

# W4 5.3 Transformations of Trig Functions Worksheet

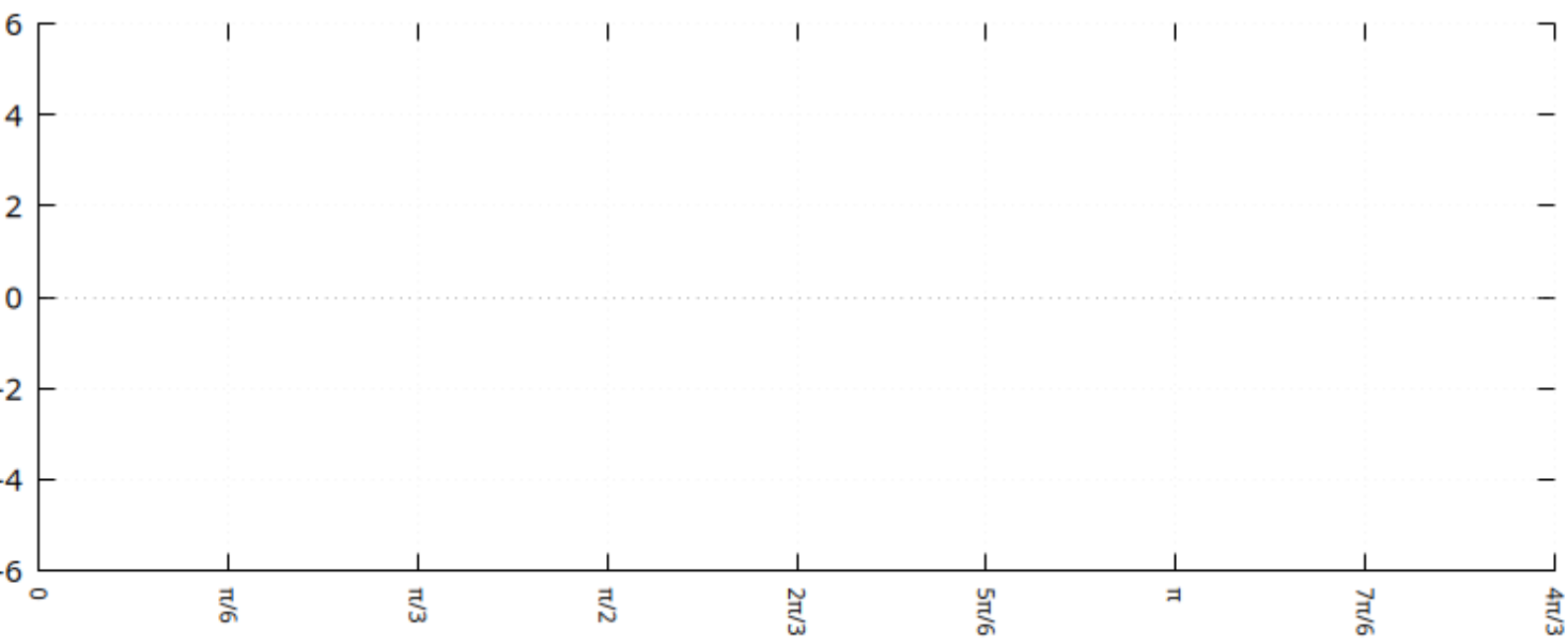
This document was composed and formatted by Annie Bernatchez.

The course material originated from [www.jensenmath.ca](http://www.jensenmath.ca)

1) For each function, fill in the table of information and then graph two cycles of the transformed function using transformations of the parent function. Choose an appropriate scale.

