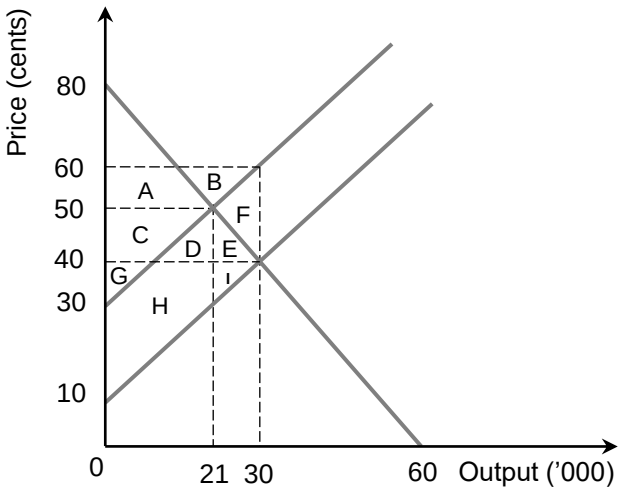
2) The graph below represents a firm producing plastic carrier bags for a chain of supermarkets. Label the supply and demand curves in the context of the negative externality created. *[3 marks]*



3) With reference to the diagram, explain the area that shows the total external costs. *[2 marks]*

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4) Calculate the size of the welfare loss to society as a result of the negative externality created by the production of plastic carrier bags. *[2 marks]*

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5) Explain the amount of per-unit tax that the government should charge to eradicate the negative externality of production. *[2 marks]*

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6) If the government decides to implement the per unit tax, calculate the tax revenue earned by the government. *[2 marks]*

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7) Apart from imposing a per-unit tax, explain **one** other way that the government could use to correct this negative externality of production. *[2 marks]*

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Worksheet 18
2.8 Market Failure – Negative Externalities

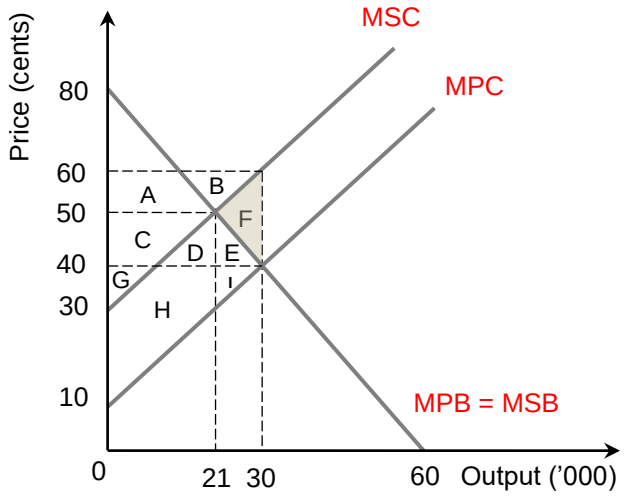
Answers

1) Define the term *negative externalities of production*. *[2 marks]*

A negative externality of production is the extra burden that must bear by a third party as a result of an external cost created by producers. River pollution as a result of chemical wastes dumped in a river by a Chemical factory would be an example of negative externalities of production.

2) The graph below represents a firm producing plastic carrier bags for a chain of supermarkets. Label the supply and demand curves in the context of the negative externality created. *[3 marks]*

See MSC, MPC, and MPB = MSB curves labelled below



3) With reference to the diagram, explain the area that shows the total external costs. *[2 marks]*

The value of the external cost at each level of output is the difference between marginal social cost (MSC) and marginal private cost (MPC), up to 30,000 plastic bags in this case.

Hence, the value of the total external cost is equal to the area D+E+H+I.

4) Calculate the size of the welfare loss to society as a result of the negative externality created by the production of plastic carrier bags. *[2 marks]*

- Welfare loss to the society is denoted by the triangular area F, caused by the overproduction of plastic carrier bags.
- Welfare loss = [(60,000 – 40,000) × ($30 – $21)] / 2 = (20,000 × $9) / 2 = **¢90,000**
- Accept answers that state **$900.**

5) Explain the amount of per-unit tax that the government should charge to eradicate the negative externality of production. *[2 marks]*

- The negative production externality is shown by the vertical distance between MSC and MPC at each level of output.
- The per unit tax to eradicate the negative externality in this situation is ¢60 – ¢40 for 30,000 units of output = ¢20
- Accept answers that show $0.60 – $0.40 = $0.20.

6) If the government decides to implement the per unit tax, calculate the tax revenue earned by the government. *[4 marks]*

- The tax revenue as a result of the $0.20 per unit tax = ¢20 × 30,000 = 600,000 cents
- Accept answers that show $0.2 × 30,000 = $6,000.

7) Apart from imposing a per-unit tax, explain **one** other way that the government could use to correct this negative externality of production. *[2 marks]*

Answers will vary, but could include an explanation of using: (i) legislation and/or regulation to prevent and/or reduce the production level of plastic carrier bags that cause negative production externalities, (ii) education to encourage firms and the general public to switch away from the use of plastic carrier bags, (iii) subsidise the production of reusable and/or biodegradable bags.

Worksheet 19
2.9 Market failure – Positive externalities

1) Define the term *positive externality*. *[2 marks]*

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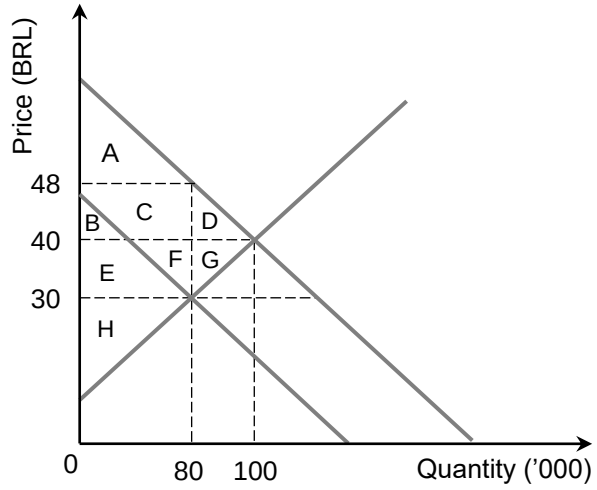
2) The diagram below shows the use of COVID-19 vaccinations in Brasilia. Label the supply and demand curves in the context of the positive externality. The price is in Brazilian reals (BRL). *[3 marks]*



3) With reference to the diagram, if the value of the external benefit is the difference between the marginal social benefit (MSB) and marginal private benefit (MPB) curves up to 80,000 doses, state the area that shows the external benefit of consumption. *[1 mark]*

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4) Outline why the production of vaccinations might create positive externalities. *[2 marks]*

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5) Calculate the size of the welfare loss shown in the diagram above. *[2 marks]*

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6) Assume the government decides to use a subsidy to eradicate the welfare loss. Show on the diagram above the changes in the demand and/or supply curves to reflect this intervention. *[2 marks]*

7) Calculate the value of the subsidy. *[2 marks]*

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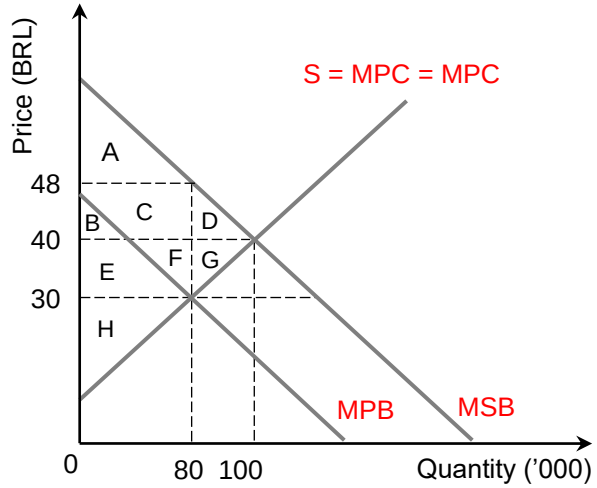
Worksheet 19
2.9 Market failure – Positive externalities

Answers

1) Define the term *positive externality*. *[2 marks]*

A positive externality (of production and consumption) refers to the benefit enjoyed by a third party from an economic transaction. For example, the production and consumption of merit goods such as vaccinations ensures that the external benefit is enjoyed by a third party.

2) The diagram below shows the use of COVID-19 vaccinations in Brasilia. Label the supply and demand curves in the context of the positive externality. The price is in Brazilian reals (BRL). *[3 marks]*



3) With reference to the diagram, if the value of the external benefit is the difference between the marginal social benefit (MSB) and marginal private benefit (MPB) curves up to 80,000 doses, state the area that shows the external benefit of consumption. *[1 mark]*

A + C + F

In this specific case, the external benefit is the vertical difference between the MSB and MPB curves at each level of output. So, with up to 80,000 doses, the area representing the sum of external benefits is shown by the areas A + C + F.

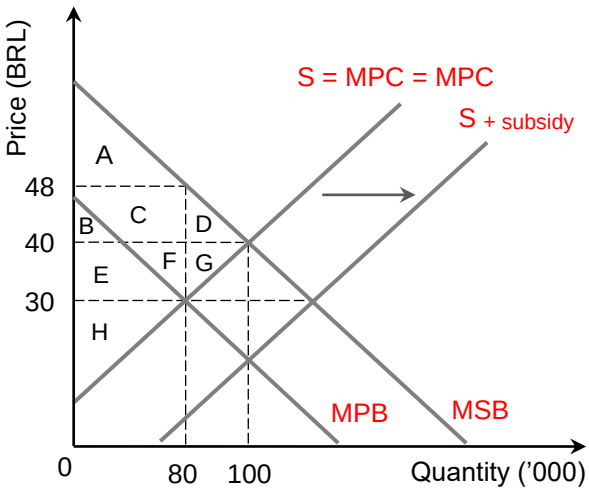
4) Outline why the production of vaccinations might create positive externalities. *[2 marks]*

Positive externalities exist when third parties gain from the spill-over effects of production and/or consumption. For example, society as a whole will gain from the production and use of vaccinations. This includes firms (employers), households (consumers), and the government.

5) Calculate the size of the welfare loss shown in the diagram above. *[2 marks]*

- The welfare loss is shown by the area D + G, which shows the total area where MSB > MSC, due to the underconsumption of vaccinations.
- Hence, the welfare loss = [(48 – 30) × (100 – 80)] / 2 = (18 × 20) / 2 = 180, i.e, 180,000 units or doses.

6) Assume the government decides to use a subsidy to eradicate the welfare loss. Show on the diagram above the changes in the demand and/or supply curves to reflect this intervention. *[2 marks]*



7) Calculate the value of the subsidy. *[2 marks]*

- Value of subsidy = Per unit subsidy × Quantity
- Per unit subsidy = 18 (BRL)
- Output (socially optimal) = 100,000 doses
- Subsidy = BRL18 × 100,000 = BRL1,800,000
- Accept BRL1.8 million

Worksheet 20
2.11 Market power – Revenues (1)

1) State how average revenue (AR) is calculated. *[1 mark]*

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2) Define the term *marginal revenue* (MR). *[2 marks]*

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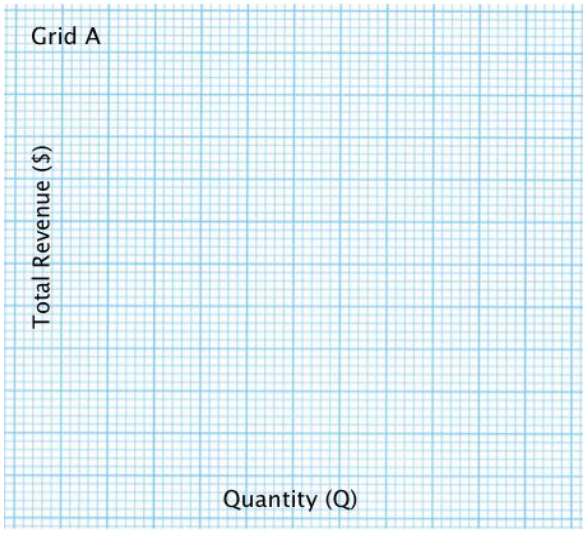
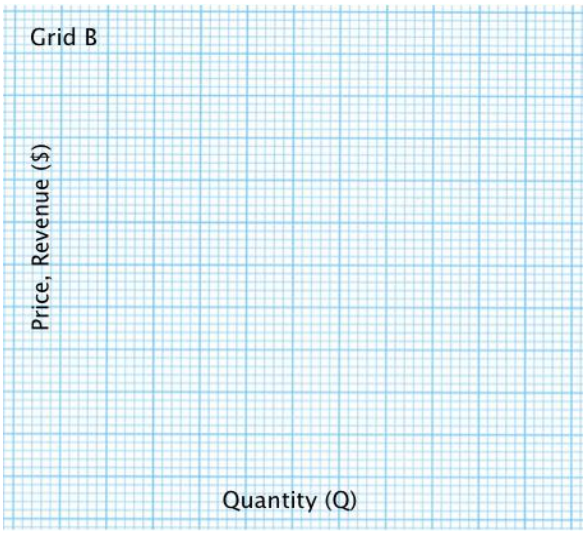
3) The information below shows the daily cost and revenue information of a small manufacturer in Qatar (figures are in Qatari riyal). Complete the table below. *[4 marks]*

Output	Price per unit	Total revenue (TR)	Marginal revenue (MR)	Average revenue (AR)	Total cost (TC)	Marginal cost (MC)
1	50				35	
2	45				45	
3	40				60	
4	35				80	
5	30				105	
6	25				135	
7	20				170	
8	15				210	
9	12				225	





4) Plot the TR curve in Grid A and the AR and MR curves in Grid B above. *[4 marks]*

5) With reference to marginal revenue, identify the output level (from the table above) where total revenue is maximized. *[1 mark]*

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6) Using the table in Question 3, identify the value of average revenue (AR) when the total revenue (TR) is maximized. *[1 mark]*

……

Worksheet 20
2.11 Market power – Revenues (1)

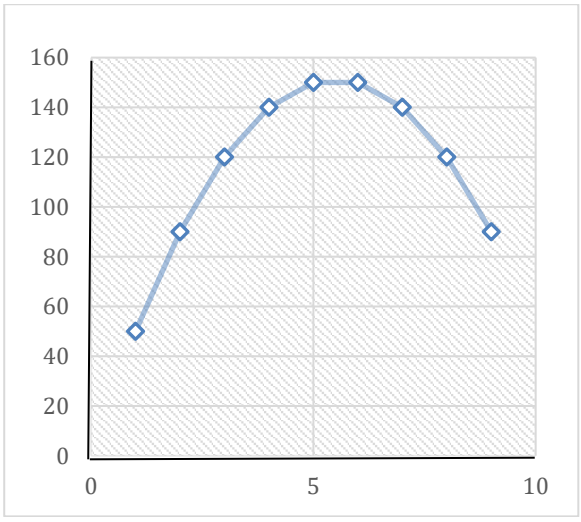
Answers

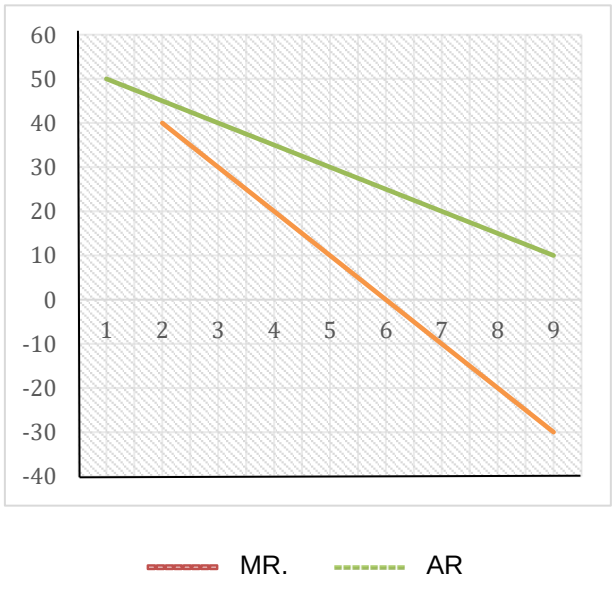
1) State how average revenue (AR) is calculated. *[1 mark]*
Average revenue = Total revenue / Total output.

2) Define the term *marginal revenue* (MR). *[2 marks]*
Marginal revenue (MR) is the additional revenue earned from producing one more unit of product. The formula for calculating marginal revenue is MR = Change in total revenue / Change in output.

3) The information below shows the daily cost and revenue information of a small manufacturer in Qatar (figures are in Qatari riyal). Complete the table below. *[4 marks]*
Award *1 mark* for each column, up to the maximum of *4 marks*. Apply the own figure rule (error carried forward) as appropriate.

Output	Price per unit	Total revenue (TR)	Marginal revenue (MR)	Average revenue (AR)	Total cost (TC)	Marginal cost (MC)
1	50	50		50	35	
2	45	90	40	45	45	10
3	40	120	30	40	60	15
4	35	140	20	35	80	20
5	30	150	10	30	105	25
6	25	150	0	25	135	30
7	20	140	-10	20	170	35
8	15	120	-20	15	210	40
9	10	90	-30	10	240	50





4) Plot the TR curve in Grid A and the AR and MR curves in Grid B above. *[4 marks]*
Award 2 marks for the correct plotting, and 2 further marks for the correct curves

5) With reference to marginal revenue, identify the output level (from the table above) where total revenue is maximized. *[1 mark]*
TR is maximized when MR = 0. This is because if output exceeds the point where MR = 0, marginal cost (MC) will be greater than marginal revenue (MR), thus resulting in a fall in total revenue. The sixth unit of output yields the highest total revenue.

6) Using the table in Question 3, identify the value of average revenue (AR) when the total revenue (TR) is maximized. *[1 mark]*
Average revenue (AR) is 25 riyals when the total revenue (TR) is maximized with the output of 6 units.

Worksheet 21
2.11 Market power – Revenues (2)

1) Outline the difference between *revenue* and *profit*. *[2 marks]*

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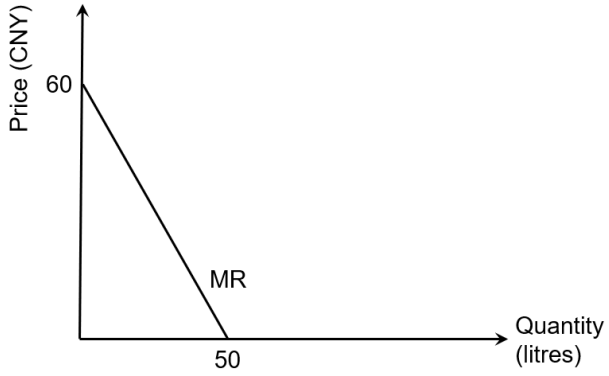
2) Using the following MR curve in the diagram below, sketch the demand curve (average revenue curve) of a local Chinese winery. The currency is in Chinese yuan (CNY). *[2 marks]*



3) Explain why the Average Revenue (AR) curve is the same as the Demand curve. *[2 mark]*

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4) State the shape of the Total Revenue (TR) curve when the Marginal Revenue (MR) is less than zero. *[1 mark]*

……

5) Comment on the price elasticity of demand (PED) for a product that increases in revenue when the price is reduced. *[2 marks]*

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6) Comment on the PED for a product that increases in revenue when the price is increased. *[2 marks]*

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7) Comment on the value of the Marginal Revenue (MR) when the PED for a good is (i) elastic, (ii) inelastic, and (iii) unitary elastic. *[3 marks]*

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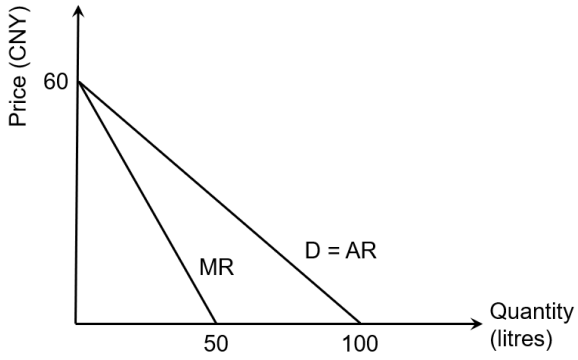
Worksheet 21
2.11 Market power – Revenues (2)

Answers

1) Outline the difference between *revenue* and *profit*. *[2 marks]*

Revenue refers to the money a firm receives from the sales of good or services. Total revenue (TR) can be calculated as TR = Price × Quantity. However, profit is the difference between total sales revenue and total costs, i.e. TR – TC.

2) Using the following MR curve in the diagram below, sketch the demand curve (average revenue curve) of a local Chinese winery. The currency is in Chinese yuan (CNY). *[2 marks]*



3) Explain why the Average Revenue (AR) curve is the same as the Demand curve. *[2 marks]*

- The calculation for average revenue (AR) is Total Revenue / Quantity.
- Total Revenue = Price × Quantity
- So, AR = (Price × Quantity) / Quantity = Price
- Hence AR = P, and since the demand curve shows the quantity demanded at each price, AR represents the demand curve.

4) State the shape of the Total Revenue (TR) curve when the Marginal Revenue (MR) is less than zero. *[1 mark]*

Revenue is maximized when Marginal Revenue (MR) is 0. If the firm produces beyond this point, MR will be negative, so Total Revenue (TR) will decline.

5) Comment on the price elasticity of demand (PED) for a product that increases in revenue when the price is reduced. *[2 marks]*

In this case, the firm sells a product that is price elastic (PED > 1). The gain in total revenue from additional sales will more than cover the loss incurred from selling the product at a lower unit price.

6) Comment on the PED for a product that increases in revenue when the price is increased. *[2 marks]*

In this case, the firm sells a product that is price inelastic (PED < 1). The gain in revenue from charging a higher price will more than compensate for the fall in quantity demanded as the demand is price inelastic.

7) Comment on the value of the Marginal Revenue (MR) when the PED for a good is (i) elastic, (ii) inelastic, and (iii) unitary elastic. *[3 marks]*

(i) The value of MR will be positive when demand is price elastic.
(ii) MR will be negative (i.e. TR will fall) as the percentage change in quantity demanded is less than the percentage change in price.
(iii) MR will be zero when demand is of unitary elasticity, i.e. there is no change in the sales revenue as the percentage change in price is matched by the respective change in quantity demanded.

