

## Transformations of Trig Functions – Homework

1. Determine the period and the amplitude of each function.

a)  $y = \sin 2x$

b)  $y = 2 \cos x$

c)  $y = 3 \sin(5x)$

d)  $y = \frac{1}{2} \cos(6x)$

e)  $y = 6 \sin\left(\frac{x}{3}\right)$

f)  $y = -\frac{1}{3} \cos\left(\frac{x}{4}\right)$

2. For each function, state all transformations from the appropriate base function.

a)  $y = 3 \sin\left[\frac{1}{4}(x - 30^\circ)\right] + 2$

b)  $y = \frac{1}{3} \cos[2(x + 15^\circ)] - 1$

c)  $y = -\frac{2}{3} \sin(3x + 180^\circ) - 2$

d)  $y = 5 \cos\left(\frac{1}{2}x - 45^\circ\right) + 3$

3. For each of the following trig functions,

(i) state the period, amplitude, phase shift and vertical shift

(ii) graph one complete cycle of the function

a)  $y = 3 \cos\left(\frac{x}{2}\right)$

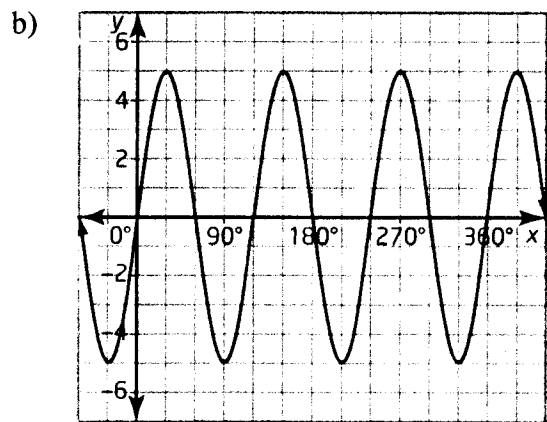
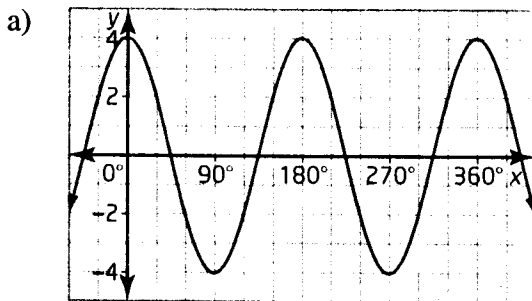
b)  $y = -\frac{1}{2} \sin(8x) + 3$

c)  $y = \sin[2(x - 45^\circ)] - 1$

d)  $y = -2 \cos[4(x - 30^\circ)] + 3$

e)  $y = 5 \sin[6x + 180^\circ] - 1$

4. Write two equations for each of the following graphs, one using the sine function, and one using the cosine function.



**Answers:**

1. a) period =  $180^\circ$ ; amplitude = 1  
 c) period =  $72^\circ$ ; amplitude = 3  
 e) period =  $1080^\circ$ ; amplitude = 6
2. a) vertical stretch of 3, horizontal stretch of 4, phase shift right  $30^\circ$ , vertical shift up 2  
 b) vertical comp. of 3, horizontal comp. of 2, phase shift left  $15^\circ$ , vertical shift down 1  
 c) vertical comp. of  $\frac{2}{3}$ , reflection in x-axis, horizontal comp. of 3, phase shift left  $60^\circ$ , vertical shift down 2  
 d) vertical stretch of 5, horizontal stretch of 2, phase shift right  $90^\circ$ , vertical shift up 3  
 e) vertical shift down 2
3. a) period =  $1440^\circ$ ; amplitude =  $\frac{3}{2}$   
 d) period =  $60^\circ$ ; amplitude =  $\frac{2}{3}$   
 b) period =  $360^\circ$ ; amplitude = 2
4. a)  $y = 4 \cos 2x$ ;  $y = 4 \sin[2(x + 45^\circ)]$   
 b)  $y = 5 \sin 3x$ ;  $y = 5 \cos[3(x + 90^\circ)]$