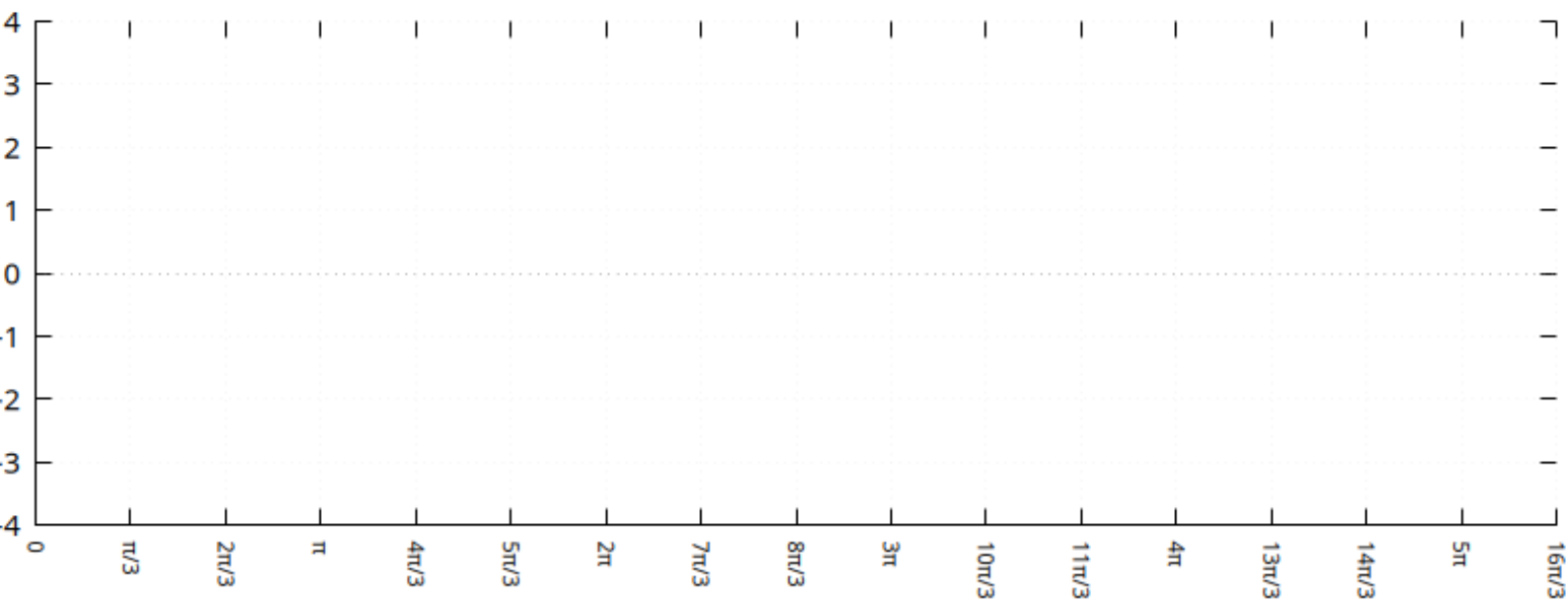
a)  $y = 5 \sin(3x)$

|              |                 |
|--------------|-----------------|
| Amplitude:   | Period:         |
| Phase shift: | Vertical shift: |
| Max:         | Min:            |