Worksheet 22
2.11 Market failure – market power: Costs

1) Define the term *marginal cost* (MC). *[2 marks]*

……

2) Define the term *average variable cost* (AVC). *[2 marks]*

……

3) Define the term average fixed cost (AFC). *[2 marks]*

……

4) State the equation for total costs (TC) and average total costs (ATC). *[2 marks]*

……

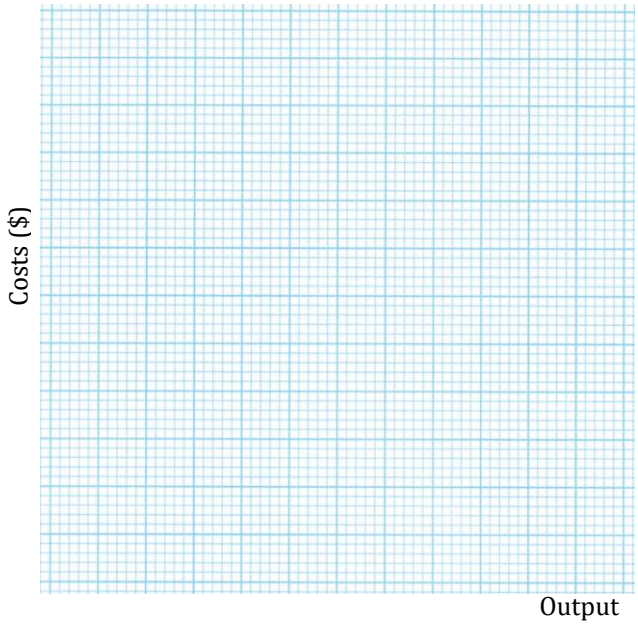
5) Fill in the following table. All values are expressed in US$. One unit of labour = $100. *[4 marks]*

Total product	Input (labour)	TFC	TVC	TC	AFC	AVC	ATC	MC
0	0	150						
3	1							
7	2							
13	3							
20	4							
26	5							
30	6							
32	7							
33	8							

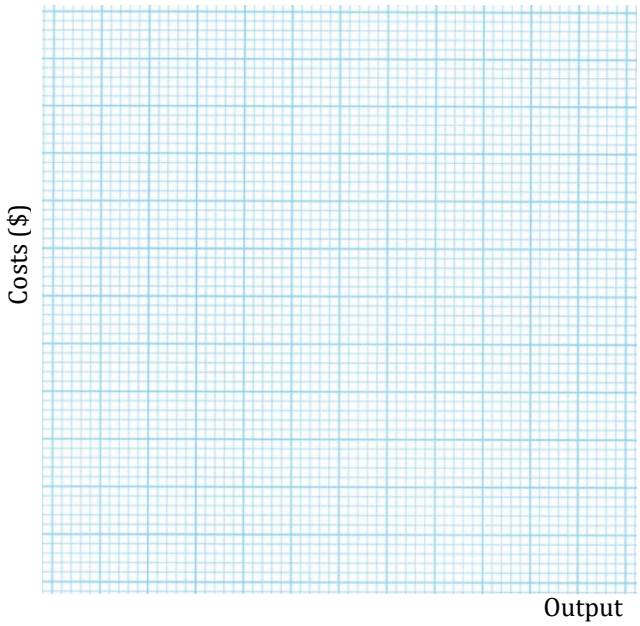
6) Plot the TC, TVC, and TFC curves in Grid A. *[4 marks]*

7) Plot the MC, ATC, AVC, and AFC curves in Grid B. *[4 marks]*

Grid A



Grid B



8) Explain the output level where the marginal cost (MC) curve intersects the average cost (AC) curve. *[2 marks]*

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Answers

1) Define the term *marginal cost* (MC). *[2 marks]*

Marginal cost (MC) can be defined as the extra cost induced by producing one more unit of output. The formula is MC = Change in Cost / Change in output, i.e. △TC / △Q.

2) Define the term *average variable cost* (AVC). *[2 marks]*

Average variable costs (AVC) are the costs that change according to the level of output, expressed in per unit terms, e.g. the raw materials needed to produce a good. The formula is Average variable cost = Total variable cost / Total quantity of output, or AVC = TVC / Q.

3) Define the term average fixed cost (AFC). *[2 marks]*

Average fixed costs (AFC) are costs that do not change according to the level of output (such as rent), expressed in per unit terms. The formula is AFC = Total fixed costs / Output level.

Top Tip: It is important to be aware that fixed costs can change, but just that they are not directly related to the level of production or output of the firm.

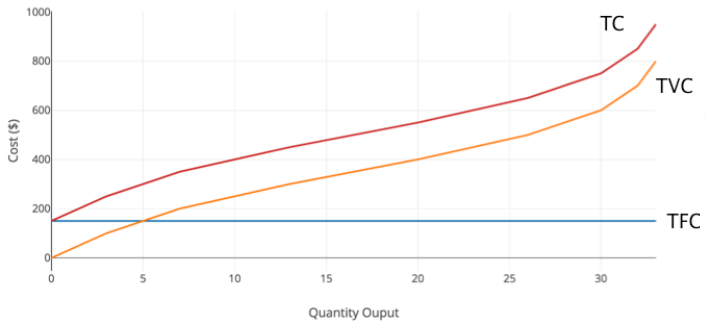
4) State the equation for total costs (TC) and average total costs (ATC). *[2 marks]*

- Total cost = Fixed Cost + Variable cost or TC = FC + VC
- Average total cost = Total cost / Quantity produced or ATC = TC / Q

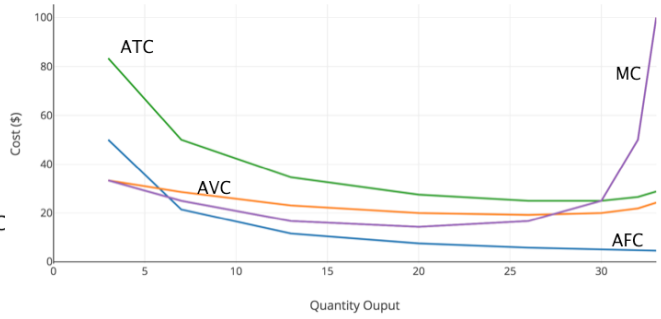
5) Fill in the following table. All values are expressed in US$. One unit of labour = $100. *[4 marks]*

Total Product	Input (labour)	Total FC (TFC)	Total VC (TVC)	TC	AFC	AVC	ATC	MC
0	0	150	0	150	-	-	-	-
3	1	150	100	250	50.00	33.33	83.33	33.33
7	2	150	200	350	21.43	28.57	50.00	25.00
13	3	150	300	450	11.54	23.08	34.62	16.67
20	4	150	400	550	7.50	20.00	27.50	14.29
26	5	150	500	650	5.77	19.23	25.00	16.67
30	6	150	600	750	5.00	20.00	25.00	25.00
32	7	150	700	850	4.69	21.88	26.56	50.00
33	8	150	800	950	4.55	24.24	28.79	100.00

6) Plot the TC, TVC, and TFC curves in Grid A. *[4]*



7) Plot the MC, ATC, AVC, and AFC curves in Grid B. *[4]*



8) Explain the output level where the marginal cost (MC) curve intersects the average cost (AC) curve. *[2 marks]*

The marginal cost (MC) curve intersects the average total cost (ATC) curve when output is 30 units, which is also the minimum point on the ATC curve. The MC curve always cuts the ATC curve at its minimum point because when MC exceeds ATC, the average value is dragged up, i.e. the higher MC lifts the ATC.

Top Tip: Imagine that the average height of the people in a room is 1.8m. If the height of the next person who steps in the room ("marginal height") is taller than 1.8m, then the value of the new average height will be more than 1.8m.

Worksheet 23
2.11 Market power – Perfect competition (1)

1) Define the term *perfect competition*. *[2 marks]*

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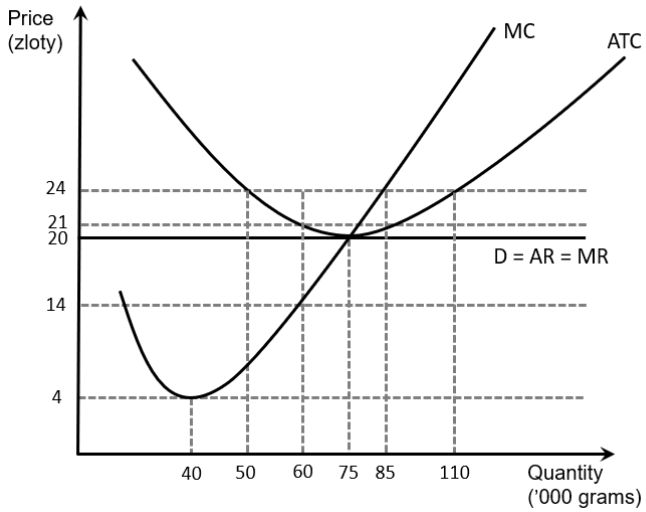
Questions 2 – 6 refer to the diagram below.



2) The diagram below shows the cost and revenue curves for a fish market in Krakow, with firms operating in a perfectly competitive market. Prices are in zloty per kg and the quantity in thousands of grams.

   a. Label the axes, average total cost curve, and the marginal cost curve. *[4 marks]*

   b. Identify the profit maximizing output from the diagram. *[1 mark]*

3) Explain why the average revenue (AR) curve is perfectly price elastic for firms operating in perfect competition. *[2 marks]*

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4) Calculate the revenue that fish sellers earn if the market price is 24 zloty. *[2 marks]*

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5) Calculate the profit if the market price increases to 24 zloty. *[2 marks]*

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6) Calculate the loss if the market price falls to 14 zloty. *[2 marks]*

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Worksheet 23
2.11 Market power – Perfect competition (1)

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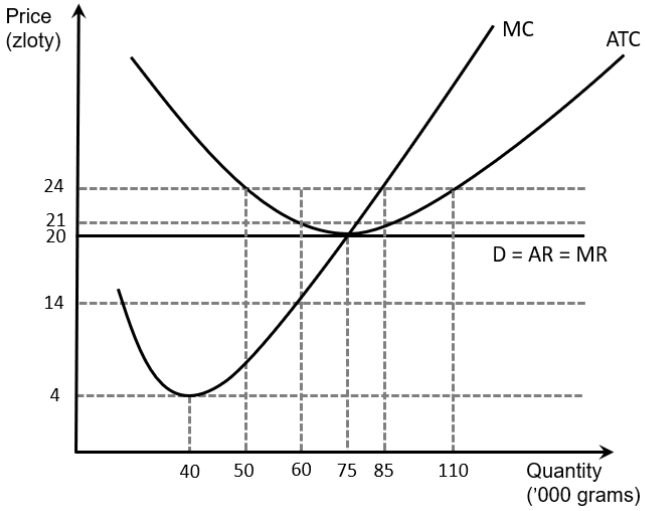
Answers

1) Define the term *perfect competition*. *[2 marks]*

Perfect competition is a form of market structure that is characterized by a high degree of competition, with no firm being large enough to influence the market price or the quantity sold.

Questions 2 – 6 refer to the diagram below.



2) The diagram below shows the cost and revenue curves for a fish market in Krakow, with firms operating in a perfectly competitive market. Prices are in zloty per kg and the quantity in thousands of grams.

   a. Label the axes, average total cost curve, and the marginal cost curve. *[4 marks]*

   b. Identify the profit maximizing output from the diagram. *[1 mark]*
   The profit maximization level of output = 75,000 grams (where MC = MR).

3) Explain why the average revenue (AR) curve is perfectly price elastic for firms operating in perfect competition. *[2 marks]*

The demand curve (D = AR) is horizontal, intersecting the y-axis at the market price because all firms in perfect competition are price takers, i.e. they face a perfectly price elastic demand curve.

4) Calculate the revenue that fish sellers earn if the market price is 24 zloty. *[2 marks]*

Under the profit maximizing condition (MC = MR), firms in the market will sell 85,000 grams.
Therefore, the revenue will be: 24 × 85 kg= 2,040 zloty.

5) Calculate the profit if the market price increases to 24 zloty. *[2 marks]*

Under the profit maximizing condition, firms will produce up to the point where the MR = MC, i.e. 85,000 grams or 85 kg (at a market price of 24 zloty per kg and an average total cost of 21 zloty).
Therefore, profit = (24 – 21) × 85 = 3 × 85 = 255 zloty.

6) Calculate the loss if the market price falls to 14 zloty. *[2 marks]*

If price falls to 14 zloty, the profit maximizing level of output falls to 60,000 grams.
Therefore, the loss = (20 – 14) × 60 = 6 × 60 = 360 zloty.

Worksheet 24
2.11 Market power – Perfect competition (2)

1) Define the term *market power*. *[2 marks]*

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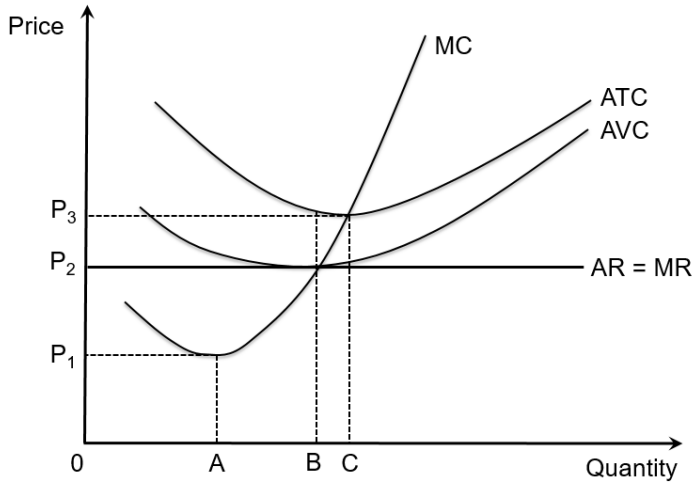
2) Refer to the diagram below that represents a situation in perfect competition, and answer the questions that follow.

   a. Show on the diagram the average fixed cost (AFC) at an output level of 0A. *[1 mark]*

   b. Identify the output level where allocative efficiency occurs. …… *[1 mark]*

   c. State whether firms operating in the market are currently making a profit or a loss. *[1 mark]*

   d. Identify the market price in the long run. *[1 mark]*



3) Explain why the marginal cost (MC) curve intersects the average total cost (ATC) and the average variable cost (AVC) curves at their minimum points. *[4 marks]*

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4) The table below is a summary of cost and revenue formulae. State the missing term from each formula. *[6 marks]*

Type of cost/revenue	Formulae	Missing term
Total revenue (TR)	Unit price × ……	
Average revenue (AR)	…… / Quantity sold	
Average fixed cost (AFC)	…… / Quantity produced	
Marginal revenue (MR)	Change in total revenue / ……	
Total cost (TC)	…… + Total variable cost	
Marginal cost	…… / Change in output	

Answers

1) Define the term *market power*. *[2 marks]*

Market power refers to the ability of a firm to control the price of a good or to influence the level of demand or supply in an industry.

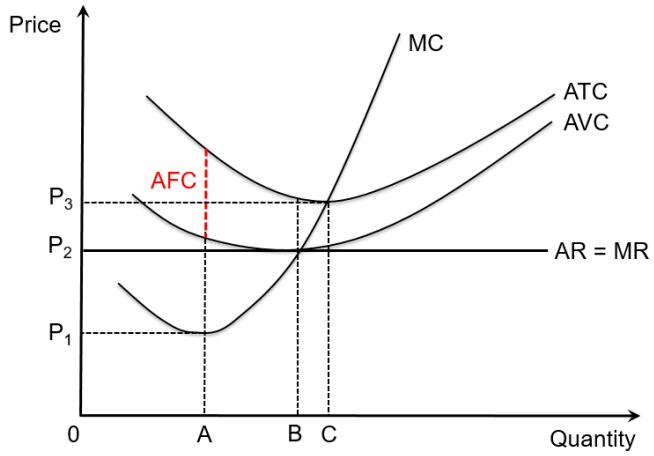
2) Refer to the diagram below that represents a situation in perfect competition, and answer the questions that follow.

a. Show on the diagram the average fixed cost (AFC) at an output level of 0A. *[1 mark]*
See below

b. Identify the output level where allocative efficiency occurs. *[1 mark]*
0B (where MC = AR)

c. State whether firms operating in the market are currently making a profit or a loss. *[1 mark]*
Loss – Firms produce at MC = MR, operating at 0B output, but as AR = P_2 in the short run, firms in the industry make a loss as the price is lower than the average total cost (ATC) at this level of output.

d. Identify the market price in the long run. *[1 mark]*
P_3 (where MC = AR = MR)



3) Explain why the marginal cost (MC) curve intersects the average total cost (ATC) and the average variable cost (AVC) curves at their minimum points. *[4 marks]*

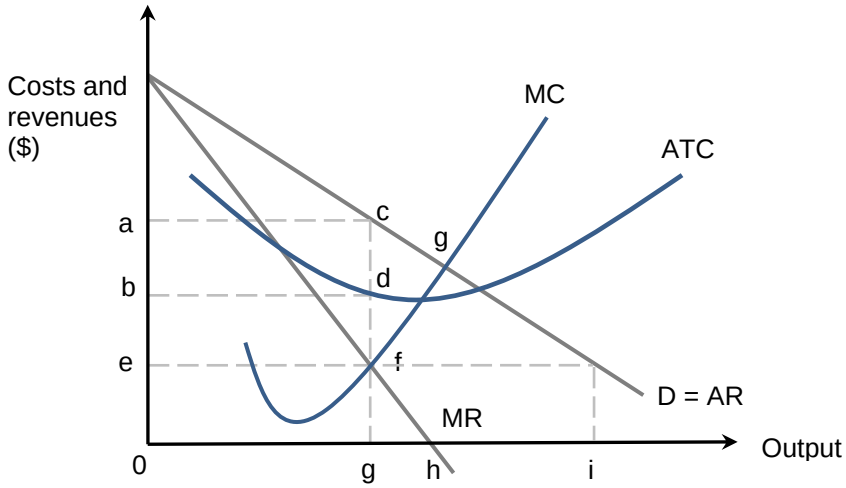
- In the case of the ATC curve, to the left of output 0C, MC is less than ATC so ATC would decline as output increases. To the right of output 0C, MC is greater than ATC so ATC must rise as output increases.
- The same applies to the AVC curve – to the left of output 0B, MC < AVC, so AVC must fall as the output level rises. To the right of 0B, MC > AVC, so AVC must rise as output increases.
- At output level 0C, MC = ATC so there is no change in the ATC (the turning point).
- At output level 0B, MC = AVC so there is no change in the AVC.

4) The table below is a summary of cost and revenue formulae. State the missing term from each formula. *[6 marks]*

Type of cost/revenue	Formulae	Missing term
Total revenue (TR)	Unit price × ……	Quantity sold
Average revenue (AR)	…… / Quantity sold	Total revenue
Average fixed cost (AFC)	…… / Quantity produced	Total cost
Marginal revenue (MR)	Change in total revenue / ……	Change in the level of output
Total cost (TC)	…… + Total variable cost	Total fixed cost
Marginal cost	…… / Change in output	Change in total cost

Worksheet 25
2.11 Market failure – market power: Monopoly

Consider the diagram below which shows the demand and cost conditions for a monopoly in the long run and answer the questions that follow.



1) Identify the profit maximizing output and price, and explain your answer. *[3 marks]*

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2) Assuming that the firm aims for profit maximization, explain the economic profit or loss made. *[4 marks]*

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3) Explain how many products the firm would produce if it sought to maximize sales revenue instead of profit. *[2 marks]*

……

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4) With reference to the diagram above, explain the output level that a perfectly competitive firm would produce at. *[2 marks]*

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5) Firms in perfect competition earn normal profit. Explain what this means. *[4 marks]*

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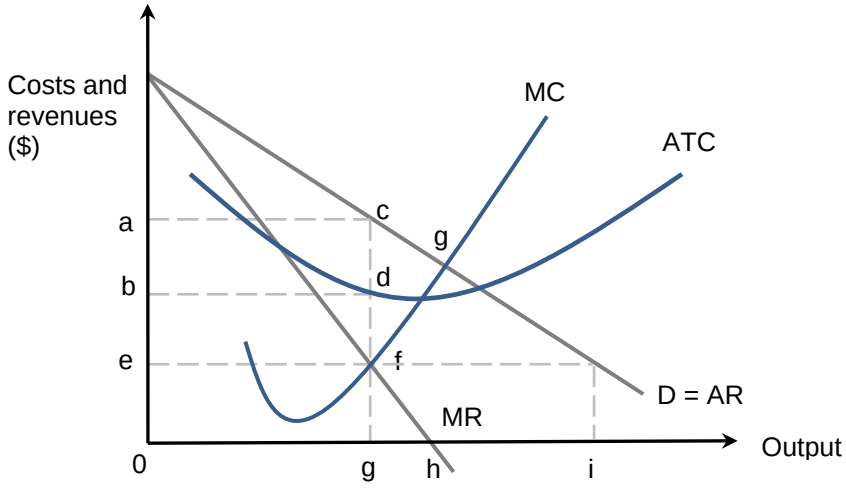
Answers

Consider the diagram below which shows the demand and cost conditions for a monopoly in the long run and answer the questions that follow.



1) Identify the profit maximizing output and price, and explain your answer. *[3 marks]*

- Profit maximizing price = a
- Profit maximizing output = g
- This is based on the assumption that the monopolist is a profit maximizer, so chooses to produce at the output level where MR = MC (the condition for profit maximization).

2) Assuming that the firm aims for profit maximization, explain the economic profit or loss made. *[4 marks]*

The profit maximizing price and output = a × g (determined by the position where MC = MR), as identified in Question 1.

- Total revenue = Price × Quantity
- Total revenue = a × g = Area a, c, g, 0.

- At this level of output, Total cost = Average cost × Output
- Total cost = Area b, d, g, 0.

- Profit = Total revenue – Total cost
- Hence, economic profit = Area a, c, g, 0 *minus* Area b, d, g, 0
- Economic profit = Area a, c, d, b.

3) Explain how many products the firm would produce if it sought to maximize sales revenue instead of profit. *[2 marks]*

- Sales revenue is maximized when MR = 0
- Hence, the firm will produce 0h units (as shown in the diagram) if revenue maximization is its aim.

4) With reference to the diagram above, explain the output level that a perfectly competitive firm would produce at. *[2 marks]*

Under perfect competition, allocatively efficient firms produce where P = MC. In the graph above, this occurs where the AR curve (the demand curve) intersects the MC at point g. It can be seen that the quantity of output is higher than 0g for the monopolist and the price is lower than 0a too.

5) Firms in perfect competition earn normal profit. Explain what this means. *[4 marks]*

If a perfectly competitive firm earns normal profits, this means that it the amount of profit is just sufficient to incentivize the firm to remain in the industry. Normal profit occurs when economic profit is equal to zero. However, zero economic profit does not actually mean the perfectly competitive firm does not make any accounting profit. This is because economic profit includes implicit costs, including opportunity costs.

Worksheet 26
2.11 Market power – Oligopoly

1) Define the term *collusive oligopoly*. *[2 marks]*

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2) Explain why oligopolistic firms may be detrimental to the interests of consumers. *[2 marks]*

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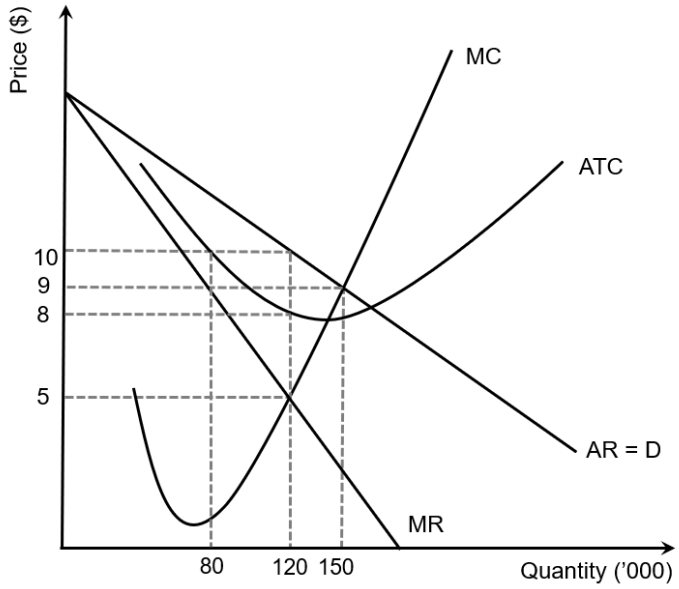
3) The diagram below represents the situation for profit maximizing firms operating in collusive oligopoly. Calculate the total profit earned by the colluding firms. *[3 marks]*



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4) List **two** examples of non-price competition used by the competing firms in oligopoly. *[2 marks]*

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5) Explain how market concentration is measured. *[2 marks]*

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Answers

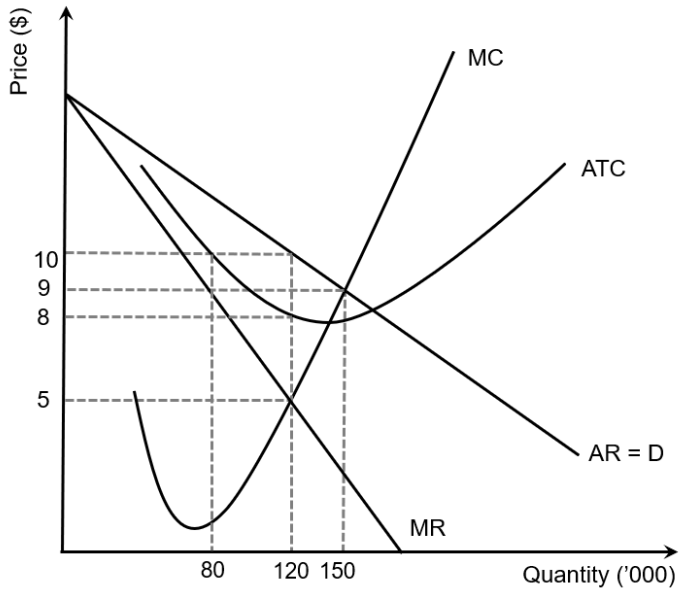
1) Define the term *collusive oligopoly*. *[2 marks]*

Collusive oligopoly happens when two or more oligopolistic firms agree to limit competition in the industry by either fixing price as a collective group or by manipulating output in the industry.

