

# Sinusoidal Functions Worksheet

For questions # 1-4 start with the parent function then complete the transformations given.

1. Using transformations, graph two cycles of the following trigonometric functions. State the period, phase shift, amplitude, and vertical shift.

a)  $y = \cos(\theta - 60^\circ) + 2$     b)  $y = \sin(\theta + 180^\circ) - 4$     c)  $y = \sin(\theta + 135^\circ) - 1$     d)  $y = \cos(\theta - 120^\circ) - 2$

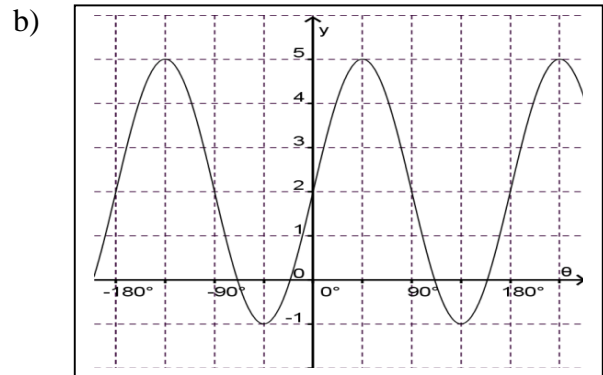
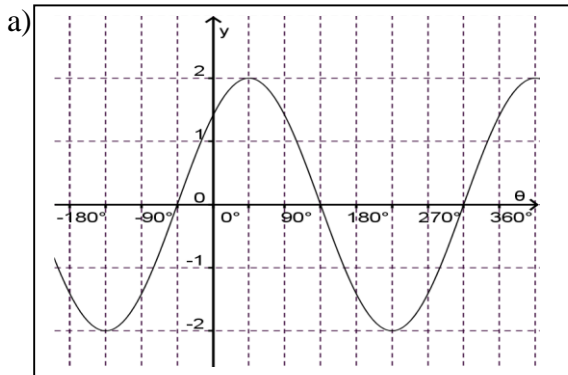
2. Using transformations, graph two cycles of the following trigonometric functions. State the period, phase shift, amplitude, and vertical shift.

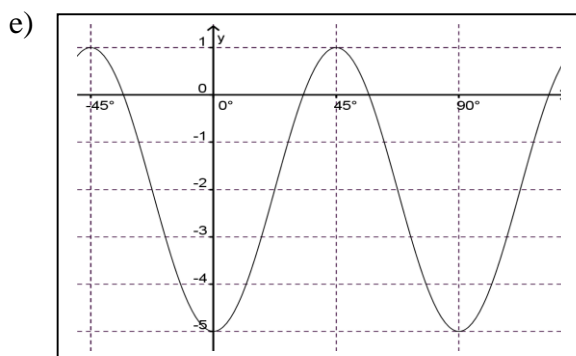
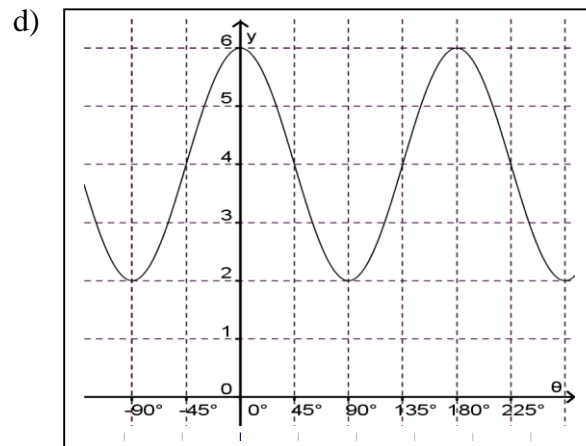
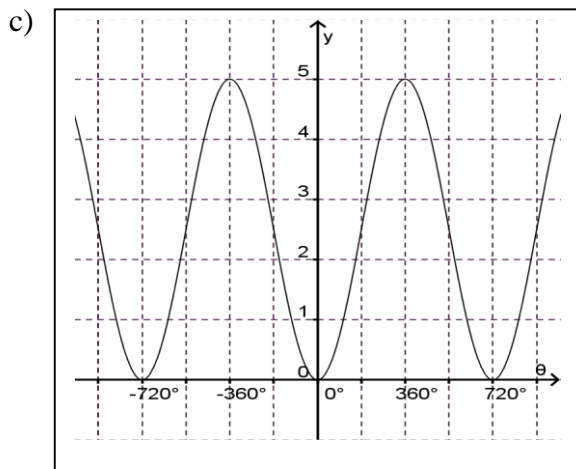
a)  $y = 2\cos(3\theta)$     b)  $y = -3\sin\left(\frac{1}{2}\theta\right)$     c)  $y = 5\sin(2\theta)$     d)  $y = -\frac{1}{2}\cos(4\theta)$

3. Using transformations, graph two cycles of the following trigonometric functions. State the period, phase shift, amplitude, and vertical shift.

a)  $y = 4\cos(\theta + 180^\circ) + 2$     b)  $y = \sin[2(\theta + 30^\circ)] + 3$     c)  $y = 2\sin[3(\theta - 180^\circ)]$   
d)  $y = 3\cos(2\theta - 180^\circ) + 5$     e)  $y = -4\sin(3\theta + 180^\circ)$     f)  $y = -5\cos(2\theta - 60^\circ) - 1$

4. Find the sine function  $y = a\sin[k(\theta + d)] + c$  for each graph by listing the amplitude, period, phase shift, and vertical shift first.





5. Find the cosine function  $y = a \cos[k(\theta + c)] + d$  for each graph in question 4.

**Answers:**

4a)  $y = 2 \sin(\theta + 45^\circ)$

b)  $y = 3 \sin(2\theta) + 2$

c)  $y = 2.5 \sin\left[\frac{1}{2}(\theta - 180^\circ)\right] + 2.5$

d)  $y = 2 \sin[2(\theta + 45^\circ)] + 4$

e)  $y = 3 \sin[4(\theta - 22.5^\circ)] - 2$

5a)  $y = 2 \cos(2\theta)$

b)  $y = 3 \cos[2(\theta - 45^\circ)] + 2$

c)  $y = -2.5 \cos\left(\frac{1}{2}\theta\right) + 2.5$

d)  $y = 2 \cos(2\theta) + 4$

e)  $y = -3 \cos(4\theta) - 2$