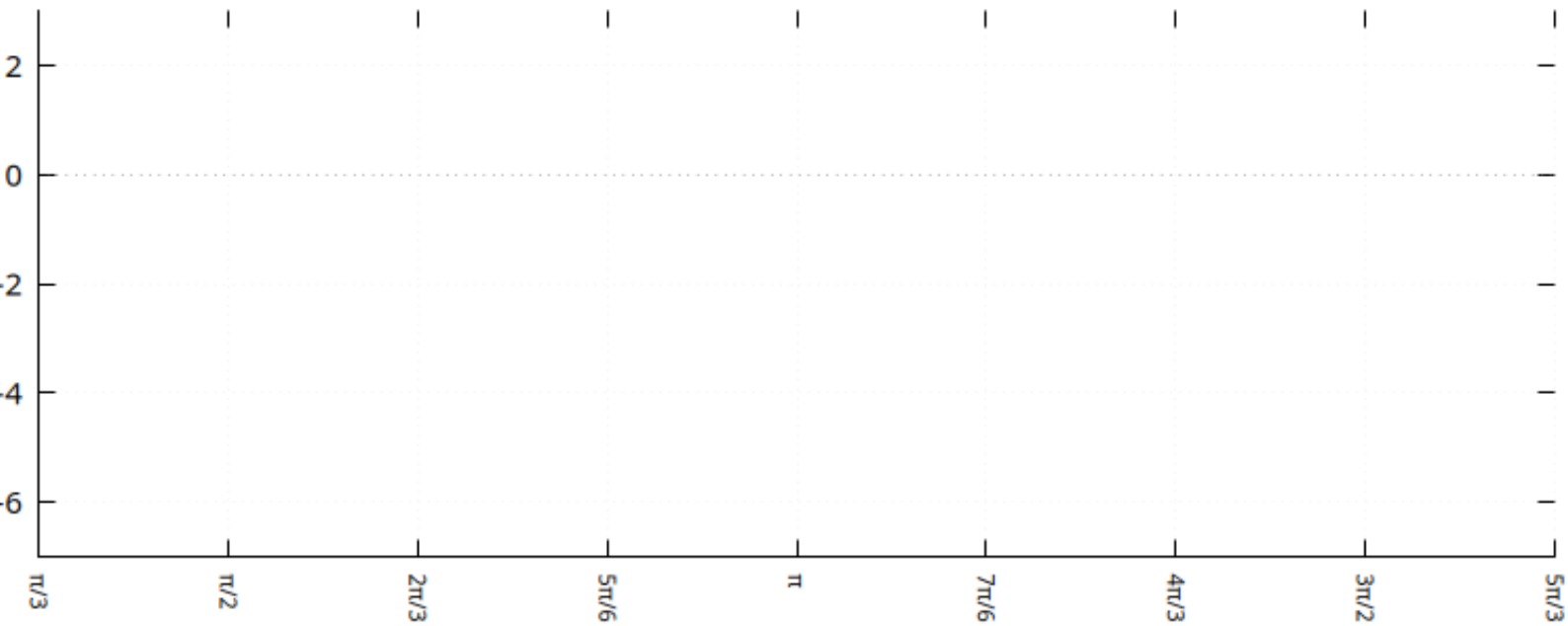
b)  $y = -3 \cos\left(\frac{3}{4}x\right)$

|              |                 |
|--------------|-----------------|
| Amplitude:   | Period:         |
| Phase shift: | Vertical shift: |
| Max:         | Min:            |



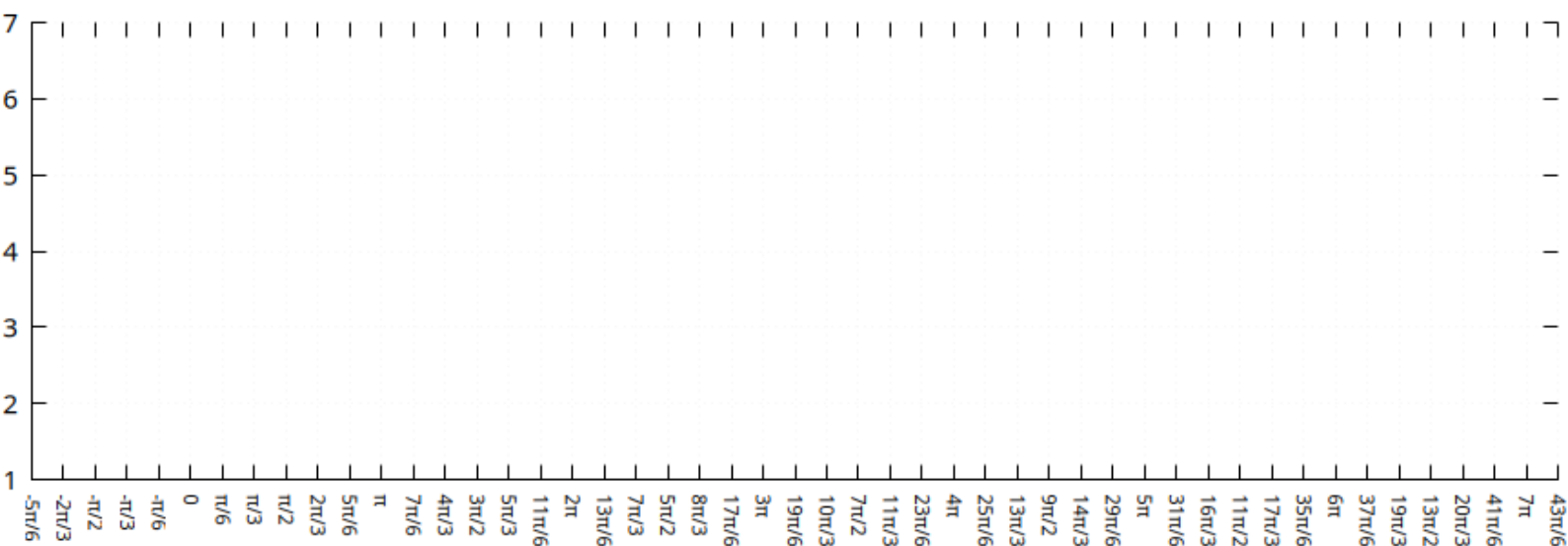
c)  $y = 4 \sin \left[ 3 \left( x - \frac{\pi}{3} \right) \right] - 2$