2) Explain why oligopolistic firms may be detrimental to the interests of consumers. *[2 marks]*

Firms in oligopoly can collude so that they earn supernormal profit by restricting market supply or forcing up the market price. Oligopolists can also create a barrier for the potential rivals, thereby limited competition in the market. This profit motive further encourages firms to collude. Ultimately, the market starts to exhibit the characteristics of a monopoly.

3) The diagram below represents the situation for profit maximizing firms operating in collusive oligopoly. Calculate the total profit earned by the colluding firms. *[3 marks]*



- The collusive oligopoly will produce 120,000 units as this is the profit maximizing level of output (where MC = MR).
- Hence, the profit maximizing price is $10, as this is the point along the AR = D curve where profit is maximized (at 120,000 units).
- Profit per unit = $10 – $8.
- Total profit = $2 × 120,000 = **$240,000**.

4) List **two** examples of non-price competition used by the competing firms in oligopoly. *[2 marks]*

Some of the non-price competition strategies used by the firms are: promotion (including advertising), product designs, packaging, after-sales services, branding, customer loyalty schemes, and craftmanship (quality).

5) Explain how market concentration is measured. *[2 marks]*

A concentration ratio measures the degree of market power held by the largest few firms in an industry. It is measured by adding the combined market shares of the largest few firms in the market.

Worksheet 27
3.1 The circular flow of income (2)

1) In the space below, construct a circular flow of income diagram for an open economy. *[4 marks]*

2) Complete the missing figures in the table below. All figures are in billions of dollars. *[4 marks]*

Expenditure approach		Income approach		Output approach	
Consumption	69	Rent	20	Average price level	.....
Government spending	23	Wages	55	Units of production (bn)	24
Investment	35	Interest	13	**Total**	.....
Exports	25	Profit	.....		
Imports	32	**Total**	120		
Total	.....				

3) Suppose the population is 8.5 million people. Using the data in the table above, calculate the gross domestic product (GDP) per capita. *[2 marks]*

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4) Explain **two** limitations of using GDP per head as a measure of a country's standards of living. *[4 marks]*

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5) Contrast the Human Development Index (HDI) with gross national income (GNI) per head as alternative measures of development. *[4 marks]*

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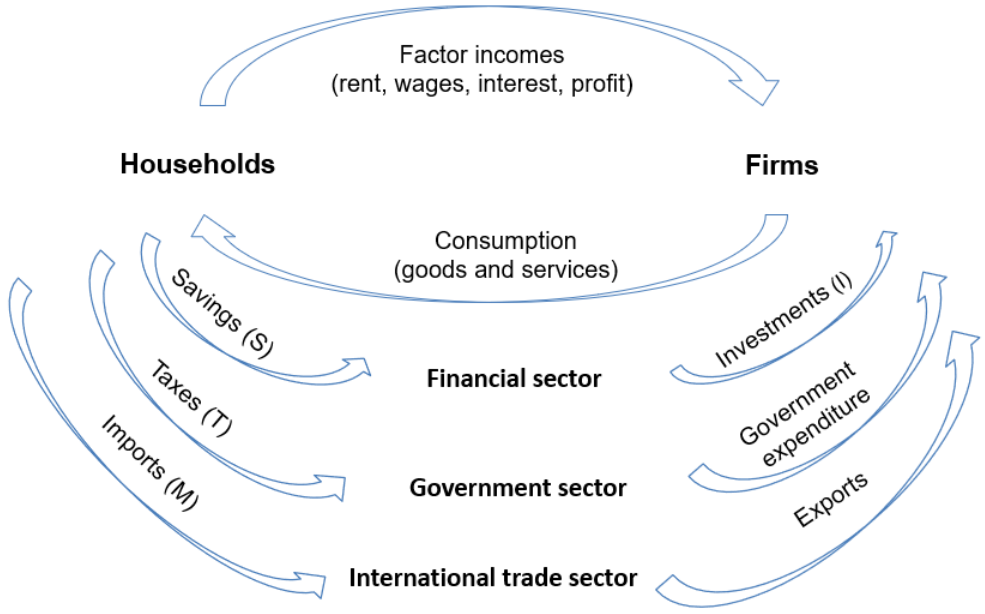
Worksheet 27
3.1 The circular flow of income (2)

Answers

1) In the space below, construct a circular flow of income diagram for an open economy. *[4 marks]*



2) Complete the missing figures in the table below. All figures are in billions of dollars. *[4 marks]*

Expenditure approach		Income approach		Output approach	
Consumption	69	Rent	20	Average price level	**5**
Government spending	23	Wages	55	Units of production (bn)	24
Investment	35	Interest	13	**Total**	**120**
Exports	25	Profit	**32**		
Imports	32	**Total**	120		
Total	**120**				

3) Suppose the population is 8.5 million people. Using the data in the table above, calculate the gross domestic product (GDP) per capita. *[2 marks]*

- GDP per capita = GDP/ Population size
- GDP per capita = $120,000,000,000 / 8,500,000 = **$14,117.65** (accept **$14,118**)

4) Explain **two** limitations of using GDP per head as a measure of a country's standards of living. *[4 marks]*

- GDP per head only measures national output in monetary term and does not consider other aspects of standards of living, such as environmental issues and access to education and healthcare services.
- It ignores the distribution of income in the economy. Quite often, inequalities mean that an increase in GDP per capita does not translate to an increase in the living standards for the average household.
- It does not consider qualitative aspects of living standards, e.g., freedom of speech and human rights.
- It does not consider the composition of national output, such as higher spending on army supplies and defense equipment, which has no direct impact on the average person's standard of living.

5) Contrast the Human Development Index (HDI) with gross national income (GNI) per head as alternative measures of development. *[4 marks]*

The UN Human Development Index (HDI) is a measure of *human* development whereas GNI per capita is a measure of *economic* development. The HDI measures three dimensions: (i) healthcare (longevity), (ii) education (mean years of schooling), and (iii) standards of living (GNI per capita). Hence, the calculation of the HDI includes measuring GNI per capita, so it is a broader indicator of development.

Worksheet 28
3.1 Calculating gross domestic product (1)

1) define the term *nominal GDP.* *[2 marks]*

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Questions 2 to 5 refer to the following information for an economy:

Variable	$ (billion)
Consumption expenditure	44
Costs of cleaning up pollution	15
Damage to ecosystems	10
Exports of goods and services	24
Factor income paid to other countries	22
Factor income received from other countries	12
Government expenditure	50
Imports of goods and services	20
Investment	18

2) Using the relevant figures only, calculate the value of nominal GDP. *[2 marks]*

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3) Using relevant information in the table, comment on the limitation of using nominal GDP as a measure of economic growth. *[2 marks]*

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4) While calculating the GDP of South Africa, identify the following items as withdrawals (W) or injections (J) for the South African economy. *[5 marks]*

a. A doctor working in a government hospital in Cape Town getting a higher salary ……
b. A software engineer in Johannesburg buying a Ferrari not assembled in South Africa ……
c. Spanish visitors touring Kruger National Park ……
d. Corporation tax imposed on all firms in Durban (including foreign firms) ……
e. The South African government deciding to spend more money on national defense ……

5) Explain the likely impact on GDP if the South African government intends to reduce the budget deficit by privatizing some of its loss-making public sector organizations. *[2 marks]*

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6) Assuming the South African government wishes to reduce the income tax rate on households and businesses, explain the impact this policy will most likely have on the GDP of South Africa. *[2 marks]*

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Worksheet 28
3.1 Calculating gross domestic product (1)

Answers

1) Define the term *nominal GDP.* *[2 marks]*

Nominal Gross Domestic Product measures national output using current prices, that is, the value of GDP at the time of measurement. It is calculated as the sum of consumption, investment, government expenditure and the net export expenditure.

2) Using the relevant figures only, calculate the value of nominal GDP. *[2 marks]*

- Nominal GDP = C + I + G + (X – M)
- Nominal GDP = 44 + 18 + 50 + (24 – 20) = $116 billion

Top tips:

- *Net property income from abroad is not required to calculate nominal GDP.*
- *Green GDP is calculated as = C + I + G + (X – M) – Value of environment degradation (pollution costs).*
- *= 44 + 18 + 50 + (24 – 20) – (15 + 10) = $91 billion. As this is not in the current syllabus, you are not expected to know this.*

3) Using relevant information in the table, comment on the limitation of using nominal GDP as a measure of economic growth. *[2 marks]*

In the table, figures are shown for environment degradation (pollution and damage to ecosystems), amounting to $25bn. This is not included in the measure of nominal output or GDP, yet it clearly has a direct impact on economic growth. Some economists calculate green GDP, which would reduce the value of nominal GDP to account for environmental degradation caused by economic activity (although green GDP is not explicitly included in the DP Economics syllabus).

4) While calculating the GDP of South Africa, identify the following items as withdrawals (W) or injections (J) for the South African economy. *[5 marks]*

a.	A doctor working in a government hospital in Cape Town getting a higher salary	Injection
b.	A software engineer in Johannesburg buying a Ferrari not assembled in South Africa	Withdrawal
c.	Spanish visitors touring Kruger National Park	Injection
d.	Corporation tax imposed on all firms in Durban (including foreign firms)	Withdrawal
e.	The South African government deciding to buy more fighter jets from the US	Injection

5) Explain the likely impact on GDP if the South African government intends to reduce the budget deficit by privatizing some of its loss-making public sector organizations. *[2 marks]*

Privatization of South African public sector organizations will lead to a decrease in government spending on these loss-making businesses. As government spending (G) is a component of the expenditure approach to measuring GDP, such a change would cause the nation's GDP to decrease, ceteris paribus. However, the investment from the private sector for buying the privatized companies should lead to an increase in GDP as investment (I) is also another component of AD. Overall, and in theory, privatization leads to a better allocation of resources, hence leads to increases in both productivity and GDP.

6) Assuming the South African government wishes to reduce the income tax rate on households and businesses, explain the impact this policy will most likely have on the GDP of South Africa. *[2 marks]*

A reduction in income taxes on households and businesses will increase households' disposable incomes and lead to more consumption and investment expenditure, ceteris paribus. As these are the two largest components of GDP, such a policy will tend to cause GDP to increase.

Worksheet 29
3.1 Calculating gross domestic product (2)

1) Complete the following table for Country Y. *[4 marks]*

Goods & Services	2019 Quantity (million)	2019 Price ($)	2019 GDP ($m)	2020 Quantity (million)	2020 Price ($)	2020 GDP ($m)	2021 Quantity (million)	2021 Price ($)	2021 GDP ($m)
Medicine	40	20		44	22		42	23	
Milk	70	8		73	9		72	10	
Cars	20	80		23	85		25	90	
Nominal GDP									

2) According to the answers in Question 1, state the year with the highest nominal GDP. *[1 mark]*

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3) Calculate the GDP deflator for 2019, 2020 and 2021. Assume 2019 is the base year. *[3 marks]*

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4) The equation for the GDP deflator is expressed as: GDP deflator = (Nominal GDP/ Real GDP) × 100

The nominal GDP per capita in Economy X in 2017 is $213. Calculate the real values of GDP for Economy X in 2018 and 2019 if nominal GDP is $678 and $198 respectively. 2017 is the base year and the price index for 2018 and 2019 is 180 and 192 respectively. *[4 marks]*

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5) Calculate the real GDP per capita for Economy Y in 2019 and 2020 if nominal GDP per capita is $10,000 and $11,000 respectively. The price indices for 2019 and 2020 are 150 and 200 respectively. *[4 marks]*

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6) Explain your finding in Question 5. *[2 marks]*

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7) Explain the usefulness of a GDP deflator in calculating a country's GDP. *[2 marks]*

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Worksheet 29
3.1 Calculating gross domestic product (2)

Answers

1) Complete the following table for Country Y. *[4 marks]*

Goods & Services	2019 Quantity (million)	2019 Price ($)	2019 GDP ($m)	2020 Quantity (million)	2020 Price ($)	2020 GDP ($m)	2021 Quantity (million)	2021 Price ($)	2021 GDP ($m)
Medicine	40	20	**800**	44	22	**968**	42	23	**966**
Milk	70	8	**560**	73	9	**657**	72	10	**720**
Cars	20	80	**1600**	23	85	**1955**	25	90	**2250**
Nominal GDP			**2960**			**4567**			**3936**

2) According to the answers in Question 1, state the year with the highest nominal GDP. *[1 mark]*

2019 has the highest nominal GDP with $4567 billion.

3) Calculate the GDP deflator for 2019, 2020 and 2021. Assume 2019 is the base year. *[3 marks]*

- GDP deflator = Nominal GDP/ Real GDP × 100
- Year 2018 GDP deflator = 100 (base year)
- Year 2019 GDP deflator = 4567 / 3304 × 100 = 138.04
- Year 2020 GDP deflator = 3936 / 3416 × 100 = 115.22

Real GDP in 2019 (using 2018 prices) = ($20)(44) + ($8)(73) + ($80)(23) = $3304m
Real GDP in 2020 (using 2018 prices) = ($20)(42) + ($8)(72) + ($80)(25) = $1,708m

4) The equation for the GDP deflator is expressed as: GDP deflator = (Nominal GDP/ Real GDP) × 100

The nominal GDP per capita in Economy X in 2017 is $213. Calculate the real values of GDP for Economy X in 2018 and 2019 if nominal GDP is $678 and $198 respectively. 2017 is the base year and the price index for 2018 and 2019 is 180 and 192 respectively. *[4 marks]*

- Real GDP = Nominal GDP/ GDP deflator × 100
- Real GDP in 2018 = 678/180 × 100 = $376.67
- Real GDP in 2019 = 198/192 × 100 = $103.13

5) Calculate the real GDP per capita for Economy Y in 2019 and 2020 if nominal GDP per capita is $10,000 and $11,000 respectively. The price indices for 2019 and 2020 are 150 and 200 respectively *[4 marks]*

- Real GDP = Nominal GDP/ GDP deflator × 100
- Real GDP in 2019 = 10000 / 150 × 100 = $6666.67
- Real GDP in 2020 = 11000 / 200 × 100 = $5,500

6) Explain your finding in Question 5. *[2 marks]*

Despite the nominal GDP increasing from $10000 to $11000 (10%), real GDP has fallen as the price index has increased by a greater amount from 150 to 200 (33.33%).

7) Explain the usefulness of a GDP deflator in calculating a country's GDP. *[2 marks]*

The GDP deflator allows economists to convert nominal values to real values (by simply dividing the nominal values with the GDP deflator). GDP represents the value of the total output of goods and services. When GDP rises and falls, the metric does not factor the impact of inflation or rising prices into its results. Using a GDP deflator addresses this by showing the effect of price changes on GDP, first by establishing a base year and, secondly by comparing current prices to prices in the base year.

Worksheet 30
3.1 Calculating gross domestic product (3)

1) Calculate nominal GDP from the following data. All figures are expressed in US$ billion. Consumption = $120; Government spending = $75; Investment = $100; Net exports = -$23. *[2 marks]*

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2) State the equation for calculating GNI. *[1 mark]*

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3) Foreign workers send $10.7bn back to their home countries whilst domestic firms located abroad repatriate $23.4bn back to the country. Calculate the GNI. *[2 marks]*

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4) With reference to Question 1 and 3, explain the significance of the difference in the country's GDP and GNI figures. *[2 marks]*

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5) An economy's GNI and GDP are $395.7 billion and $436.9 billion respectively. Calculate its net income from abroad. *[2 marks]*

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6) Calculate an economy's GNI if GDP is $786.78 billion and net income from abroad is -$97.7 billion. *[2 marks]*

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7) Referring to Question 6, calculate the ratio of the economy's GNI to GDP. Explain what this suggests about its level of economic activity. *[3 marks]*

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8) Explain whether it is better for a country to have a higher figure for GNI or GDP. *[4 marks]*

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Worksheet 30
3.1 Calculating gross domestic product (3)

Answers

1) Calculate nominal GDP from the following data. All figures are expressed in US$ billion. Consumption = $120; Government spending = $75; Investment = $100; Net exports = -$23. *[2 marks]*

- GDP = Consumption (C) + Investment (I) + Government spending (G) + Net Exports (X – M)
- GDP = 120 + 100 + 75 – 23 = $272 billion

2) State the equation for calculating GNI. *[1 mark]*

GNI = GDP + Income from abroad − Income sent abroad

3) Foreign workers send $10.7 bn back to their home countries whilst domestic firms located abroad repatriate $23.4 bn back to the country. Calculate the GNI. *[2 marks]*

GNI = 272 + 23.4 – 10.7 = $284.7 billion

4) With reference to Question 1 and 3, explain the significance of the difference in the country's GDP and GNI figures. *[2 marks]*

The country's GNI is $12.7 billion higher than its GDP ($284.7bn vs $272bn). This means that the income generated by its residents and firms is higher than what is produced within the country.

5) An economy's GNI and GDP are $395.7 billion and $436.9 billion respectively. Calculate its net income from abroad. *[2 marks]*

- Net income from abroad = Income from abroad − Income sent abroad
- GNI = GDP+ Net income from abroad
- 395.7 = 436.9 + Net income from abroad
- Net income from abroad = -$41.2 billion

6) Calculate an economy's GNI if GDP is $786.78 billion and net income from abroad is -$97.7 billion. *[2 marks]*

- GNI = GDP + Net income from abroad
- GNI = 786.78 – 97.7 = $689.08 billion

7) Referring to Question 6, calculate the ratio of the economy's GNI to GDP. Explain what this suggests about its level of economic activity. *[3 marks]*

GNI:GDP = 689.08:786.78 = 0.875

This means that the national income produced by the economy's citizens is around nine tenth (0.88) of the size of the domestic production within in the country. This may mean that a small portion of the domestic income is sent abroad and does is not attributed to the country's citizens.

Top Tip: GNI measures income of a country's residents, regardless where this income comes from. This is a more appropriate indicator to measure the amount of income going to the nation's citizens. This is especially true in the study of development where nations have a high GDP but low GNP or GNI as a lot of the profits of multinational companies are repatriated back to their home countries.

8) Explain whether it is better for a country to have a higher figure for GNI or GDP. *[4 marks]*

GNI can be larger than GDP if the amount of income sent from abroad is greater than the income sent abroad. This is better for the country as it means domestic citizens have a greater total income if GNI is greater than its GDP. In other words, national income stays within the hands of the country's citizens rather than leaving the country.

Worksheet 31
3.3 Macroeconomic objectives – Economic growth

1) Rwanda, officially the Republic of Rwanda, had real GDP of $9.64 billion in 2018. This increased to $10.36 billion in 2019 but fell to $10.33 billion in 2020. Calculate the rate of economic growth from 2018 to 2019 and from 2019 to 2020. *[3 marks]*

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2) The real GDP of the USA in 2018 was $20.61 trillion. It was $21.43 trillion in 2019 but fell to $20.94 trillion in 2020. Calculate the rate of economic growth from 2018 to 2019 and from 2019 to 2020. *[3 marks]*

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3) Using the same figures for real GDP in Question 2, Calculate the real GDP per capita for the three years when the population was 326.84 million, 328.33 million and 329.48 million respectively. *[3 marks]*

2018:
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2019:
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2020:
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4) Use the answers from Question 3 to calculate the rate of change in real GDP per capita from 2018 – 2019 and 2019 – 2020. Comment on your findings. *[4 marks]*

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5) In 2021, the real GDP in a country with a population of 5.2 million people was $50 billion. In 2022, the figures for real GDP and population size were $49 billion and 5.7 million people respectively. Calculate the percentage change in the country's real GDP per capita. *[3 marks]*

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Worksheet 31
3.3 Macroeconomic objectives – Economic growth

1) Rwanda, officially the Republic of Rwanda, had real GDP of $9.64 billion in 2018. This increased to $10.36 billion in 2019 but fell to $10.33 billion in 2020. Calculate the rate of economic growth from 2018 to 2019 and from 2019 to 2020. *[3 marks]*

- Economic growth for the period 2018 to 2019:
  - Economic growth = % change in real GDP
  - Economic growth = % change in real GDP = (10.36 – 9.64) / 9.64 × 100 = **7.47%**
- Economic growth for the period 2019 to 2020:
  - Economic growth = % change in real GDP
  - Economic growth = % change in real GDP = (10.33 – 10.36) / 10.36 × 100 = -**0.29**

2) The real GDP of the USA in 2018 was $20.61 trillion. It was $21.43 trillion in 2019 but fell to $20.94 trillion in 2020. Calculate the rate of economic growth from 2018 to 2019 and from 2019 to 2020. *[3 marks]*

- Economic growth for 2018 to 2019 = % change in real GDP = (17.43 – 17.04) / 17.04 × 100% = **2.28%**
- Economic growth for 2019 to 2020 = % change in real GDP = (17.96 – 17.43) / 17.43 × 100% = **3.04%**

3) Using the same figures for real GDP in Question 2, Calculate the real GDP per capita for the three years when the population was 326.84 million, 328.33 million and 329.48 million respectively. *[3 marks]*

- 2018 GDP per capita = 20.61 tn / 326.84 m = $63,058.38
- 2019 GDP per capita = 21.43 tn / 328.33 m = $65,269.70
- 2020 GDP per capita = 20.94 tn / 329.48 m = $63,554.69

4) Use the answers from Question 3 to calculate the rate of change in real GDP per capita from 2018 – 2019 and 2019 – 2020. Comment on your findings. *[4 marks]*

- 2018 – 2019 change in real GDP per capita:
  - Change in real GDP per capita = (New value – Old value) / Old value × 100
  - Change in real GDP per capita = [(65,269.70 – 63,058.38) / 63,058.38] × 100% = **3.51%**
- 2019 – 2020 change in real GDP per capita:
  - Change in GDP per capita = [(63,554.69 – 65,269.70) / 65,269.70] × 100% = -**2.63%**
- Between 2018 and 2019, the change in real GDP per capital in the USA was 3.51%. This is because the growth in real GDP (of 3.98%) was greater than the growth in the population size (of only 0.46%).
- Between 2019 and 2020, the change in real GDP per capital *fell* by 2.63%. This was contributed by the relatively larger fall in real GDP (of 2.29%, larger due to the COVID-19 pandemic) whilst the population size grew in the same time period (by 0.35%).

5) In 2021, the real GDP in a country with a population of 5.2 million people was $50 billion. In 2022, the figures for real GDP and population size were $49 billion and 5.7 million people respectively. Calculate the percentage change in the country's real GDP per capita. *[3 marks]*

- GDP per capita 2021 = ($50bn / 5.2m) = $9,615.39
- GDP per capita 2022 = ($49bn / 5.7m) = $8,596.49
- % change in real GDP per capita = ($8,596.49 – $9,615.39) / $9,615.39 = **-10.6%**

Worksheet 32
3.3 Macroeconomic objectives – Unemployment

1) define the term *natural rate of unemployment* (NRU). *[2 marks]*

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2) Distinguish between *frictional*, *cyclical*, and *structural unemployment*. *[3 marks]*

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3) Explain why it is sometimes difficult to compare unemployment rates between nations. *[4 marks]*

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4) Calculate the unemployment rate from the data below. *[2 marks]*

Population	10,434,987
Number of employed	6,400,389
Working age population	7,573,878
Number of unemployed	958,987

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5) Calculate the unemployment rate from the following information. *[2 marks]*

Total population	30,000,000
Labour force	21,000,000
Working age population seeking work but unable to find it	3,000,000
People on unemployment benefits	958,987
Retired population	1,000,000

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6) Outline **two** government policies that can be used to reduce unemployment in a country. *[4 marks]*

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Worksheet 32
3.3 Macroeconomic objectives – Unemployment

Answers

1) Define the term *natural rate of unemployment* (NRU). *[2 marks]*

Natural unemployment, or the natural rate of unemployment, is the minimum unemployment rate resulting from real or voluntary economic forces. It reflects the number of people unemployed due to the structure of the labour force, such as those replaced by technology or those who lack certain skills to gain employment.

2) Distinguish between *frictional*, *cyclical*, and *structural unemployment*. *[3 marks]*

Frictional unemployment refers to workers who are in-between jobs. It is generally short-term and is considered part of the natural unemployment of an economy.

Structural unemployment refers to the workers whose skills are no longer in demand in the market as a result of changes in technology that have replaced workers.

Cyclical unemployment refers to workers who have lost their jobs due to a fall in aggregate demand or aggregate supply in the economy. This is regarded as unnatural unemployment and indicates that an economy is in a recession.

3) Explain why it is sometimes difficult to compare unemployment rates between nations. *[4 marks]*

It can be challenging to compare the unemployment rates between different countries as different countries define unemployment in different ways so have different measures of unemployment. This makes it difficult for statisticians and economists to consider who qualifies as being unemployed and who does not.

4) Calculate the unemployment rate from the data below. *[2 marks]*

Population	10,434,987
Number of employed	6,400,389
Working age population	7,573,878
Number of unemployed	958,987

- Unemployment rate = (Total number of unemployed / Labour force) × 100%
- Unemployment rate = [958,987 / (6,400,389 + 958,987)] × 100% = 13.03%

5) Calculate the unemployment rate from the following information. *[2 marks]*

Total population	30,000,000
Labour force	21,000,000
Working age population seeking work but unable to find it	3,000,000
People on unemployment benefits	958,987
Retired population	1,000,000

- Unemployment rate = (Number of unemployed / Labour force) × 100%
- Unemployment rate = (3,000,000 / 21,000,000) × 100% = 14.29%

6) Outline **two** government policies that can be used to reduce unemployment in a country. *[4 marks]*

A government may use the following policies to help reduce the unemployment rate in the country:

- Demand-side policies, such as increases in government spending and/or tax cuts, which may help to shift aggregate demand to the right, and lead to an increase in national output and employment.
- Supply-side policies, such as tax incentives for businesses which might result in firms hiring new workers and/or arranging job-training programs aimed at giving unemployed workers new skills that are demanded by firms.
- Monetary policy, such as the central bank increasing the supply of money, which causes interest rates to fall. This could also boost consumption and investment expenditure, so help to reduce unemployment.

Worksheet 33
3.3 Macroeconomic objectives – Inflation

1) Distinguish between *inflation*, *disinflation,* and *deflation*. *[3 marks]*

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2) Consider the price indices of Country A for the period from 2017 to 2022.

Year	Price Index
2017	105
2018	108
2019	100
2020	98
2021	110
2022	115

(i) Identify the base year. *[1 mark]*

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(ii) Calculate the rate of inflation between 2021 and 2022. *[2 marks]*

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(iii) Identify the period when deflation took place. Calculate the rate of deflation. *[3 marks]*

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3) (i) Complete the following table to construct a price index for a basket of goods and services. *[4 marks]*

Goods & Services	Quantity	2020 Price ($)	Value of basket in 2020	2021 Price ($)	Value of basket in 2021	2022 Price ($)	Value of basket in 2022
Rice	50	2		3		3	
School fee	20	25		27		25	
Petrol	40	8		7		8	
Childcare	25	10		11		10	
Total value of basket	-	-		-		-	

(ii) Calculate the price index for 2020, 2021 and 2022 using 2020 as the base year. *[3 marks]*

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(iii) Using your answer from Question 2, calculate the annual inflation rate for 2022. *[2 marks]*

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4) State **three** disadvantages of the Consumer Price Index (CPI) as a measure of inflation. *[3 marks]*

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Worksheet 33
3.3 Macroeconomic objectives – Inflation

Answers

1) Distinguish between *inflation*, *disinflation,* and *deflation*. *[3 marks]*

Inflation is defined as a continuous increase in the general level of prices. *Deflation*, on the other hand, is a sustained fall in the general level of prices. *Disinflation* is defined as a situation when the rate of inflation falls; prices are still rising on average, but at a slower rate than before.

2) Consider the following price indices for the period from 2017 to 2022.

(i) Identify the base year. *[1 mark]*

2019 is the base year, with a price index of 100.

(ii) Calculate the rate of inflation between 2021 and 2022. *[2 marks]*

- Inflation rate = (New index value – Old index value) / Old index value × 100
- Inflation rate = (115 – 110) / 110 × 100 = 4.54%

(iii) Identify the period when deflation took place. Calculate the rate of deflation. *[3 marks]*

- Deflation took place between 2019 and 2020 as the index values fell from 100 to 98
- Inflation rate = (New index value – Old index value) / Old index value × 100
- Inflation rate = (98 – 100) / 100 × 100 = - 2%
- Hence, the deflation rate between 2019 and 2020 was 2%.

3) (i) Complete the following table to construct a price index for a basket of goods and services. *[4 marks]*

Goods & Services	Quantity	2020 Price ($)	Value of basket in 2020	2021 Price ($)	Value of basket in 2021	2022 Price ($)	Value of basket in 2022
Rice	50	2	**100**	3	**150**	3	**150**
School fee	20	25	**500**	27	**540**	25	**500**
Petrol	40	8	**320**	7	**280**	9	**360**
Childcare	25	10	**250**	11	**275**	10	**250**
Total value of basket	-	-	**1,170**	-	**1,245**	-	**1,260**

(ii) Calculate the price index for 2020, 2021 and 2022 using 2020 as the base year. *[3 marks]*

- The price index for a specific year = Value of basket in a specific year / Value of same basket in base year × 100
- Index in 2020 = 1,170 / 1,170 × 100 = 100.0
- Index in 2021 = 1,245 / 1,170 × 100 = 106.41
- Index in 2022 = 1,260 / 1,170 × 100 = 107.69

(iii) Using your answer from Question 2, calculate the annual inflation rate for 2022. *[3 marks]*

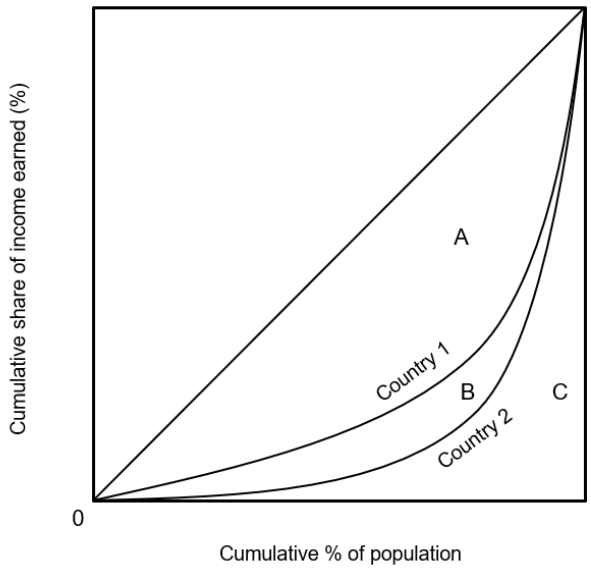
- Inflation rate = (New value – Old value) / Old value × 100
- Year on year inflation for 2022 = (1,260 – 1,245) / 1,245 × 100% = 1.20%

4) State **three** disadvantages of the Consumer Price Index (CPI) as a measure of inflation. *[3 marks]*

- The Consumer Price Index (CPI) does not reflect the purchases of all goods and services in a country (it only covers a "representative" basket of products for the "average" household").
- The CPI does not include the changes in the quality of goods or services produced and consumed in a nation over time.
- The CPI gives different weights or importance to different types of products. When the price of a certain product increases, consumers may start to buy less of it in favor of cheaper substitutes which can have a destabilizing impact on the assigning of weights in the CPI.

Worksheet 34
3.4 Economics of inequality and poverty: Income inequality

Consider the following graph, depicting the Lorenz curves for two countries.



- Area of A = 30 units
- Area of B = 8 units
- Area of C = 12 units

1) Calculate the Gini coefficient for Country 1 **and** Country 2 to determine which country has the greater income inequality. *[4 marks]*

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2) Explain **two** reasons why greater inequality can actually be beneficial for economic growth. *[4 marks]*

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3) Explain **two** reasons why greater equality can be beneficial for economic growth. *[4 marks]*

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4) Explain the difference between **equality** and **efficiency**, and why the concepts may conflict with each another. *[4 marks]*

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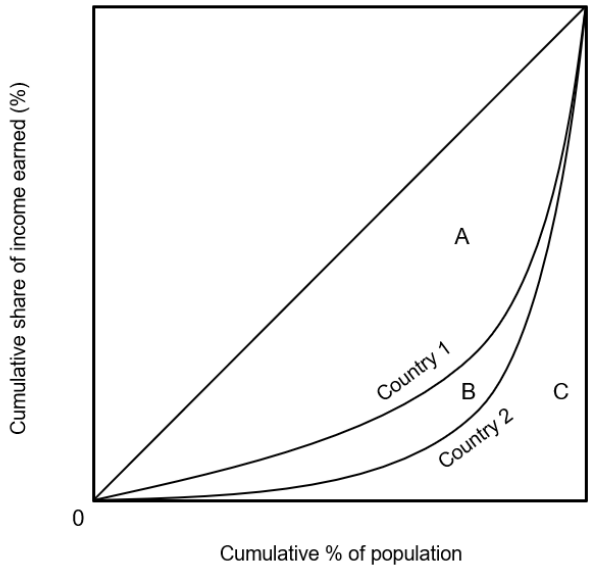
Answers

1) Calculate the Gini coefficient for Country 1 **and** Country 2 to determine which country has the greater income inequality. *[4 marks]*



- Area of A: 30 units
- Area of B: 8 units
- Area of C: 12 units

The Gini coefficient is the ratio of the area between the country's Lorenz curve and the diagonal line (of income equality) to the entire triangle. The calculations are as follows:

- Country 1 = 30 / 50 = 0.6
- Country 2 = (30 + 8) / 50 = 0.76

Hence, Country 2 has greater income inequality as it has a higher Gini coefficient (it is clearly further away from the line of total equality).

2) Explain **two** reasons why greater inequality can actually be beneficial for economic growth. *[4 marks]*

- Free market economists believe that high income inequality can be beneficial for economic growth because the inequalities are necessary to create incentives to work hard.
- Creating a richer or wealthier group is essential to allow the economy to have savings which are needed to fund investment expenditure. This can result in greater investment in physical capital and thus economic growth.
- By contrast, government spending on welfare benefits along with other ways to redistribute income and wealth, can alleviate poverty but divert scarce resources away from investments and production.

3) Explain **two** reasons why greater equality can be beneficial for economic growth. *[4 marks]*

- Higher spending on merit goods, such as basic education, health care and sanitation, can lead to an improvement in the human capital of a country, thus lead to a more productive workforce and economic growth.
- Improvements in income equality will lead to greater demand for domestically produced goods and services, due to the higher marginal propensity to consume (MPC) of low-income earners. In turn, this will lead to greater domestic investment and employment, so is beneficial for the country's economic growth.
- Improvements in income equality will lead to a more politically and economically stable society, thus allows the country to be a more attractive place for domestic and foreign direct investments (FDI). This has a positive impact on the country's economic growth in the long term.

4) Explain the difference between **equality** and **efficiency**, and why the concepts may conflict with each another. *[4 marks]*

Efficiency is related to the optimal allocation and production of the economy's scarce resources, whereas **equality** is concerned with the extent to which these resources are distributed equally throughout society. Both concepts may be at odds with each other because the concept of efficiency does not take the notion of equality into account – what may be an efficient allocation of resources may not necessarily be equitable.

Top Tip: Allocative efficiency is defined as an allocation of factor resources where one party cannot be made better off without making another party worse off. Consider a situation where there are six biscuits. An allocation where one party has five biscuits and the other has only one is deemed to be allocatively efficient because all biscuits have been allocated. However, this allocation could be considered unequal as one party has much more than the other. Students should also know that equity and equality are different concepts, as the former is a normative concept and is primarily concerned with whether the distribution is fair or not.

Worksheet 35
3.4 Economics of inequality and poverty: The Lorenz curve

1) Outline what is meant by the Gini-coefficient. *[2 marks]*

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2) Outline what is meant by the Lorenz curve. *[2 marks]*

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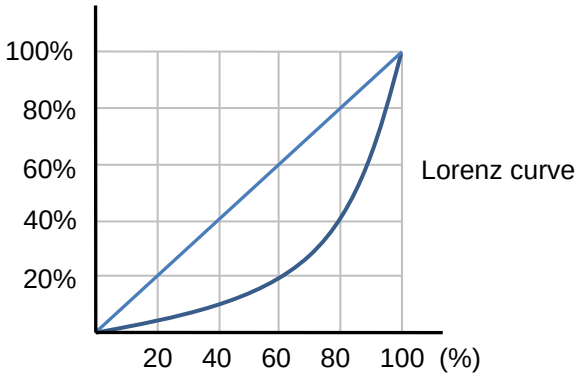
3) The following questions refer to the Lorenz curve shown below.



i. State what the 45-degree line represents. *[1 mark]*

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ii. State the correct label for the horizontal axis if the y-axis is the cumulative share of income. *[1 mark]*

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iii. Identify which of the following statements is correct. *[1 mark]*

A. The 1st quintile earns 60% of the national income
B. The 2nd quintile earns 10% of the national income
C. The 3rd quintile earns 60% of the national income
D. The 4th quintile earns 40% of the national income

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iv. Determine the incomes from the fourth quintile in the country. *[1 mark]*

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4) Distinguish between the terms *equality* and *equity* in the context of distribution of income. *[4 marks]*

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Worksheet 35
3.4 Economics of inequality and poverty: The Lorenz curve

Answers

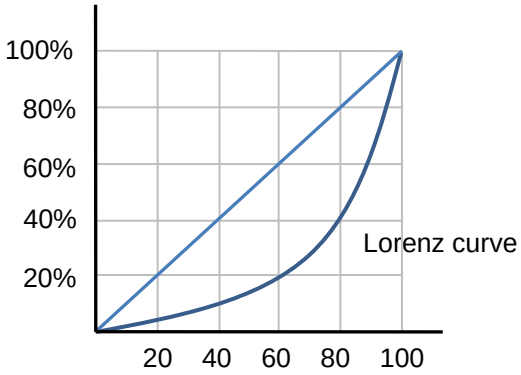
1) Outline what is meant by the Gini-coefficient. *[2 marks]*

The Gini coefficient is a statistical measure of the wealth distribution of a nation's residents. It is used to measure a country's inequality with regards to income distribution. The number ranges from 0 (perfect equality) to 1 (perfect inequality).

2) Outline what is meant by the Lorenz curve. *[3 marks]*

The Lorenz curve is a graphical representation of the wealth distribution of a country, such as the poorest 20% earning 5% of the nation's wealth. The further the Lorenz curve is from the line of absolute equality (the diagonal line), the more unequal the distribution of income.

3) The following questions refer to the Lorenz curve shown below.



i. State what the 45-degree line represents. *[1 mark]*

Perfect income equality in the economy

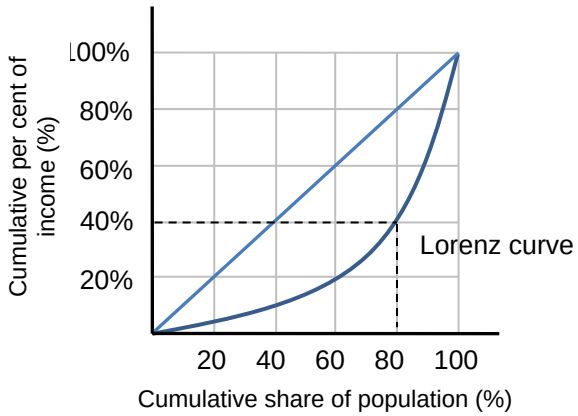
ii. State the correct label for the horizontal axis if the y-axis is the cumulative share of income. *[1 mark]*

Cumulative share of population.

iii. Identify which of the following statements is correct. *[1 mark]*

A. The 1st quintile earns 60% of the national income
B. The 2nd quintile earns 10% of the national income
C. The 3rd quintile earns 60% of the national income
D. The 4th quintile earns 40% of the national income

iv. Determine the incomes from the fourth quintile in the country. *[1 mark]*



The 4th quintile (80%) of the population account for 40% of the national income

4) Distinguish between the terms *equality* and *equity* in the context of distribution of income. *[4 marks]*

Equality occurs when national income is distributed equally, i.e. the Gini coefficient is 0. This means people have the same (or remarkably similar) incomes. *Equity* refers to justified fairness in the distribution of income. Arguably, people who work harder should be paid higher incomes or those with better qualifications and work experience should have the opportunity to earn more incomes.

Worksheet 36
3.5 The Keynesian Multiplier (1) (HL Only)

1) Define the term *Keynesian multiplier*. *[2 marks]*

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2) Explain the difference between the marginal propensity to consume (MPC) and the marginal propensity to save (MPS). *[4 marks]*

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3) Calculate the value of the multiplier if an increase in investment of $200 million leads to an increase in national income (GDP) of $350 million. *[2 marks]*

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4) Calculate the change in GDP of Country X if the investment in the country increases by $50 billion and the multiplier is 2.5. *[2 marks]*

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5) Explain why the sum of MPC, MPS, MPT, and MPM equals 1. *[2 marks]*

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6) Complete the table, for an economy with an MPC = 0.5 following an increase in investment expenditure of $10 million. *[4 marks]*

Increase in investment	Change in income (real GDP $m)	Change in consumption ($m)
1st round		
2nd round		
3rd round		
4th round		
5th round		

7) Explain why consumption expenditure falls in each successive round in Question 6. *[2 marks]*

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8) Suppose an economy has an MPC of 0.6 and there is an output gap equivalent to $50 billion. Calculate how much the government needs to invest if the full employment level of output is to be achieved. *[2 marks]*

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Worksheet 36
3.5 The Keynesian Multiplier (1) (HL Only)

Answers

1) Define the term *Keynesian multiplier*. *[2 marks]*

The Keynesian multiplier shows that an increase in any injections into the circular flow of an economy yields a larger increase in aggregate demand.

2) Explain the difference between the marginal propensity to consume (MPC) and the marginal propensity to save (MPS). *[4 marks]*

The MPC is the change in consumption as a result of a change in average household income, so reflects the portion of additional national income that is spent on consumption (an injection into the circular flow). By contrast, the MPS is the change in savings as a result of a change in national income, so reflects the portion of income that is saved (a withdrawal).

3) Calculate the value of the multiplier if an increase in investment of $200 million leads to an increase in national income (GDP) of $350 million. *[2 marks]*

- The multiplier can be calculated by dividing the increase in national income by the increase in the injection.
- Multiplier = 350 / 200 = 1.75

4) Calculate the change in GDP of Country X if the investment in the country increases by $50 billion and the multiplier is 2.5. *[2 marks]*

- If the multiplier is 2.5 and investment is increased by $50 billion, then the GDP will increase by 2.5 × $50 billion
- Hence, △GDP = 50 × 2.5 = $125 million.

5) Explain why the sum of MPC, MPS, MPT, and MPM equals 1. *[2 marks]*

By definition, national income must be either spent on consumption and imports or be saved or taxed. Hence, the sum of all these parts must equal to 1 (or 100% of national income).

6) Complete the table, assuming the MPC = 0.5 and an increase in investment of $10 million. *[4 marks]*

Increase in investment	Change in income (real GDP $m)	Change in consumption ($m)
1st round	10	10 × 0.5 = 5.0
2nd round	5.0	5.0 × 0.5 = 2.50
3rd round	2.50	2.5 × 0.5 = 1.25
4th round	1.25	1.25 × 0.5 = 0.625
5th round	0.625	0.625 ×.5 = 0.3125

7) Explain why induced consumption falls in each successive round in Question 6. *[2 marks]*

The change in income (real GDP) decreases in each round as consumers only spend a part of any additional income (50% in this case as the marginal propensity to consume is 0.5).

8) Suppose an economy has an MPC of 0.6 and there is an output gap equivalent to $50 billion. Calculate how much the government needs to invest if the full employment level of output is to be achieved. *[2 marks]*

- The Keynesian multiplier (k) = 1 / (1 – MPC). Here the size of the multiplier = 1 / (1 – 0.6)
- Hence, k = 1 / 0.4 = 2.5
- If the government wants to compensate the output gap of $50 billion, the government must inject 50 / 2.5 = $20 billion into the economy.

Worksheet 37
3.5 The Keynesian Multiplier (2) (HL only)

1) Using an appropriate AD-AS diagram, explain the Keynesian multiplier effect. *[4 marks]*

2) Calculate the total change in national income if investment increases by $10 million and the economy's marginal propensity to consume (MPC) is 0.8. *[2 marks]*

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3) Country A has a marginal propensity to save of 0.10 and a marginal propensity to import of 0.20. Country B saves 15% of its disposable income and spend 30% of its income on imported goods and services. Explain which of these two countries has the higher multiplier. *[2 marks]*

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4) Define the term *crowding out.* *[2 marks]*

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5) Explain how crowding out limits the effectiveness of expansionary fiscal policy. *[2 marks]*

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6) Calculate the autonomous spending in the economy if the MPC = 0.25 and there is a resulting change in national income of $100 billion. *[2 marks]*

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7) Calculate the value of the multiplier in the marginal propensity to tax (MPT) = 0.15, marginal propensity to import (MPM) = 0.35, and marginal propensity to save (MPS) = 0.15. *[2 marks]*

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8) Calculate the value of the multiplier if the MPS = 0.3 and under the assumption that the country does not levy any tax and the government forbids any imports. *[2 marks]*

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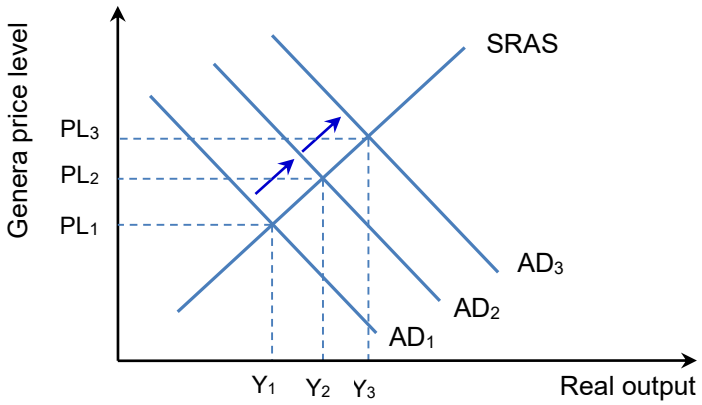
Answers

1) Using an appropriate AD-AS diagram, explain the Keynesian multiplier effect. *[4 marks]*



The multiplier effect occurs when an increase in exports (X), investment (I), or government spending (G) leads to higher increase in real output. Due to an initial injection into the circular flow, AD (aggregate demand) shifts from AD_1 to AD_2, increasing both the general price level (from PL_1 to PL_2) and the real output (from Y_1 to Y_2). However, the multiplier effect leads to a further increase in AD (shifting it further to AD_3, as shown in the diagram) and an increase in real output to Y_3.