|              |                 |
|--------------|-----------------|
| Amplitude:   | Period:         |
| Phase shift: | Vertical shift: |
| Max:         | Min:            |



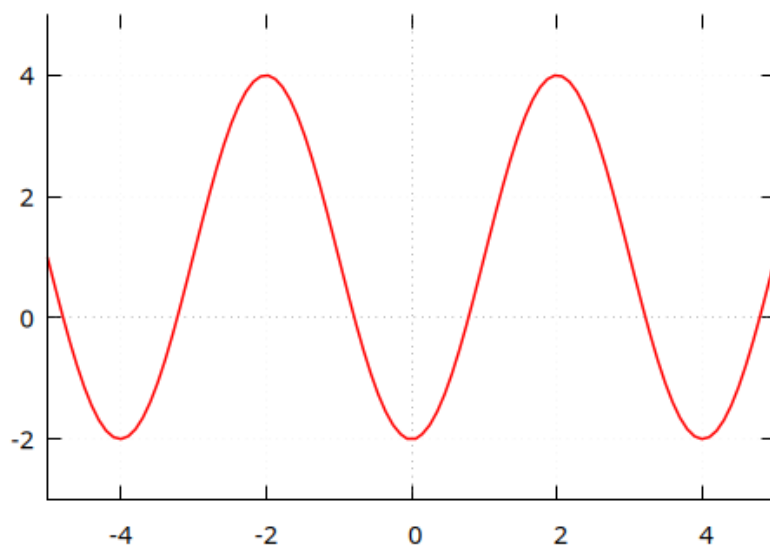
d)  $y = 2 \sin \left[ \frac{1}{2} \left( x + \frac{5\pi}{6} \right) \right] + 4$

|              |                 |
|--------------|-----------------|
| Amplitude:   | Period:         |
| Phase shift: | Vertical shift: |
| Max:         | Min:            |

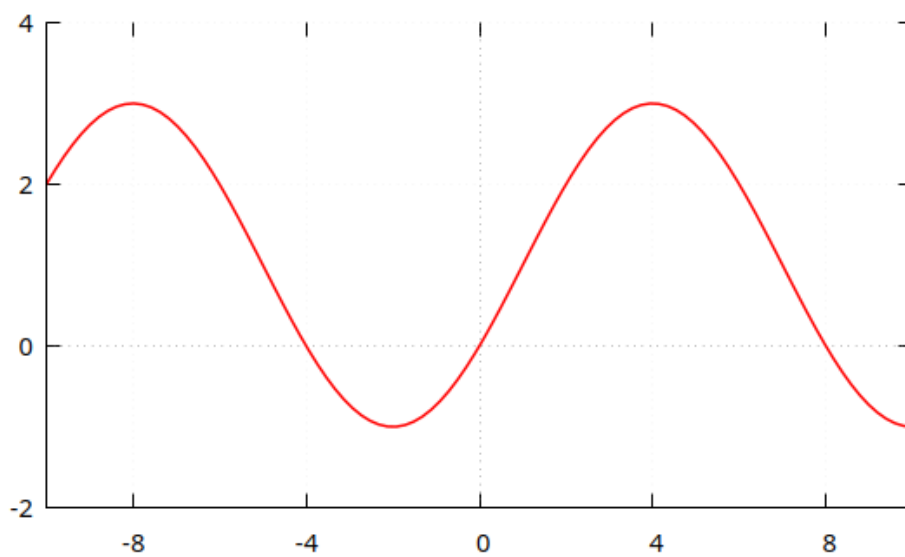


2) Model each graph shown as a sine and cosine function.