2) Calculate the total change in national income if investment increases by $10 million and the economy's marginal propensity to consume (MPC) is 0.8. *[2 marks]*

- Multiplier = 1 / (1 – MPC)
- Change in AD = 1 / (1 – 0.8) × $10m = $50 million

3) Country A has a marginal propensity to save of 0.10 and a marginal propensity to import of 0.20. Country B saves 15% of its disposable income and spend 30% of its income on imported goods and services. Explain which of these two countries has the higher multiplier. *[2 marks]*

- MPC for country A = 1 – (0.1 + 0.2) = 1 – 0.3 = 0.7; so the multiplier for = 1 / (1 – 0.7) = 3.33
- MPC for country B = 1 – (0.15 + 0.3) = 1 – 0.45 = 0.55; so the multiplier = 1 / (1 – 0.55) = 2.22

4) Define the term *crowding out.* *[2 marks]*

The crowding out effect is an economic theory arguing that rising public sector spending drives down or even eliminates private sector spending due to the resulting rise in interest rates.

5) Explain how crowding out limits the effectiveness of expansionary fiscal policy. *[2 marks]*

When a government borrows money to finance public sector spending, often to address a budget deficit, the interest rate rises due to the relatively higher demand for loanable funds. That leads to a reduction in private sector investment as firms would have to pay more due to a higher cost of borrowing. That is why the increased government spending balances out with a decrease in investment, limiting the effectiveness of expansionary fiscal policies.

6) Calculate the autonomous spending in the economy if the MPC = 0.25 and there is a resulting change in national income of $100 billion. *[2 marks]*

- Autonomous spending = Change in national income / Keynesian Multiplier
- Autonomous spending = 100 / [1 / (1 – 0.25)] = $75 billion

7) Calculate the value of the multiplier in the marginal propensity to tax (MPT) = 0.15, marginal propensity to import (MPM) = 0.35, and marginal propensity to save (MPS) = 0.15. *[2 marks]*

- Multiplier = 1 / (MPS + MPT + MPM)
- Multiplier = 1 / (0.15 + 0.15 + 0.35) = 1/0.65= 1.54

8) Calculate the value of the multiplier if the MPS = 0.3 and under the assumption that the country does not levy any tax and the government forbids any imports. *[2 marks]*

As there are no taxes or imports, the MPT + MPM = 0

- MPS = 1 – MPC
- MPC = 1 – 0.3 = 0.7
- Therefore the multiplier = 1 / (1 – 0.7) = 1/0.3 = 3.33

Worksheet 38
4.1 Comparative advantage

The following table shows Country X and Country Y's maximum ability to produce timber and beef if all resources are dedicated to the production of these goods. Assume that timber and beef are the only products produced and labour is the only input needed. There is also an assumption of constant returns to scale. Both timber and beef are expressed in millions of units of production.

Country	Timber	Beef
Country X	40	60
Country Y	30	10

1) State which country has an absolute advantage in the production of timber. *[1 mark]*

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2) Calculate the opportunity cost for Country X of producing 1 million units of timber **and** the opportunity cost for Country Y of producing 1 million units of beef. *[2 marks]*

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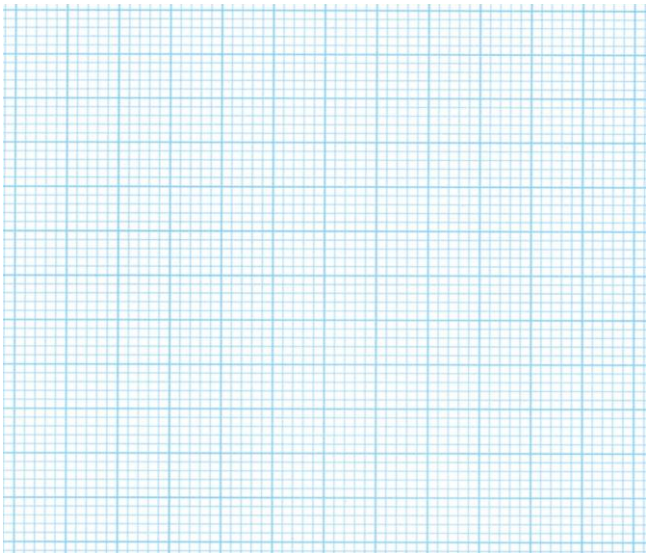
3) Using the data, draw the production possibility frontier (PPF) for Country X and Y below. *[4 marks]*



4) From your graph above, determine which country has a comparative advantage in the production of timber **and** which country has a comparative advantage in the production beef. *[2 marks]*

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5) If both nations attempt self-sufficiency and divert half of their available resources to the production of each good, calculate how much timber and beef these countries would be able to produce. *[2 marks]*

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6) Assume both nations choose to specialise and then trade their surplus, at the exchange rate of one unit of beef to 1 unit of timber. Calculate the total amount of beef and timber that both countries will left with after the trade, if they trade 5 units of beef to 5 unit of timber. *[2 marks]*

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Worksheet 38
4.1 Comparative advantage

Answers

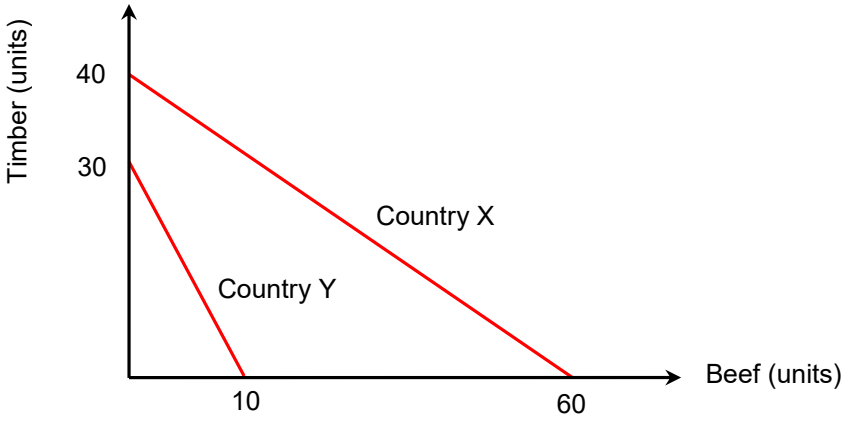
The following table shows Country X and Country Y's maximum ability to produce timber and beef if all resources are dedicated to the production of these goods. Assume that timber and beef are the only products produced and labour is the only input needed. There is also an assumption of constant returns to scale. Both timber and beef are expressed in millions of units of production.

Country	Timber	Beef
Country X	40	60
Country Y	30	10

1) State which country has an absolute advantage in the production of timber. *[1 mark]*
Country X has the absolute advantage to produce timber (40 units vs 30 units for Country Y)

2) Calculate the opportunity cost for Country X of producing 1 million units of timber **and** the opportunity cost for Country Y of producing 1 million units of beef. *[2 marks]*
- Opportunity cost for Country X = 60/40 = 3/2
- Opportunity cost for Country Y = 30/10 = 3

3) Using the data, draw the production possibility frontier (PPF) for Country X and Y below. *[4 marks]*



4) From your graph above, determine which country has a comparative advantage in the production of timber **and** which country has a comparative advantage in the production beef. *[2 marks]*
- Country X has a lower opportunity cost of beef production
- Country Y has a lower opportunity cost of timber production
- Henceforth, Country X should produce beef and Country Y should produce timber.

5) If both nations attempt self-sufficiency and divert half of their available resources to the production of each good, calculate how much timber and beef these countries would be able to produce. *[2 marks]*

- Country X will be able to produce 20 million units of timber and 30 million units of beef
- Country Y will be able to produce 15 million units of timber and 5 million units of beef

				Without trade	
	Timber		Beef	Timber	Beef
Country X	40	or	60	20	30
Country Y	30	or	10	15	5

6) Assume both nations choose to specialise and then trade their surplus, at the exchange rate of one unit of beef to 1 unit of timber. Calculate the total amount of beef and timber both the countries will left with after the trade, if they trade 5 units of beef to 5 unit of timber. *[2 marks]*

After trade, Country X will be left with 5 million kg of timber and 55 million kg of beef whilst Country Y will be left with 25 million kg of timber and 5 million kg of beef.

				No trade		Specialization		Trade	
	Tim		Beef	Tim	Beef	Tim	Beef	Tim	Beef
Country X	40	or	60	20	30	0	60	5	55
Country Y	30	or	10	15	5	30	0	25	5

Worksheet 39
4.2 Types of trade protection: Tariffs (1)

1) From the demand and supply diagram below, state the price of the product before trade, after trade and after imposition of a tariff. *[3 marks]*

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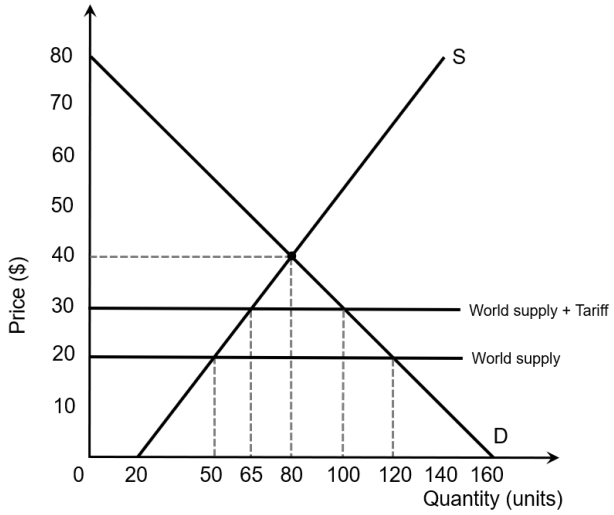

2) State the quantity demanded and quantity supplied by the domestic market *before* and *after* the tariff has been imposed. *[4 marks]*

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3) Calculate the change in domestic supply **and** the change in domestic demand after the tariff has been imposed. *[4 marks]*

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4) Calculate the change in the amount imported *after* the tariff has been imposed. *[2 marks]*

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5) Calculate the tax revenue generated from the tariff. *[2 marks]*

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6) Calculate the welfare loss to the domestic economy from the imposition of the tariff. *[2 marks]*

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7) Outline why the world supply curve is perfectly price elastic. *[2 marks]*

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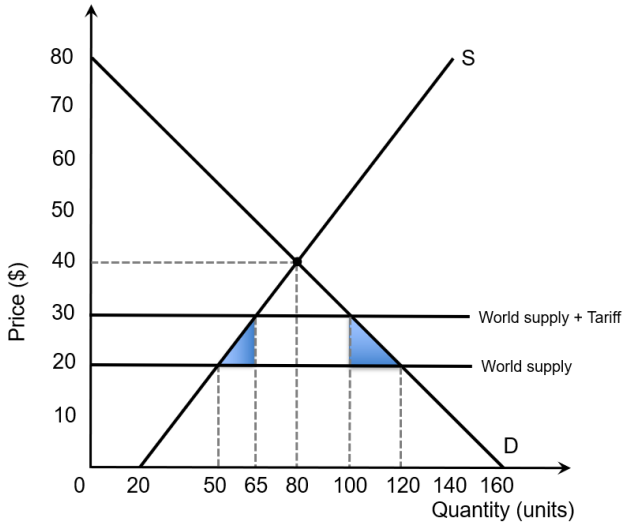
Worksheet 39
4.2 Types of trade protection: Tariffs (1)

Answers

1) From the demand and supply diagram below, state the price of the product before trade, after trade and after imposition of a tariff. *[3 marks]*

Before trade = $60, After trade = $30, After imposition of a tariff = $40



2) State the quantity demanded and quantity supplied by the domestic market *before* and *after* the tariff has been imposed. *[4 marks]*

Before imposition of the tariff:
- Domestic quantity demanded domestically = 120 units
- Domestic quantity supplied = 50 units

After imposition of the tariff:
- Domestic quantity demanded domestically = 100 units
- Domestic quantity supplied = 65 units

3) Calculate the change in domestic supply **and** the change in domestic demand after the tariff has been imposed. *[4 marks]*

- Domestic supply expands from 50 units to 65 units (an increase of 15 units) after the tariff is imposed.
- Domestic demand contracts by from 120 units to 100 units (a decrease of 20 units) after the tariff is imposed.

4) Calculate the change in the amount imported *after* the tariff has been imposed. *[2 marks]*

- Volume of imports before the tariff is imposed = 120 – 50 = 70 units
- Volume of imports after the tariff is imposed = 100 – 65 = 35 units
- Hence, the change in the volume of imports = 70 – 35 = 35 units, i.e. imports have decreased by 35 units, or half of the previous the volume.

5) Calculate the tax revenue generated from the tariff. *[2 marks]*

- Tariff revenue = Per unit tariff × Quantity of imports
- Tariff revenue = $10 × 35 = **$350**

6) Calculate the welfare loss to the domestic economy from the imposition of the tariff. *[2 marks]*

- Welfare loss (of consumer surplus and world efficiency) is shown by the shaded areas in the above diagram
- Welfare loss = [(65 – 50) × (30 – 20)] / 2 + [(120 – 100) × (30 – 20)] / 2
- Welfare loss = (15 × 10) / 2 + (20 × 10) / 2 = 75 + 100 = **$175**

Top tip: A welfare loss exists because the imposition of the tariff results in inefficiencies in terms of greater production from inefficient domestic producers (illustrated by the blue shaded area on the left) and reduced choice and consumption (shown by the blue shaded area on the right). Hence, the welfare loss is a result of the tariff causing a misallocation of scarce resources.

7) Outline why the world supply curve is perfectly price elastic. *[2 marks]*

The world supply curve is assumed to be perfectly price elastic because one of the assumptions of free trade is perfect competition so that producers are price takers at the market price (of $20 in the above case). It is assumed that domestic firms are too small to have any market power to influence world prices so are forced to accept the world price once the country becomes open to international trade.

Worksheet 40
4.2 Types of trade protection: Tariffs (2)

1) Use the diagram below to calculate the change in the volume of imports following the imposition of a per unit tariff. *[2 marks]*

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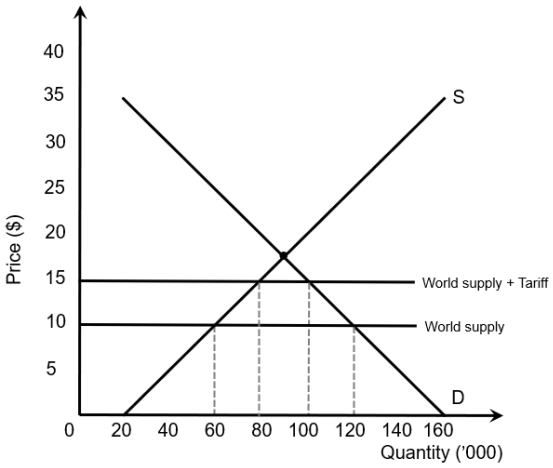

2) Calculate the tax revenue following the imposition of the per unit tariff. *[2 marks]*

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3) Calculate the welfare loss as a consequence of the imposition of the tariff. *[2 marks]*

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4) In terms of economic well-being, outline the impact of free trade (without trade barriers) on both importing and exporting countries. *[2 marks]*

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5) Explain how imposing tariffs creates a greater barrier to the economic development of low-income countries. *[4 marks]*

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6) Suggest why a government is not always in favour of opening markets to free trade. *[4 marks]*

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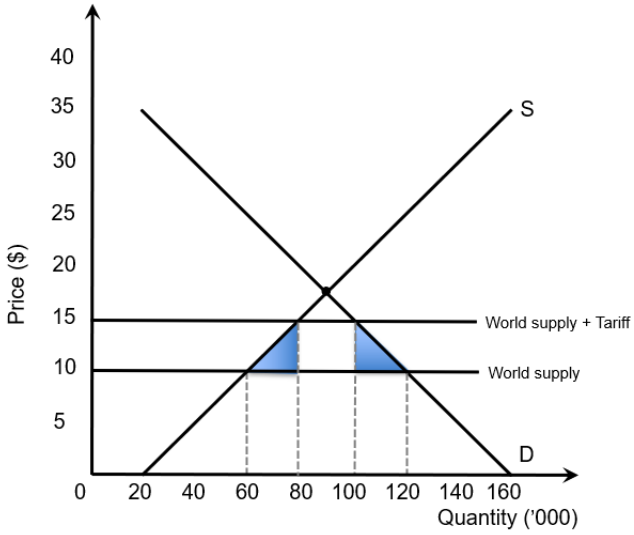
Answers

1) Use the diagram below to calculate the change in the volume of imports following the imposition of a per unit tariff. *[4 marks]*



- Pre-tariff position: Quantity imported = 120,000 – 60,000 = 60,000 units
- Post-tariff position: Quantity imported = 100,000 – 80,000 = 20,000 units
- Hence, the change in quantity imported = 60,000 – 20,000 = 40,000 units
- Therefore, the quantity imported has fallen by 40,000 units following the imposition of the per unit tariff.

2) Calculate the tax revenue following the imposition of the per unit tariff. *[2 marks]*

- Tariff = Per unit tariff × Quantity of imports
- Per unit tariff = $15 – $10 = $5
- Tariff = $5 × 20,000 = $100,000

3) Calculate the welfare loss as a consequence of the imposition of the tariff. *[2 marks]*

- The welfare loss is shown by the shaded areas in the diagram above
- Welfare loss = [(80 – 60) × (15 – 10)] / 2 + [(120 – 100) × (15 – 10)] / 2
- Welfare loss = [(20 × 5) / 2] + [(20 × 5) / 2] = $100,000

4) In terms of economic well-being, outline the impact of free trade (without trade barriers) on both importing and exporting countries. *[2 marks]*

Due to the increase in consumer surplus for those in the importing country as well as higher producer surplus for firms in exporting countries, total economic well-being increases with free trade. Alternatively, students can explain economic well-being from the context of greater choice and improved competitiveness.

5) Explain how imposing tariffs creates a greater barrier to the economic development of low-income countries. *[4 marks]*

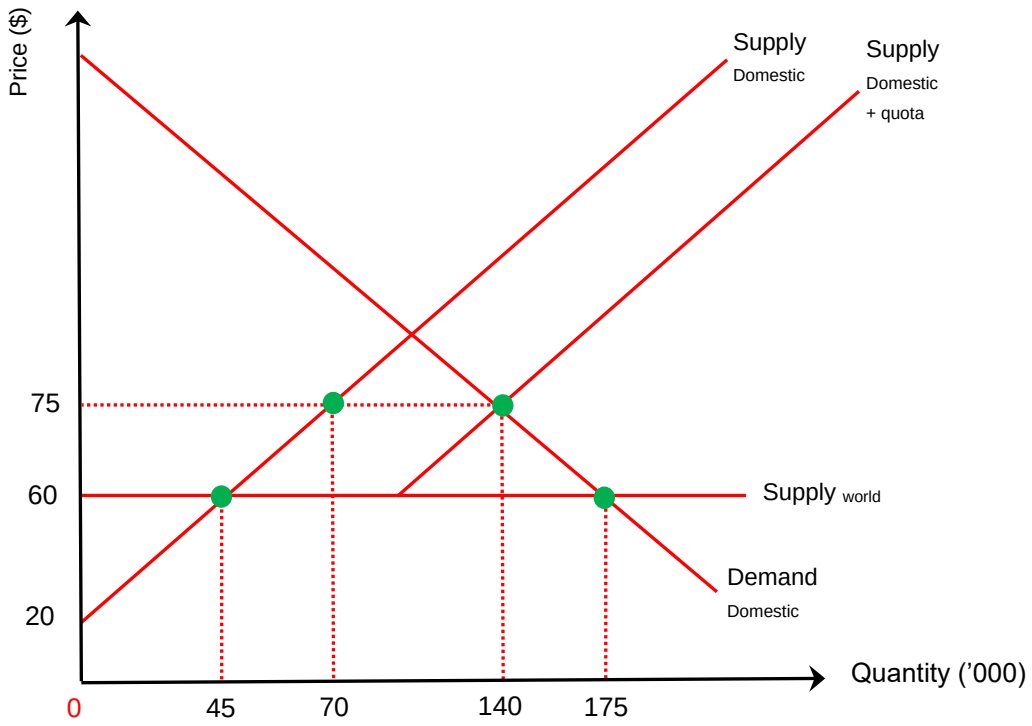
Imposing tariffs and/or increasing the rate of per unit tariffs reduces the price competitiveness of foreign firms. Hence, the imposition of tariffs reduces the ability of these overseas firm from competing with the protected domestic firms. This problem is worsened when high-income countries with large market power are protected by their governments thereby reducing or even eliminating the economic development of firms from low-income countries.

6) Suggest why a government is not always in favour of opening markets to free trade? *[4 marks]*

As suggested in Question 5 above, not all gains from free trade are the same for each stakeholder group. Retaliation may be needed to protect domestic firms from unfair competition, for example. Furthermore, domestic infant industries are vulnerable to the market power of large multinational companies (MNCs) so generally suffer from the lack of protection. The large-scale operations and economies of scale of foreign MNCs pose a huge threat to domestic firms. Governments may also want to protect these industries from the possibility of dumping.

Worksheet 41
4.2 Import quotas

1) From the diagram below, calculate the amount of quota imposed by Country A, per month. *[2 marks]*



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2) Calculate the quota revenue earned by Country A. *[2 marks]*

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3) Outline how (i) domestic consumers, (ii) domestic producers, and (iii) the government are affected by the imposition of the quota. *[3 marks]*

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4) Calculate consumer expenditure at the free trade position, without government intervention. *[2 marks]*

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5) Calculate the change in the government budget after imposition of the quota. *[2 marks]*

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6) Explain who earns the quota rents. *[2 marks]*

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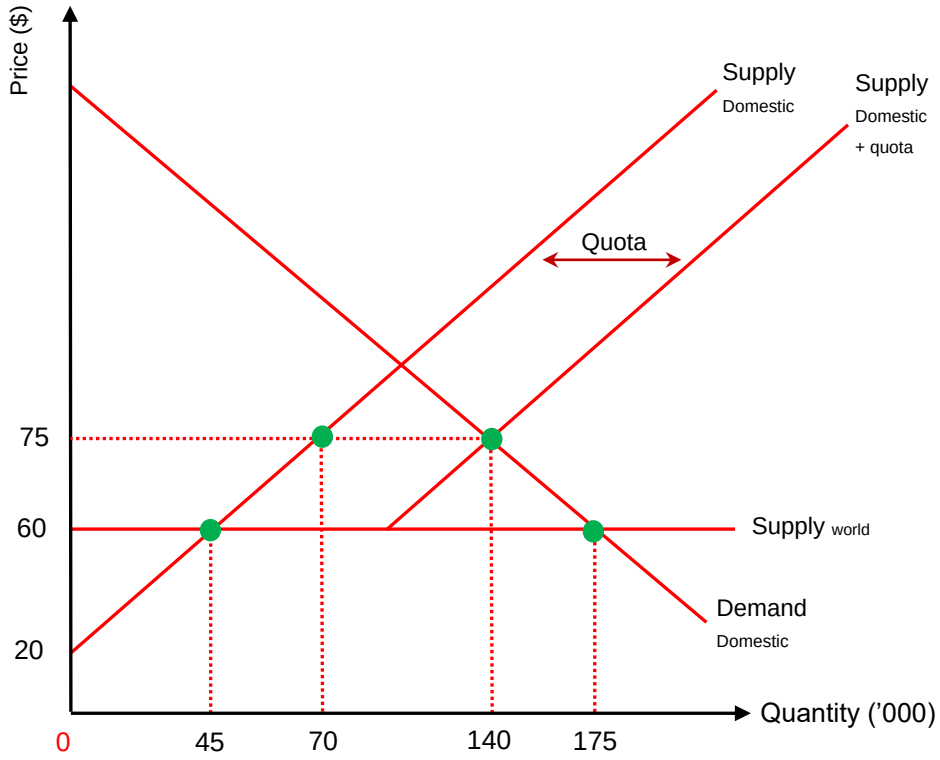
Worksheet 41
4.2 Import quotas

Answers

1) From the diagram below, calculate the amount of quota imposed by Country A, per month. *[2 marks]*



The quota is the volume of imports permitted into Country A. At $75, domestic production is 140,000 units per month and domestic consumption is 70,000. Hence, the quota = 140,000 – 70,000 = **70,000 units**.

2) Calculate the quota revenue earned by Country A. *[2 marks]*

- With the quota, firms can buy goods at the world price of $60 and resell these at the higher domestic price of $75. The price differential of $15 ($75 – $60) is the per unit quota revenue that they receive.
- Quota revenue = Per unit quota revenue × Import quota
- Quota revenue = 15 × 70,000 = **$1,050,000**

3) Outline how (i) domestic consumers, (ii) domestic producers, and (iii) the government are affected by the imposition of the quota. *[3 marks]*

- Consumers will be worse off with a quota as a result of an increase in domestic price (from $60 to $75), and a fall in demand from 175,000 to 140,000 units as a result.
- Domestic producers are better off as they can now sell their products at the higher price of $75.
- The government is not directly affected by the quota, so is neither better off nor worse off.

4) Calculate consumer expenditure at the free trade position, without government intervention. *[2 marks]*

Consumer expenditure before imposition of the quota is = $60 × 175,000 = $10,500,000.

5) Calculate the change in the government budget after imposition of the quota. *[2 marks]*

The government does not earn any money from the imposition of a quota. Hence, the government budget is not directly affected.

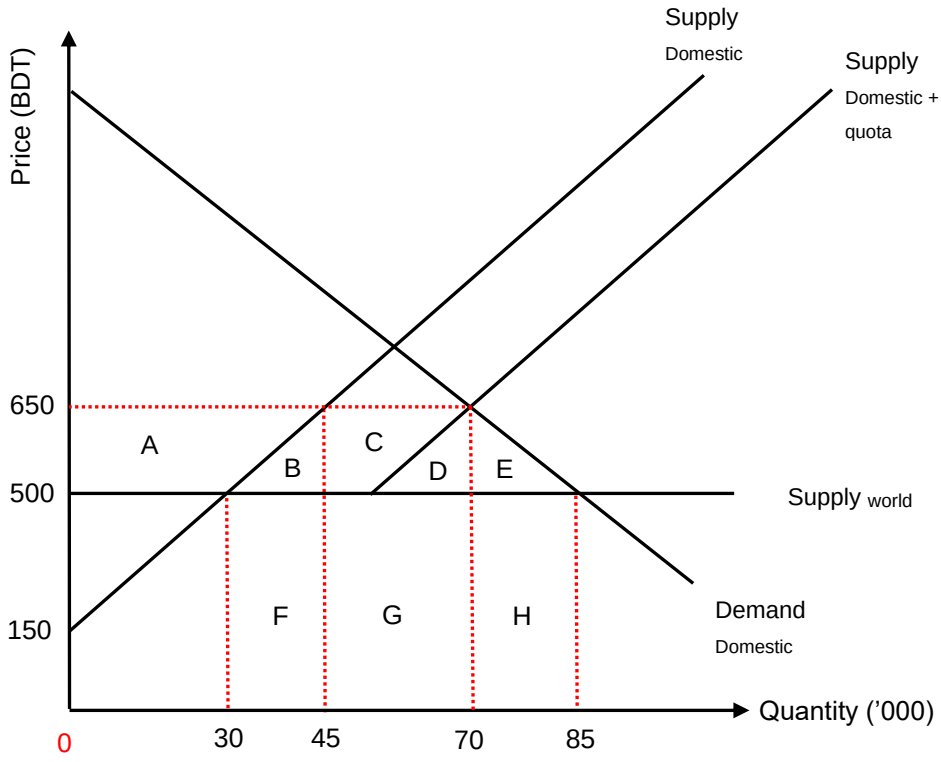
6) Explain who earns the quota rents. *[2 marks]*

Quota rents represent the money created as a result of the artificial restriction on the quantity of the good that is available in the domestic market. The size of the quota rent = ($75 – $60) × (140,000 – 70,000) = $10,500,000. The domestic government could auction off (sell) these licenses, to domestic importing firms, foreign exporters, or the government of the foreign exporters.

Worksheet 42
4.2 Import quotas and Import substitution

1) Bangladesh imposes a quota on the imports of Italian chocolates. From the diagram below, calculate the quota imposed by the domestic government. The currency is expressed in Bangladeshi taka (BDT).

[2 marks]



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2) Calculate the revenues earned by domestic producers before the imposition of a quota. *[2 marks]*

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3) Calculate the change in consumer surplus as a result of the quota. *[2 marks]*

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4) Calculate the change in producer surplus as a result of the quota. *[2 marks]*

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5) Define the term *import substitution.* *[2 marks]*

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6) Explain **one** consequence of import substitution. *[2 marks]*

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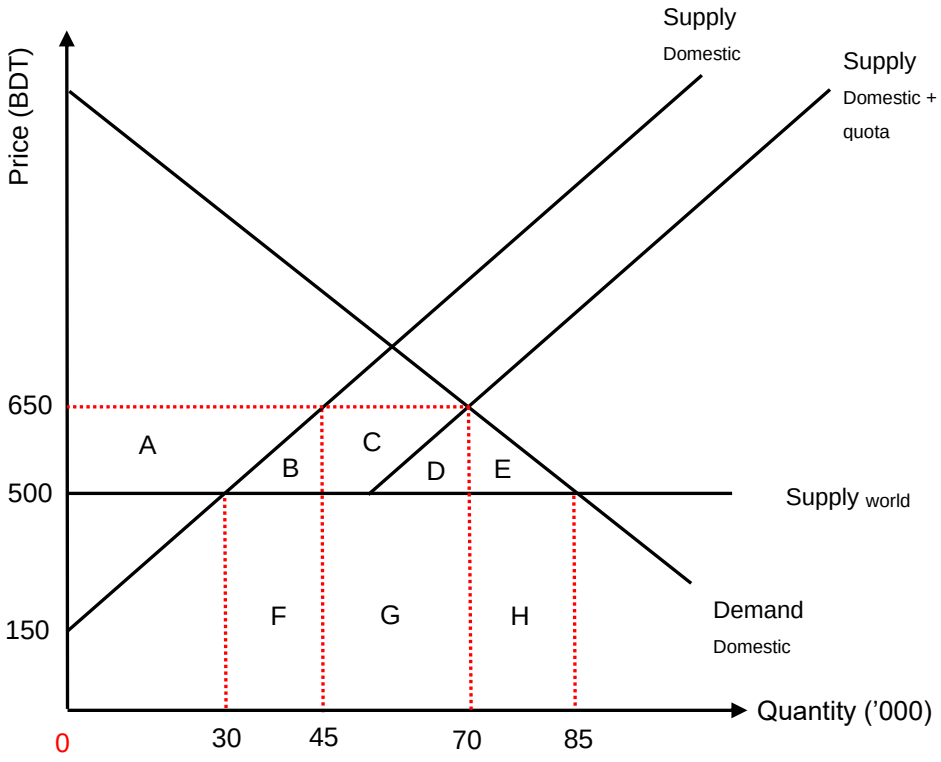
Answers

1) Bangladesh imposes a quota on the imports of Italian chocolates. From the diagram below, calculate the quota imposed by the domestic government. *[2 marks]*

The quota imposed by the Bangladeshi government on Italian chocolate = (70 – 45) = 25,000 units.



2) Calculate the revenues earned by domestic producers before the imposition of a quota. *[2 marks]*

Revenues = (500 × 30,000) = 15,000,000 Bangladeshi takas.

3) Calculate the change in consumer surplus as a result of the quota. *[2 marks]*

- Consumer surplus will decrease as a result of the imposition of the quota. It is equivalent to the area (A+B+C+D+E), i.e. [(650 – 500) × 70,000] + [(85,000 – 70,000) × (650 – 500)]/2
- Change in consumer surplus = 10,500,000 + 1,125,000= 11,625,000 Bangladeshi takas

4) Calculate the change in producer surplus as a result of the quota. *[2 marks]*

- Producer surplus will increase as a result of the imposition of the quota. It is equal to the area of the trapezium (A).
- Change in producer surplus = [(45,000 + 30,000)/2] × (650 – 500) = 37,500 × 150 = 5,625,000 BDT

5) Define the term *import substitution.* *[2 marks]*

Import substitution is a trade strategy used to promote economic growth and/or economic development by blocking imports of manufactured good. The purpose is to increase the consumption of domestically produced goods and services.

6) Explain **one** consequence of import substitution. *[2 marks]*

Possible consequences of import substitution could include:

- Protection of domestic firms can result in economic inefficiency and a misallocation of scarce resources.
- Such trade protection can lead to an overvalued exchange rate that results in a rise in domestic prices.
- It distorts comparative advantages, especially if the domestic economy is unable to take advantage of economies of scale.
- *Accept any other valid consequence of import substitution.*

Worksheet 43
4.5 Exchange rates

1) Suppose that the exchange rate between the Canadian dollar ($) and the British pound (£) is $1 = £0.59 and the Euro (€) is $1 = €0.68. Calculate the exchange rate of the British pound to the Euro. *[2 marks]*

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2) The following questions refer to a student from Singapore decides to study in Italy. Suppose the exchange rate is 1 Singaporean dollar equals 0.62 euros.

i. Calculate the amount of SGD required if the student's school fees are €28,000 per year. *[2 marks]*

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ii. Calculate the exchange rate if the euro appreciates by 1.5% against the Singaporean dollar. *[2 marks]*

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iii. Calculate the change in the amount of Singaporean dollars needed for the student to pay the school fees in Italy as a result of the change in the exchange rate. *[2 marks]*

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3) The following questions refer to a student from Cambodia who wants to study classical Spanish at the University of Salamanca in Spain. The current exchange rate is 1 euro = 4,889 Cambodian riel.

i. If the tuition fees to study for a year is €12,000 and monthly living expenses are €800, calculate total annual cost for the student in Cambodian riel. *[2 marks]*

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ii. If the euro appreciates against the Cambodian riel by 9%, calculate the new exchange rate **and** the increase in the amount needed by the student as the result of the currency appreciation. *[4 marks]*

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4) Define the term *managed exchange rate.* *[2 marks]*

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5) Outline **one** action that the European Central Bank (ECB) could take to prevent an appreciation of the euro. *[2 marks]*

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Worksheet 43
4.5 Exchange rates

Answers

1) Suppose that the exchange rate between the Canadian dollar ($) and the British pound (£) is $1 = £0.59 and the Euro (€) is $1 = €0.68. Calculate the exchange rate of the British pound to the Euro. *[2 marks]*

- 0.59:0.68 = 1:1.1525 (or 1.15 to 2 d.p.)
- Hence, the exchange rate is £1 = €1.15
- Accept answers that show that €1 = £0.87.

2) The following questions refer to a student from Singapore decides to study in Italy. Suppose the exchange rate is 1 Singaporean dollar equals 0.62 euros.

i. Calculate the amount of SGD required if the student's school fees are €28,000 per year. *[2 marks]*

- $1 = €0.62 is the same as €1 = $1.61 (to 2 d.p.)
- So, €28,000 × 1.61 = SGD45,080

ii. Calculate the exchange rate if the euro appreciates by 1.5% against the Singaporean dollar. *[2 marks]*

- Previously, €1 = $1.61
- If the euro appreciated by 1.5%, the Italian currency could buy 1.5% more Singaporean dollars
- So, €1 = $1.61 × 1.015 = $1.63415 (or $1.63 to 2 d.p.)

iii. Calculate the change in the amount of Singaporean dollars needed for the student to pay the school fees in Italy as a result of the change in the exchange rate. *[2 marks]*

- As €1 = 1.63, to purchase €28,000 the Singaporean student would now need €28,000 × 1.63 = $45,640
- Hence, the student needs an extra $560 (SGD45,640 – SGD45,080) to pay for the school fees.

3) The following questions refer to a student from Cambodia who wants to study classical Spanish at the University of Salamanca in Spain. The current exchange rate is 1 euro = 4,889 Cambodian riel.

i. If the tuition fees to study for a year is €12,000 and monthly living expenses are €800, calculate total annual cost for the student in Cambodian riel. *[2 marks]*

- Total annual expenses = [€12,000 + (€800 × 12)] × 4,889
- Total annual expenses = (€12,000 + €9,600) × 4,889 = €21,600 × 4,889 = 105,602,400 riel.

ii. If the euro appreciates against the Cambodian riel by 9%, calculate the new exchange rate **and** the increase in the amount needed by the student as the result of the currency appreciation. *[4 marks]*

- The new exchange rate is: 4,889 × 1.09 = 5,329
- Increase in expenses = 5,329 × €21,600 = 115,106,400 Cambodian riel.
- Alternatively, accept answers that show 105,602,400 × 1.09 = 115,106,616 (due to rounding).

4) Define the term *managed exchange rate*. *[2 marks]*

A managed exchange rate refers to an exchange rate system that allows an exchange rate to float in the foreign exchange markets within a predetermined band but is subject to intervention by the domestic central bank or domestic monetary authority. The purpose is to prevent undesirable movements in the exchange rate.

5) Outline **one** action that the European Central Bank (ECB) could take to prevent an appreciation of the euro. *[2 marks]*

The EU Central bank could:

- Sell euros in the foreign exchange market (by supplying euros and purchasing other currencies) to increase the supply of euro, thereby reducing the value (or exchange rate) of the euro.
- Reduce interest rates in order to reduce the demand for the euro, thereby reducing its value (or exchange rate), ceteris paribus.

Worksheet 44
4.6 The balance of payments (1)

The following table offers information relating to the balance of payments of Country A in 2022. Country A has a current account surplus of €100 million. The current account deficit of Country A is €63 million.

Item	Euros (millions)
Export of goods	1,223
Import of goods	1,129
Export of services	A
Import of services	825
Net income	-15
Net current transfers	9
Net capital transfers	19
Net transactions in non-produced assets	21
Net direct investment	-232
Net portfolio investment	112
Reserve assets	B

1. Calculate the value of A (export of services) for Country A. *[2 marks]*

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2. Distinguish between *foreign direct investment* and *portfolio investment*. *[3 marks]*

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3. calculate the financial account balance. *[2 marks]*

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4. Calculate the value of B (reserve assets). *[2 marks]*

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5. Assuming Country A has a lower inflation rate than its trading partners, outline how this could affect its correct account balance. *[2 marks]*

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6. Explain how a depreciation of the euro would result in a J-curve effect. (HL only) *[4 marks]*

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Worksheet 44
4.6 The balance of payments (1)

Answers

The following table offers information relating to the balance of payments of Country A in 2022. Country A has a current account surplus of €100 million. The current account deficit of Country A is €63 million.

Item	Euros (millions)
Export of goods	1,223
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Export of services	A
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Net income	-15
Net current transfers	9
Net capital transfers	19
Net transactions in non-produced assets	21
Net direct investment	-232
Net portfolio investment	112
Reserve assets	B

1. Calculate the value of A (export of services) for Country A. *[2 marks]*

- The export of services can be calculated from the current account deficit of Country A.
- Current account deficit = - 63 = 1,223 + X – 1,129 – 825 + (- 15) + 9 = A – 737
- A = Export of service = €674 million

2. Distinguish between *foreign direct investment* and *portfolio investment*. *[3 marks]*

Foreign direct investment (FDI) takes place when an investor establishes foreign business operations or acquires foreign business assets in an overseas company. By contrasts, foreign portfolio investment (FPI) refers to the purchase of securities and other financial assets by investors from another country. Examples of foreign portfolio investments include stocks, bonds, mutual funds, and exchange traded funds.

3. Calculate the financial account balance. *[2 marks]*

- We know the sum of the current account, capital account, and financial account would be zero
- 63 + (19 + 9) + Financial account = 0
- Financial account = -35 million euros

4. Calculate the value of B (reserve assets). *[2 marks]*

- Reserve assets can be calculated with help of the value of the financial account (from Question 3)
- The financial account is the sum of net direct investment, net portfolio investment, and reserve assets.
- -35 = -232 + 112 + B = -120 + B
- B = €85 million

5. Assuming Country A has a lower inflation rate than its trading partners, outline how this could affect its correct account balance. *[2 marks]*

A lower inflation rate in Country A compared to its trading countries would make exports relatively more competitive as the trading partners would like to import more from Country A, ceteris paribus. A higher inflation rate in trading countries would also mean Country A is likely to import less from these countries. As a result, Country A is likely to enjoy an improvement in its current account balance.

6. Explain how a depreciation of the euro would result in a J-curve effect. (HL only) *[4 marks]*

A currency depreciation would make exports of Country A more price competitive and imports more costly. As a result, the current account balance would gradually improve, ceteris paribus. The demand for exports/imports will be price inelastic in short run and the Marshall-Learner condition will not be met. Hence, the current account balance may worsen in the short run. Over time, consumers of Country A will alter their demand based on the changing price of imports and exports and the PED for these will become more elastic, thereby helping to reduce the deficit or even cause a surplus on the balance of payments.

Worksheet 45
4.6 The balance of payments (2)

1. Define the term *portfolio investment*. *[2 marks]*

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2. The following table offers information relating to Country X's balance of payments in 2022. Complete the missing numbers in order to calculate the balance on the current account, capital account, and financial account. *[6 marks]*

No	Items	USD billions
Current account		
1	Export of goods	40
2	Import of goods	55
Balance of trade in goods		
3	Export of services	20
4	Import of services	27
Balance of trade in services		
5.	Income (inflows – outflows)	2
6	Current transfer (secondary income)	-3
Balance on current account		
Capital account		
7	Capital transfers (inflow – outflow)	2
8	Transfer in non-produced, non-financial assets	1
Balance on capital account		
Financial account		
9	Direct investment (inflow – outflow)	23
10	Portfolio investment (inflow – outflow)	-5
11	Official reserves	2
Balance on financial account		
Total balance on current account, capital account and financial account		

3. Explain **two** methods that can be used to correct a persistent current account deficit. *[4 marks]*

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Worksheet 45
4.6 The balance of payments (2)

Answers

1. Define the term *portfolio investment*. *[2 marks]*

Portfolio investments are investments in the form of a group of assets, including transactions in equity, securities, such as common stock, and debt securities, such as banknotes, bonds, and debentures.

2. The following table offers information relating to Country X's balance of payments in 2022. Complete the missing numbers in order to calculate the balance on the current account, capital account, and financial account. *[6 marks]*

No	Items	USD billions
Current account		
1	Export of goods	40
2	Import of goods	55
Balance of trade in goods		(Item 1 – Item 2) = 40 – 55= -15
3	Export of services	20
4	Import of services	27
Balance of trade in services		(Item 3 – Item 4) = 20 – 27 = -7
5.	Income (inflows – outflows)	2
6	Current transfer (secondary income)	-3
Balance on current account		(Balance in trade in goods + Balance in trade in services + Income + Current transfers) = (-15) + (-7) + 2 + (-3) = - 23
Capital account		
7	Capital transfers (inflow – outflow)	2
8	Transfer in non-produced, non-financial assets	1
Balance on capital account		Item 7 + 8 = 2 + 1 = 3
Financial account		
9	Direct investment (inflow – outflow)	23
10	Portfolio investment (inflow – outflow)	-5
11	Official reserves	2
Balance on financial account		20
Total balance on current account, capital account and financial account		0

3. Explain **two** methods that can be used to correct a persistent current account deficit. *[4 marks]*

If a country experiences a current account deficit for a prolonged period, it will be detrimental to the economy. The central bank of a country with a persistent current account deficit intervenes to address this issue. The government usually chooses a combination of policies from expenditure switching policies, expenditure reducing policies, and expansionary supply side policies, such as any two of the following:

- Exchange rate manipulation - devaluating the home currency to make exports more attractive.
- Protectionism - act of switching expenditures from imports to domestically produced products.
- Contractionary fiscal policy - act of reducing aggregate demand by setting higher tax on households and firms and/or reducing government expenditure in the economy.
- Contractionary monetary policy - act of raising interest rates to discourage the consumption of imported goods, although this can cause an appreciation in the exchange rate, thereby worsening the current account.
- Investment in education, healthcare, and research and development (R&D) - with sustained investment in these areas, productivity and international competitiveness improve, facilitating export-driven growth and development through higher quality goods, services, and intellectual properties.

Worksheet 46
Paper 3 – Policy Paper 1: Falling exchange rate in Pakistan

The Pakistani rupee (PKR) ended the 2020 calendar year as the worst performing currency in Asia. The currency was down 3.4% against the US dollar at the end of the year whilst other Asian currencies appreciated, including the Chinese yuan, Filipino peso, South Korean won, Malaysian ringgit, and Thai baht. The rupee closed the year at PKR160.19 per dollar. It remained volatile during the year as it marked a range of between PKR153.85 per USD and PKR168.41 per USD.

The State Bank of Pakistan, the country's central bank, has said that currency interventions are not just about managing volatility but important for enabling the orderly evolution of its exchange rate to a market-based system. Going forwards, a healthy current account balance, subdued debt payments, and the global collapse in oil prices will all help to stabilize the rupee around current levels.

In 2020, Pakistan recorded $1.39 billion in merchandise exports, which was a 34% drop from the previous year. However, improvements in Pakistan's external account have eased some of the negative impacts caused by the COVID-19 pandemic. Export industries in Pakistan are labour-intensive and provide plenty of jobs.

Table 1: Inflation rate compared to previous year

Year	Inflation rate (%)
2016	2.86
2017	4.15
2018	3.90
2019	6.74
2020	10.74

Table 2: Pakistani rupee (PKR) to US dollar (USD)

Year	Exchange rate, 1 PKR to 1 USD (January 1st of each year)
2017	0.00958
2018	0.00903
2019	0.00715
2020	0.00656
2021	0.00622

Source: adapted from businesstribune.com.pk/ and xe.com

Using the data provided and your knowledge of economics, recommend how the Pakistani government could address the impacts caused by a falling exchange rate. *[10 marks]*

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Worksheet 46
Paper 3 – Policy Paper 1: Falling exchange rate in Pakistan

Answers

The Pakistani rupee (PKR) ended the 2020 calendar year as the worst performing currency in Asia. The currency was down 3.4% against the US dollar at the end of the year whilst other Asian currencies appreciated, including the Chinese yuan, Filipino peso, South Korean won, Malaysian ringgit, and Thai baht. The rupee closed the year at PKR160.19 per dollar. It remained volatile during the year as it marked a range of between PKR153.85 per USD and PKR168.41 per USD.