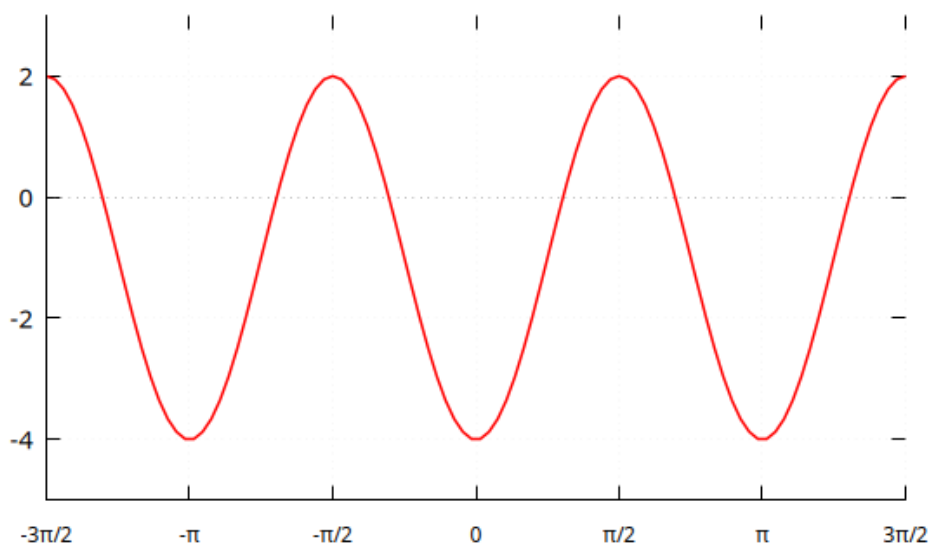
a)



b)



c)



3) A sine function has a maximum value of 7, a minimum value of -1, a phase shift of  $\frac{3\pi}{4}$  radians to the left, and a period of  $\frac{\pi}{2}$ .

a) Write an equation for this function.

b) Write an equivalent cosine equation for this function.

4) A cosine function has a maximum value of 1, a minimum value of -5, a phase shift of 2 radians to the right, and a period of 3.

a) Write an equation for this function.

b) Write an equivalent sine equation for this function.

## Answer Key

1) a) Amplitude 5, Period  $\frac{2\pi}{3}$ , no phase shift, no vertical shift, Max 5, Min -5

b) Amplitude 3, Period  $\frac{8\pi}{3}$ , no phase shift, no vertical shift, Max 3, Min -3

c) Amplitude 4, Period  $\frac{2\pi}{3}$ , phase shift  $\frac{\pi}{3}$  right, vertical shift 2 down, Max 2, Min -6

d) Amplitude 2, Period  $4\pi$ , phase shift  $\frac{5\pi}{6}$  left, vertical shift 4 up, Max 6, Min 2

2) a)  $y = 3 \sin \left[ \frac{\pi}{2}(x - 1) \right] + 1$  ;  $y = 3 \cos \left[ \frac{\pi}{2}(x - 2) \right] + 1$

b)  $y = 2 \sin \left[ \frac{\pi}{6}(x - 1) \right] + 1$  ;  $y = 2 \cos \left[ \frac{\pi}{6}(x - 4) \right] + 1$

c)  $y = 3 \sin \left[ 2 \left( x - \frac{\pi}{4} \right) \right] - 1$  ;  $y = 3 \cos \left[ 2 \left( x - \frac{\pi}{2} \right) \right] - 1$

3) a)  $y = 4 \sin \left[ 4 \left( x + \frac{3\pi}{4} \right) \right] + 3$  b)  $y = 4 \cos \left[ 4 \left( x + \frac{5\pi}{8} \right) \right] + 3$

4) a)  $y = 3 \cos \left[ \frac{2\pi}{3}(x - 2) \right] - 2$  b)  $y = 3 \sin \left[ \frac{2\pi}{3} \left( x - \frac{5}{4} \right) \right] - 2$