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2020	0.00656
2021	0.00622

Source: adapted from businesstribune.com.pk/ and xe.com

Using the data provided and your knowledge of economics, recommend how the Pakistani government could address the impacts caused by a falling exchange rate. *[10 marks]*

Possible policies may include, but are not restricted to:

- Selling foreign exchange assets and purchasing its own currency (the PKR) to push up its value.
- Raising interest rates in Pakistan, which creates an injection of hot money when foreign banks and financial institutions move money to Pakistan to take advantage of a better rate of return on savings. However, higher interest rates may reduce the rate of economic growth, which is undesirable in the context of Pakistan.
- Selling/buying treasury bills (government securities) depending on the short-term needs/objectives of the Pakistani government and the economy.
- Making exports more competitive by targeting a reduction in the rate of inflation.
- The State Bank of Pakistan (central bank) could pursue tighter fiscal and/or monetary policy measures.
- Alternatively, it could use supply-side policies to focus on long run impacts and benefits. Supply-side policies to increase Pakistan's international competitiveness could include, for example, privatization and reducing or eliminating regulations that may help export industries to become more economical.
- Ensuing economic and political stability to achieve economic growth and development in Pakistan in the long-term.
- Policy measures to improve Pakistan's current account deficit caused by the fall in the PKR.
- *Accept any other valid policy, written in the context of the case study.*
- *Accept a combination of policies, although this approach is not necessary to reach the top mark band.*

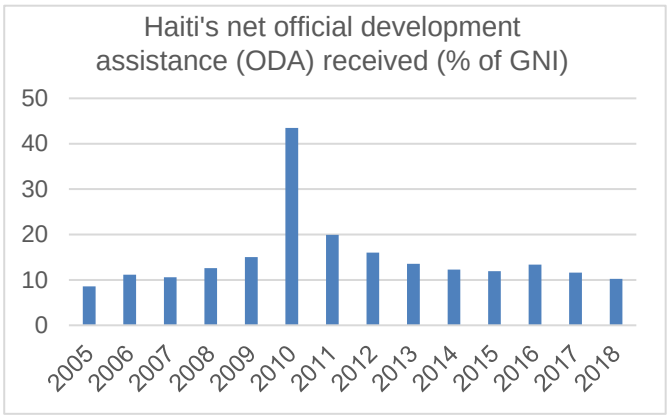
This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

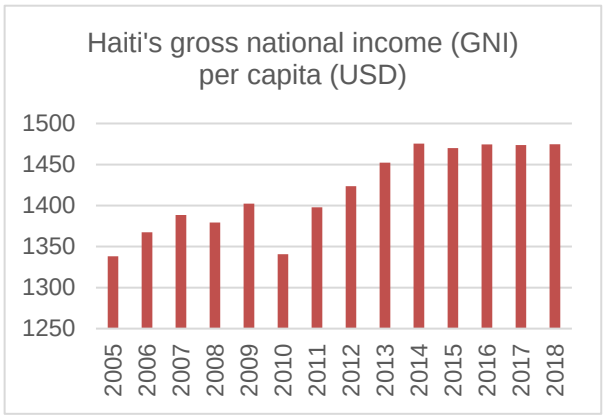
Haiti's foreign aid

Haiti, located on the island of Hispaniola in the Caribbean, with a population of 10.6 million inhabitants, is one of the poorest countries in the world. Around 59 per cent of its population lives under the poverty line and more than 24 per cent live under conditions of extreme poverty. Haiti's hunger situation has been gradually improving over the past two decades and its Global Hunger Index (used to measure and track hunger at global, regional, and national levels) has dropped by about 20 per cent. The GHI report reveals positive development in hunger indicators and for the first time in more than two decades, the prevalence of wasting, or low weight for height (which is a strong predictor of mortality among children under five) was found to be low.

Other reports show that life expectancy at birth in Haiti has increased by nine years over the past twenty years. Haiti is prone to natural disasters and have been a victim of a poor food distribution system. It has not been possible to distribute the food aid due to high fuel prices, poor infrastructure, and a weak and corrupt national government. Haitians joke that they live in the land of 10,000 non-governmental organizations.

Haiti has also been the recipient of billions of dollars in foreign government bilateral and multilateral aid over the past quarter of a century. This enormous giving has created harmful distortions in the local economy because when what would otherwise be traded or produced by Haitians is given away, it drives entrepreneurs out of business. Haiti has been recording trade deficits for over a decade and is strongly dependent on the remittances from the Haitian diaspora. As a means of addressing Haiti's development problems, Spain proposed a different aid model. Spain has offered over US$100 million to help revitalize agriculture in Haiti and to rebuild roads and schools.





Sources: Adapted from CIA Factbook, Statista, and https://www.globalhungerindex.org/trends.html

Check with your teacher as to whether you should write or type your answer to the following policy paper question.

Using the data provided and your knowledge of economics, recommend a policy which could be introduced by the government of Haiti in response to the falling foreign aid over last three years.

[10 marks]

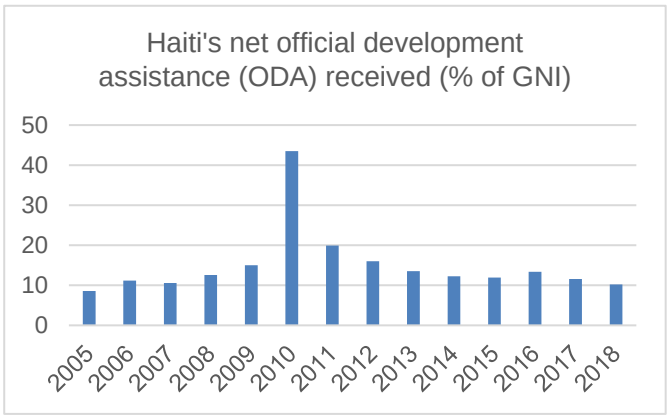
Answers

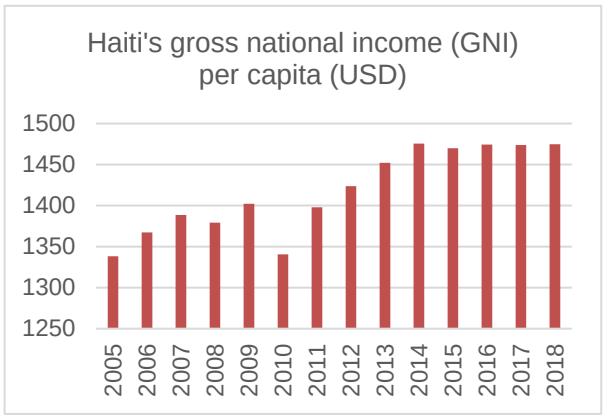
Haiti's foreign aid

Haiti, located on the island of Hispaniola in the Caribbean, with a population of 10.6 million inhabitants, is one of the poorest countries in the world. Around 59 per cent of its population lives under the poverty line and more than 24 per cent live under conditions of extreme poverty. Haiti's hunger situation has been gradually improving over the past two decades and its Global Hunger Index (used to measure and track hunger at global, regional, and national levels) has dropped by about 20 per cent. The GHI report reveals positive development in hunger indicators and for the first time in more than two decades, the prevalence of wasting, or low weight for height (which is a strong predictor of mortality among children under five) was found to be low.

Other reports show that life expectancy at birth in Haiti has increased by nine years over the past twenty years. Haiti is prone to natural disasters and have been a victim of a poor food distribution system. It has not been possible to distribute the food aid due to high fuel prices, poor infrastructure, and a weak and corrupt national government. Haitians joke that they live in the land of 10,000 non-governmental organizations.

Haiti has also been the recipient of billions of dollars in foreign government bilateral and multilateral aid over the past quarter of a century. This enormous giving has created harmful distortions in the local economy because when what would otherwise be traded or produced by Haitians is given away, it drives entrepreneurs out of business. Haiti has been recording trade deficits for over a decade and is strongly dependent on the remittances from the Haitian diaspora. As a means of addressing Haiti's development problems, Spain proposed a different aid model. Spain has offered over US$100 million to help revitalize agriculture in Haiti and to rebuild roads and schools.





Source: Adapted from CIA Factbook and Statista

Using the data provided and your knowledge of economics, recommend a policy which could be introduced by the government of Haiti in response to the falling foreign aid over last three years.

[10 marks]

Possible policies may include (but are not restricted to):

- Policies such as import substitution and export promotion to address Haiti's trade deficits.
- Monetary policy - a decrease in interest rate, which may encourage more private and FDI.
- Policies for a better infrastructure and basic amenities for local communities.
- Supply side policies, e.g. privatization and deregulation to increase productivity and competition.
- Policies to reduce tax and/or increase government spending to boost the economy.
- Relevant exchange rate policy for a stronger/more stable currency in the long term.
- Institutional policies for a more stable and less corrupt government.
- Drive for stronger and strategic foreign policies for bilateral or multi-lateral trade agreements.
- Policies to facilitate support for aid reduction and/or aid cancellation/debt forgiveness.
- *Accept any other appropriate policy recommendation.*
- *Accept a combination of policies written in the context of the case study.*

This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

Worksheet 48
Paper 3 – Policy Paper 3: Burundi

Coffee price in Burundi

Burundi's dependence on coffee exports has reduced over the years, from 80% in 1998 to 28% in 2013 (based on total export earnings of coffee as a proportion of GDP). The slump in coffee prices has also meant the export price of coffee as a proportion of the retail price has fallen. This has created some winners. Multinational companies and global coffee chains (such as Starbucks) are making record profits as the price of their main raw material slumps. However, for the low-income producers of Burundi, what has happened to the price of coffee is a disaster. Years ago, when coffee prices were higher, they could afford to send their children to school. Many families have taken their children out of school because they cannot afford the fees. Many of them face this dilemma - getting their children educated or getting them fed. Some policy makers argue that the high-income countries often have no tariffs on coffee beans but impose tariffs on processed coffee products to keep out these higher value products that return more income to job-starved poor countries.

US price of coffee per pound (0.45kg)

Year	Average closing price
2019	$1.0182
2018	$1.1360
2017	$1.3346
2016	$1.3683
2015	$1.3315
2014	$1.7840

Selected key macroeconomic performance indicators

Year	GDP annual growth rate (%)	GDP per capita ($)	Population (millions)
2020	3.94	270.69	11.89
2019	-0.47	278.32	11.53
2018	2.08	281.97	11.18
2017	5.53	268.43	10.83
2016	5.22	294.22	10.49

Source: adapted from https://www.macrotrends.net/2535/coffee-prices-historical-chart-data and https://tradingeconomics.com/burundi/

Using the data provided and your knowledge of economics, recommend two policies which could be introduced by the government of Burundi to sustain economic development in response to falling coffee prices. *[10 marks]*

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Answers

Coffee price in Burundi

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Using the data provided and your knowledge of economics, recommend two policies which could be introduced by the government of Burundi to sustain economic development in response to falling coffee prices. *[10 marks]*

Possible policies may include (but are not restricted to):

- Support for the domestic coffee industry e.g., improved technology, pesticides, fertilizers, and irrigation systems, although this might not be sustainable in the long-term.
- Impose import tariffs on substitute coffee products.
- Investment in infrastructure in order to support the coffee industry.
- Policies to promote domestic consumption and agriculture productivity to reduce Burundi's reliance on coffee exports.
- Policies to encourage Burundi's exports by promoting export initiatives.
- The establishment/development of a regional trading bloc, which can help with exports.
- Supply side policies to improve Burundi's economic growth and development.
- Exchange rate policies to influence coffee export earnings.
- Policies to curb growth of Burundi's population (note GDP per capita has fallen during the time period shown).
- *Accept any combination of any of these policies.*
- *Accept any other valid policy written in the context of the case study.*

This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

Increasing popularity of sugary drinks in India

The Indian soft drinks market is set to continue its robust growth trajectory as annual per-capita bottle consumption is expected to reach around 84 by 2021. The bottled water category is expected to see a robust volume growth with increasing awareness among consumers about water-borne diseases and shortages in drinking water in the urban areas.

In terms of revenue, the non-alcoholic beverages market in India was valued at INR 336.50 billion ($4.42bn) in 2020. It is expected to reach INR 1,131.52 billion ($14.83 billion) by 2027, expanding at a compound annual growth rate of approximately 18.69% during this period. The pie chart below indicates the distribution channel of non-alcoholic beverages.

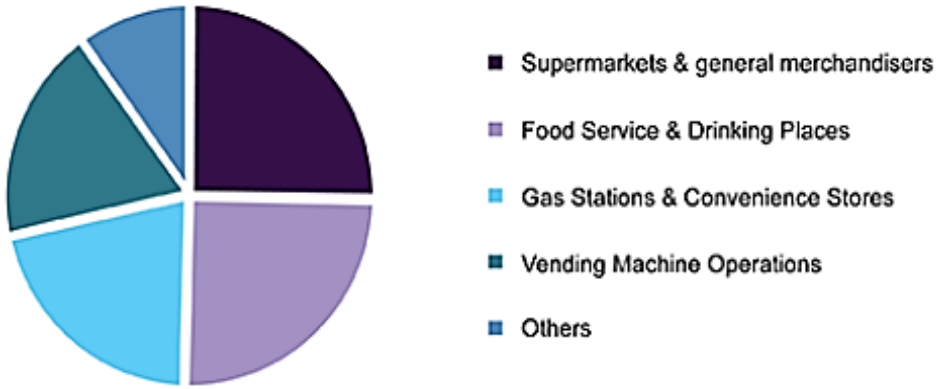

Fig 1: Market revenue of non-alcohol beverage by distribution channel

Consumption in India's soft drinks was 44 bottles per capita in 2016, which is relatively lower compared to mature markets such as the US, where the per-capita consumption is 1,496 bottles. In Mexico, it is 1,489 bottles and 1,221 bottles in Germany. In developing markets such as Brazil, the number is still higher at 537 bottles.

Drinking large amounts of sugary beverages can increase the risks of gaining weight and developing Type 2 diabetes, heart disease, and gout. Intake of sugary beverages is closely associated with weight gain and obesity. Women who drink one or more sugary beverages daily have almost twice the risk of developing diabetes as those who drink less than one sugary beverage daily. A child's risk of becoming obese increases by 60% with each additional sugary beverage consumed daily. Obesity-related conditions were estimated to have cost the Indian economy around $200 billion during 2005 – 2015.

Sources: adapted from https://www.bphc.org/whatwedo/healthy-eating-active-living/sugar-smarts/be-sugar-smart/Pages/Health-Effects-of-Sugary-Drinks.aspx and https://retail.economictimes.indiatimes.com/news/food-entertainment/grocery/indias-per-capita-soft-drink-consumption-to-be-almost-double-to-84-bottles-a-year-by-2021-vbl/68952587
https://www.grandviewresearch.com/industry-analysis/nonalcoholic-beverage-market

Using the data provided and your knowledge of economics, recommend a policy which the Indian government could introduce to address the increasing popularity of sugary drinks.
[10 marks]

Answers

Increasing popularity of sugary drinks in India

The Indian soft drinks market is set to continue its robust growth trajectory as annual per-capita bottle consumption is expected to reach around 84 by 2021. The bottled water category is expected to see a robust volume growth with increasing awareness among consumers about water-borne diseases and shortages in drinking water in the urban areas.

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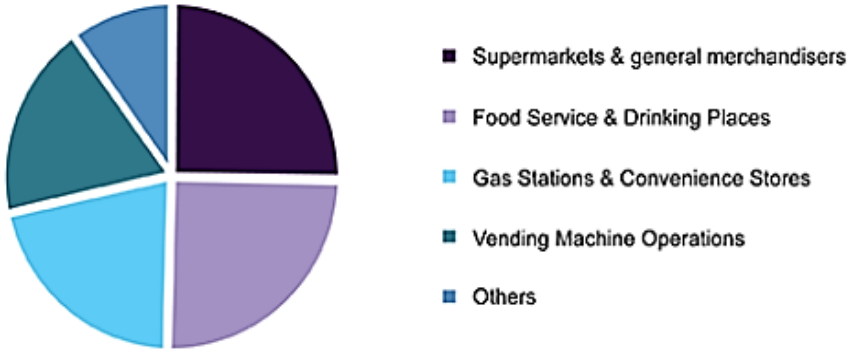

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Using the data provided and your knowledge of economics, recommend a policy which the Indian government could introduce to address the increasing popularity of sugary drinks. *[10 marks]*

Possible policies may include, but are not restricted to:

- An indirect tax imposed on sugar or products containing high levels of sugar (sugar tax).
- Legislation to regulate the sugar content in food and drinks.
- Legislation to restrict the availability of products which are high in sugar, such as in schools or shops located near to schools.
- Subsidies on "healthier" food products to make these relatively more attractive.
- Education/advertising aimed at decreasing the demand for products high in sugar.
- Behavioural economic policies, such as nudge theory and the use of choice architecture.
- Education/advertising aimed at decreasing the demand for products high in sugar.
- Incentivize innovation of substitute products to sugary drinks and continue supporting the firms taking initiatives to spread awareness among consumers about water-borne diseases and the shortages in drinking water in the urban areas.
- *Accept any other valid policy or a combination of relevant policies.*

This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

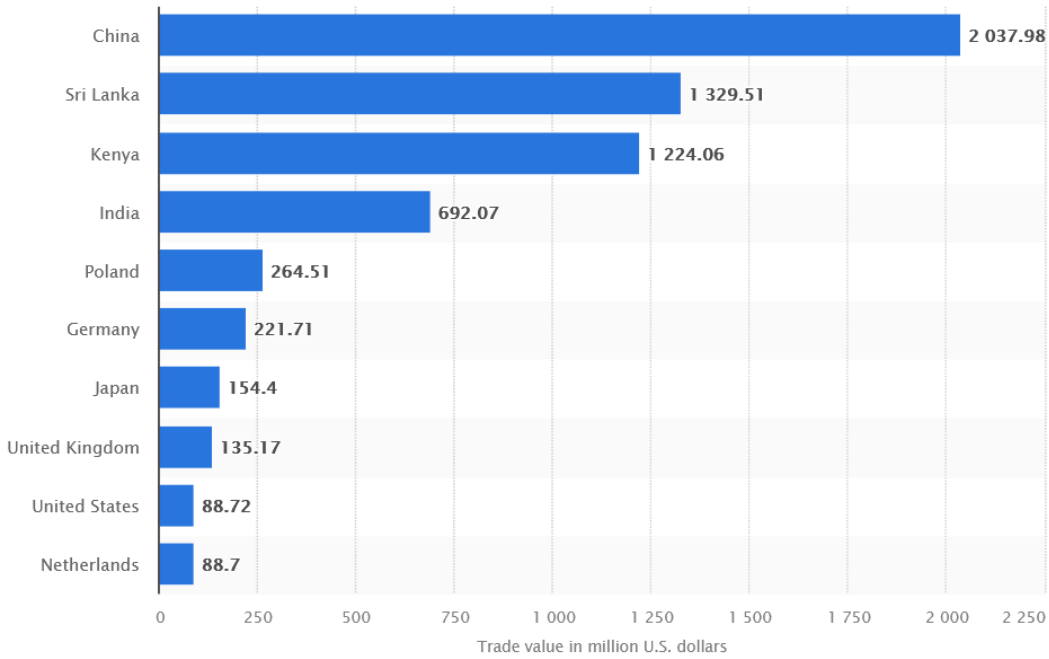
Worksheet 50
Paper 3 – Policy Paper 5: The low price of tea

Growers hurt by the low price of tea

The world produces so much tea that British people are paying far less for their favourite drink than they did 30 years ago. Global overproduction, supermarket price wars, and a weak dollar all mean that the price is less than a penny per cup. Industry research shows that the real price of a cup of tea is a quarter of what it was back in 1977.

The findings are good news for the world's second-biggest per capita tea-drinking nation, but bad news for the other tea-growing countries, which last year produced 3.5 million tonnes of tea, of which 160,000 tonnes were shipped to Britain. Tea is grown in some of the poorest countries in the world and is often a primary source of income. In Uganda, for example, tea is the third-largest export earner. For many growers and pickers, it is their only source of income. Consistently low prices mean that planned investment in infrastructure has to be postponed or cancelled and this is likely to result in lower rates of economic growth. This impacts on individual small farmers and puts more pressure on their way of life.

British tea importers argue that many countries, including Bangladesh, India, and Vietnam, are planting and growing far more tea bushes than the world demands, under pressure from poor local farmers desperate to make a living. The unrestrained growth of small tea growers has resulted in oversupply of teas which at times are not of good quality. International tea prices fell from a high of $5.32 per kilo in November 2009 to a low of $1.86 in June 2020. Global sales from tea exports by country totalled an estimated US$6.4 billion in 2019. The value of worldwide tea exports fell by an average -12.8% for all exporting countries since 2015 when tea shipments were valued at $7.3 billion. Year over year, global tea exports depreciated -18.8% from 2018 to 2019.



Leading tea exporting countries worldwide in 202 (in million US dollars)

Sources: Adapted from *The Times, Economic Times, and Statista*

Using the data provided and your knowledge of economics, recommend a policy which could be introduced by the government of economically less developed countries (ELDCs) in response to the falling worldwide market price of tea. *[10 marks]*

Answers

Growers hurt by the low price of tea

The world produces so much tea that British people are paying far less for their favourite drink than they did 30 years ago. Global overproduction, supermarket price wars, and a weak dollar all mean that the price is less than a penny per cup. Industry research shows that the real price of a cup of tea is a quarter of what it was back in 1977.

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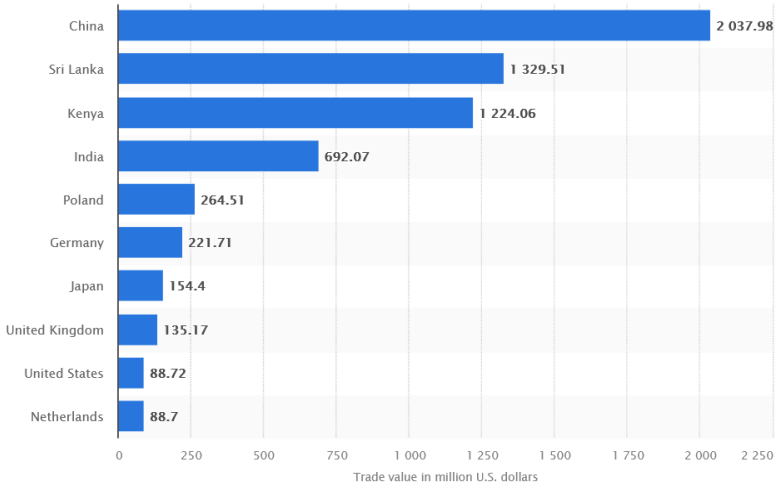

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Sources: Adapted from *The Times, Economic Times, and Statista*

Using the data provided and your knowledge of economics, recommend a policy which could be introduced by the government of economically less developed countries (ELDCs) in response to the falling worldwide market price of tea. *[10 marks]*

Possible policies may include (but are not restricted to):

- Support for the domestic tea industry, e.g. export subsidies and/or import tariffs.
- Policies to encourage the domestic processing/production of tea.
- Policies to promote domestic consumption.
- Import tariffs imposed on tea from competing nations.
- Policies to encourage diversification.
- Investment in infrastructure in order to support the tea industry.
- The establishment/development of a regional trading bloc to support ELDCs.
- A combination of policies.
- *Any other valid policy.*

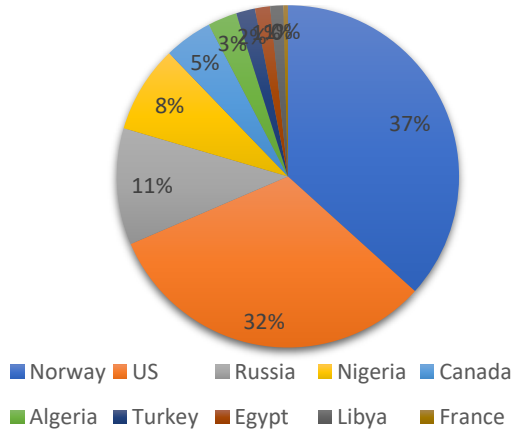
This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

Petrol prices in the UK

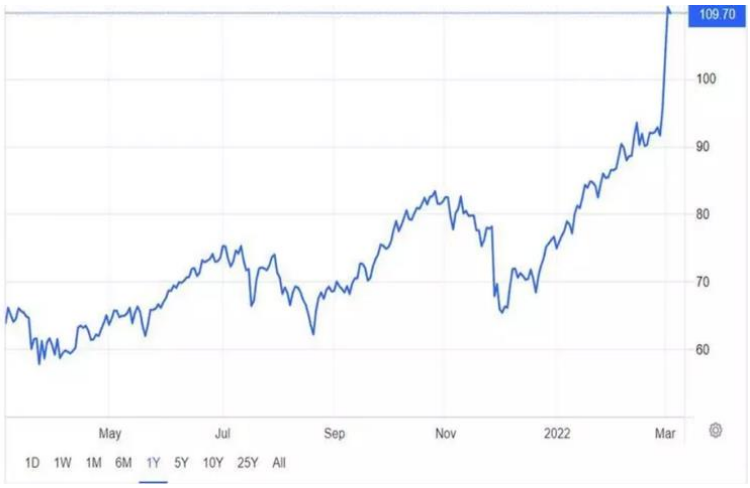
Households in the UK faced challenges to their living standards after fears of supply disruption from oil suppliers in the Middle East and Russia's invasion of Ukraine, which sent the price of oil to its highest level in seven years. With the cost of petrol and diesel already close to their highest-ever level in the UK, the cost of driving is set to rise again after a jump in oil prices to almost $120 a barrel. US investment bank Goldman Sachs has said the price of crude will keep around $100 a barrel as global economic activity recovers from the disruptions caused by the Omicron variant of the COVID-19 pandemic, as well as the war.

Higher oil prices naturally improve the economics of alternatives such as electric or hydrogen-fuelled vehicles. Combined with the need to decrease import dependence, a serious policy push is required followed by a strong consumer response to deploy electric vehicles and other solutions quickly and at a greater scale.

Achieving a substantial change however could take years if not decades. For example, in Norway, where 65% of all vehicles sold in 2021 were electric, oil demand has fallen less than 10% since 2013. The key to the energy transition is probably in the hands of consumers, although the huge changes required need to be supported by the auto industry and governments. For example, if UK citizens adjusted car driving patterns to average levels observed in Hungary, the entire import of oil from countries like Russia or Saudi Arabia would not be needed. This would also greatly improve energy security and significantly cut CO2 emissions.



Crude oil imports of UK in 2020



Brent oil price (Apr 2021 - Mar 2022)

Source: adapted from www.weforum.org/agenda/2022/03/how-does-the-war-in-ukraine-affect-oil-prices/

Using the information provided and your knowledge of economics, recommend a policy that the UK government could take in response to higher fuel prices. *[10 marks]*

Answers

Petrol prices in the UK

Households in the UK faced challenges to their living standards after fears of supply disruption from oil suppliers in the Middle East and Russia's invasion of Ukraine, which sent the price of oil to its highest level in seven years. With the cost of petrol and diesel already close to their highest-ever level in the UK, the cost of driving is set to rise again after a jump in oil prices to almost $120 a barrel. US investment bank Goldman Sachs has said the price of crude will keep around $100 a barrel as global economic activity recovers from the disruptions caused by the Omicron variant of the COVID-19 pandemic, as well as the war.

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Using the information provided and your knowledge of economics, recommend a policy that the UK government could take in response to higher fuel prices. *[10 marks]*

Possible policies, issues, and areas for discussion may include (but are not restricted to):

- Releasing oil reserves to address short-term volatility.
- Direct support offered to individuals and households who suffer most from the impact of higher oil prices.
- Subsidize households to offset price rises, but this could increase demand further, driving prices even higher.
- Exploring the possibility of lowering public transport prices so that people who use private vehicles have more of an incentive to travel by public transport.
- Promotion of hybrid-vehicles, which require less consumption of fuel.
- Negotiating with the Organization of the Petroleum Exporting Countries (OPEC) to increase production of crude oil, thereby raising supply and hence lowering oil prices.
- Tax adjustments in the price of retail fuel - passing on only a part (or none) of the price increase and either finance the subsidy or offer a tax reduction, or reduce the abnormal profits of oil companies. The government can adjust prices in such a way that private oil companies supplying the petroleum receive a lower profit margin on each unit sold.
- *Accept any other valid policy, written in the context of the case study.*
- *Please note that for every possible recommendation, there are elements of restrictions and limitations. The better answers include careful consideration of limitations and the possible repercussions of the recommended or suggested policy(ies).*

This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

The world's most unequal country

According to a recent World Bank, South Africa is the most unequal country in the world, ranking first among 164 countries. The 2022 report on "Inequality in Southern Africa: An Assessment of the Southern African Customs Union" indicates that 'race' plays a determining factor in a society where 10 percent of the population owns more than 80 percent of the wealth. "The legacy of colonialism and apartheid, rooted in racial and spatial segregation, continues to reinforce inequality" the report suggests. Half of the population has more liabilities than assets. Women earns 30 percent less than men with the same level of education.

Although the world in general has improved in terms of eradicating extreme poverty, hunger in South Africa has grown dramatically. At least two million more South Africans suffered from hunger in 2020 in comparison to 2008. In addition, one in four children suffers from stunting due to malnutrition. In rural South Africa, the uneven distribution of agricultural land makes the issue of inequality even worse. The World Bank report suggests promoting policy measures that foster equality of opportunity and address the highly skewed distribution of productive assets in the country.

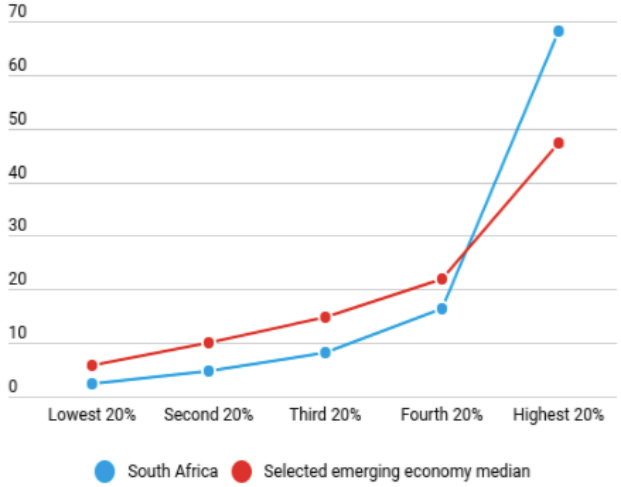

Fig. 1: Concentrated wealth/income held by income group

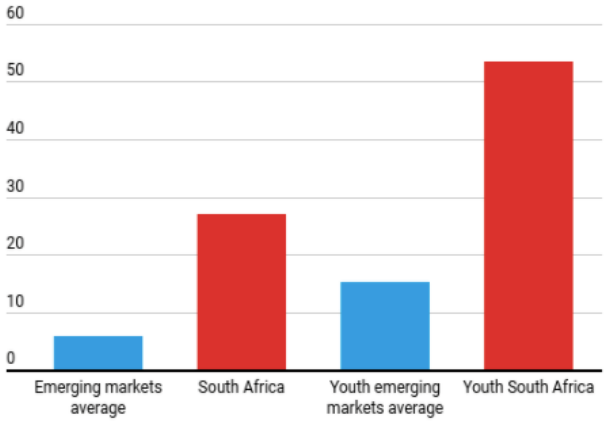

Fig. 2: Youth unemployment (% of labour force)

Sources: adapted from https://www.aljazeera.com/news/2022/3/10/south-africa-most-unequal-country-in-the-world-report, https://www.borgenmagazine.com/inequality-and-poverty-in-south-africa/, and https://www.imf.org/en/News/Articles/2020/01/29/na012820six-charts-on-south-africas-persistent-and-multi-faceted-inequality

Using the data provided and your knowledge of economics, recommend a suitable policy which could be introduced by the government of South Africa in response to the high level of inequality and poverty. *[10 marks]*

Answers

The world's most unequal country

According to a recent World Bank, South Africa is the most unequal country in the world, ranking first among 164 countries. The 2022 report on "Inequality in Southern Africa: An Assessment of the Southern African Customs Union" indicates that 'race' plays a determining factor in a society where 10 percent of the population owns more than 80 percent of the wealth. "The legacy of colonialism and apartheid, rooted in racial and spatial segregation, continues to reinforce inequality" the report suggests. Half of the population has more liabilities than assets. Women earns 30 percent less than men with the same level of education.

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Using the data provided and your knowledge of economics, recommend a suitable policy which could be introduced by the government of South Africa in response to the high level of inequality and poverty. *[10 marks]*

Possible policies may include (but are not restricted to):

- Policy makers can focus on achieving a broad-based growth strategy that generates more low-skilled jobs for the unemployed as the economy has not created enough jobs to tackle the problems of youth unemployed and new entrants to the labour market.
- Employment prospects can be enhanced by improving the quality of education and facilitating affordable transportation for job seekers to get to job centres and commuters to get to work.
- Improved access to economic opportunities for women, that is, increased employment opportunities for women to participate in the labour force. This also includes improving women's access to credit and other productive resources.
- Creating more low-skilled jobs to improve labour force participation, especially in the poorest provinces and amongst the youth (Figure 2), which will spur inclusion.
- Fiscal policy could be used to reduce inequality, namely a more progressive tax system and implementing an effective social safety net which could reduce overall inequality.
- Initiating fundamental reforms such as improved access to banking and credit, including microfinance and mobile banking for more robust and inclusive growth. The focus needs to be on creating a business environment more conducive to private investments and job creation. This requires improved governance, reducing the cost of doing business, making goods and services more open to competition, allowing firms to compensate workers in line with their skills and productivity, and making state-owned service providers more efficient.
- Supply side policies to create opportunities to support the marginalized population through improved quality of education, healthcare, and transportation.
- *Accept any other valid policy or any combination of policies.*

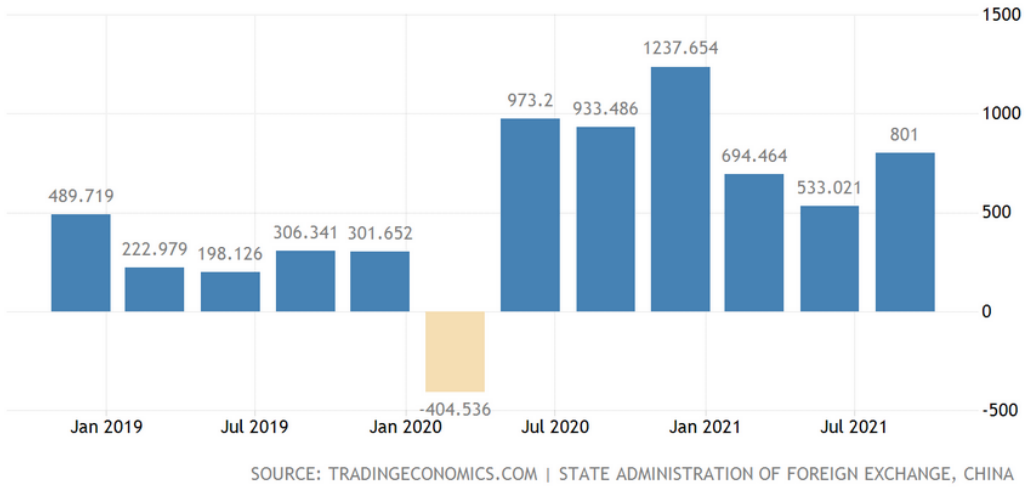
This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

China's rising inflation

The People's Bank of China, China's central bank, has announced that the inflation rate may get higher. Some economists are predicting that the Chinese central bank is preparing for the country's highest recorded inflation rate in 10 years. They are predicting that the inflation figure may be 4% or more, the highest since February 2012.

According to the People's Bank of China (PBOC), price increases are not only the result of temporary factors, such as rising food prices, but also the result of long-term structural factors such as rising labour costs. According to the PBOC, the upward pressure on prices is growing, and the risk of inflation needs attention. Energy costs, foreign demand, and expectations of rising prices are also contributing factors to inflationary pressures in the country.

The risk of high inflation in China has also accelerated. Rising consumer prices may add pressure on the PBOC to raise interest rates after having reduced the base interest rate from 6.5% during 2012 to 4.5% during 2016. The world's second-biggest economy expanded by 6% in 2020 and 8.1% in 2021, despite the prolonged COVID-19 pandemic across the world. The current account surplus may "stay at a relatively high level", the PBOC said it a recent quarterly report, noting that export gains are usually larger in the second half of the year.



Current account in USD'000 million

The PBOC repeated its commitment to increase the flexibility of the yuan. Trading partners including the US have urged China to allow the exchange rate to strengthen. The yuan has climbed 9.3% against the dollar since the end of a fixed exchange rate in July 2005 but fell sharply against the US dollar following the global outbreak of the coronavirus. Nevertheless, policy makers do not feel that this is enough of an adjustment and urged the Chinese government to allow market forces to set the price of the yuan.

Using the data provided and your knowledge of economics, recommend a policy which could be introduced by the government of China in response to higher inflation in recent years. *[10 marks]*

Answers

China's rising inflation

The People's Bank of China, China's central bank, has announced that the inflation rate may get higher. Some economists are predicting that the Chinese central bank is preparing for the country's highest recorded inflation rate in 10 years. They are predicting that the inflation figure may be 4% or more, the highest since February 2012.

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Using the data provided and your knowledge of economics, recommend a policy which could be introduced by the government of China in response to higher inflation in recent years. *[10 marks]*

Possible policies may include (but are not restricted to):

- Contractionary monetary policy in the form of increased interest rates and how this might help reduce the growth of aggregate demand in the economy (and hence demand-pull inflation), subsequently leading to a lower rate of inflation.
- Increase in base interest rates and the impact of this on consumption expenditure, investment expenditure, government expenditure, and net exports; all of which can have a direct impact on the general level of prices.
- Supply side policies, such as privatization and deregulation, to increase productivity and competition in the long run, and hence their impact on the general price level.
- Contractionary fiscal policies to increase taxes and/or decrease government spending, thereby limiting the potential of demand-pull inflation in China.
- Relevant exchange rate policy for a stronger Chinese currency, and the direct impact this has on China's balance of payments.
- Changes to income policies to slow down or limit wage-growth, thereby limiting the direct impact on cost-push inflation in the economy caused by China's "rising labour costs".
- Policies targeting the growth of the country's money supply (monetarist policies).
- *Accept any other appropriate policy recommendation.*
- *Accept a combination of policies written in the context of the case study.*

This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

Fighting the economic slowdown in Chile

A reduction in inflationary pressures because of slow growth in international demand and a deceleration of the world economy has required the Central Bank of Chile to cut interest rates to one of their lowest levels since 2011. The low interest rates have in turn contributed towards the depreciating peso (the Chilean currency) and a rise in import prices.

The Chilean government would like to see foreign trade add to economic growth so is planning to eliminate its remaining controls on capital flows to stop the decline in foreign direct investment (FDI) and to provide funds to support businesses.

A bilateral free trade agreement with the USA will help in the long run, but Chile's economy could use a boost now, although there is limited scope to the country to continue using expansionary monetary policy as its main policy instrument available (see Figure 59.1).

Figure 1 - Interest rates (%) in Chile (2011 – 2021)

Table 1 - Real GDP (annual % change)

Year	%
2016	1.71
2017	1.19
2018	3.71
2019	0.94
2020	-5.77

Table 2 - Current account balance (% of GDP)

Year	%
2016	-1.4
2017	-1.5
2018	-3.6
2019	-3.9
2020	1.4

Sources: adapted from Business Week, World Bank, and Statista

Using the data/information provided and your knowledge of economics, recommend a policy which could be introduced by the Chilean government in response to the economy's slowdown.

[10 marks]

Answers

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Table 59.1 – Real GDP (annual % change)

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Table 59.2 - Current account balance (% of GDP)

Year	%
2016	-1.4
2017	-1.5
2018	-3.6
2019	-3.9
2020	1.4

Sources: adapted from Business Week, World Bank, and Statista

Using the data provided and your knowledge of economics, recommend a policy which could be introduced by the Chilean government in response to the economy's slowdown. *[10 marks]*

Possible policies may include (but are not restricted to):

- Expansionary fiscal
- Expansionary monetary policy*
- Supply-side policies
- Exchange rate policies
- R&D grants
- Subsidies for local (domestic) firms
- Investment grants to entice FDI
- Investments in human capital
- Investments in infrastructure
- Trade agreements with the US
- Structural aid / ODA
- Loans from the IMF / World Bank
- Export-led growth strategies
- Import substitution policies

* although this will be limited in its effectiveness given interest rates are at their lowest level since 2011.

- *Accept any other appropriate policy recommendation.*
- *Accept a combination of policies written in the context of the case study.*

This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.

Argentina's economic collapse

Argentina owes a staggering amount of money (around $323 billion as of the end of 2019), which it cannot afford to pay back. Its mounting debts have been a problem for many years. Argentina owes billions to the IMF and to bondholders all around the world, particularly in the US. The Argentinian peso (ARS) began circulation in 1992 following a severe period of economic depression in the country. This economic hardship, which lasted from 1998 to 2002, came less than a decade after Argentina's "Great Depression" (1974 – 1990).

Initially, the ARS was pegged to the US dollar in 2000. After another financial crisis in 2001, the Central Bank of Argentina abandoned peg in 2002. The peso subsequently saw a devaluation of up to 75 per cent, triggering a boom in exports, and, in turn, brought an influx of new US dollars.

The election of President Mauricio Macri in 2015 led to a loosening of monetary controls put in place by the previous administration. In 2016, the Central Bank of Argentina removed most restrictions on the amount of savings that individuals and companies could convert into US dollars. These moves led to a 30% devaluation of the peso. The inflation rate hovered around 10% between 2010 to 2014 but has soared ever since.

Figure 1 - Argentina's inflation rate (2011 – 2021)

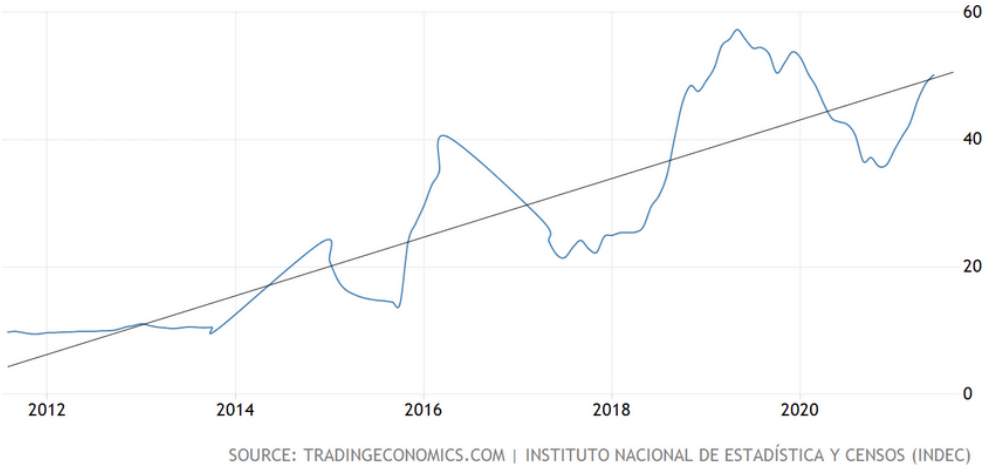
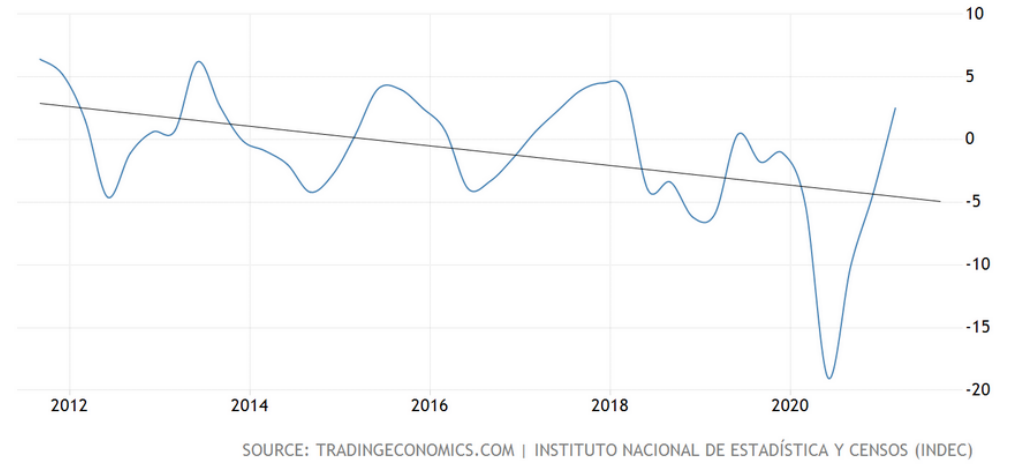


Figure 2 – Argentina's GDP growth rate (2011 – 2021)



Source: adapted from *Trading Economics* https://tradingeconomics.com/argentina/

Using the data/information provided and your knowledge of economics, recommend suitable policies which could be introduced by the Argentinian government in its pursuit of economic recovery. *[10 marks]*

Answers

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Figure 60.1 – Argentina's inflation rate (2011 – 2021)

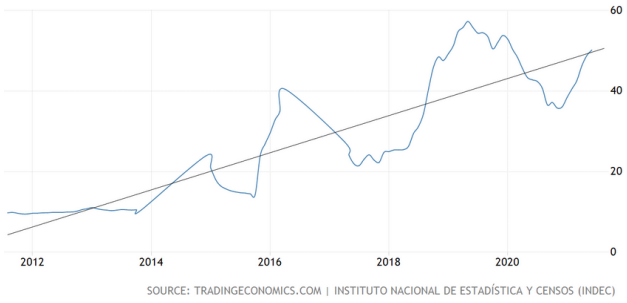
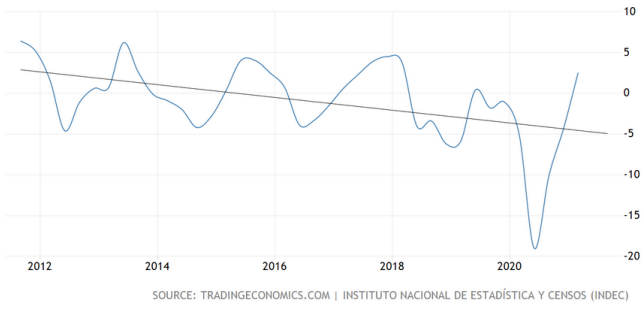


Figure 60.2 – Argentina's GDP growth rate (2011 – 2021)



Source: adapted from *Trading Economics* https://tradingeconomics.com/argentina/

Using the data/information provided and your knowledge of economics, recommend a suitable set of policies which could be introduced by the Argentinian government in its pursuit of economic recovery. *[10 marks]*

Possible policies could include (but are not restricted to) an explanation of:

- Selling foreign exchange assets and purchasing its own currency to increase the value. In theory, this will make it easier to repay foreign lenders and reduce imported inflation.
- Raise interest rates to combat the long-term trend of escalating inflation rates in Argentina (Figure 60.1).
- Reducing inflation, through contractionary fiscal and/or monetary policies will also make exports more competitive. In the long-term, this should help to increase GDP and reduce unemployment (Figure 60.2).
- Deflationary or contractionary fiscal policies to reduce Argentina's prolonged but unsustainable budget deficits and government debts.
- Supply-side policies to increase Argentina's long-term international competitiveness, especially as its currency is no longer pegged (fixed) to the USD.
- Wage control measures used to combat the problems of high inflation in Argentina.
- *Accept any other appropriate policy recommendation written in the context of the case study.*
- *Accept a suitable combination of policies written in the context of the case study.*

This question should be marked in alignment with the assessment criteria and level descriptors presented on pages 65 – 66 of the IB Economics guide.