Graphing Trigonometric Functions

1. Recall: Transformations "alter" graphs. Several types of transformations are possible, including:

$$y = f(x) + b \qquad y = f(x + b) \qquad y = af(x) \qquad y = f(ax)$$

$$y = -f(x) \qquad y = f(-x) \qquad y = f(x + b) + c$$

Functions can undergo vertical and _____ shifts, called _____.

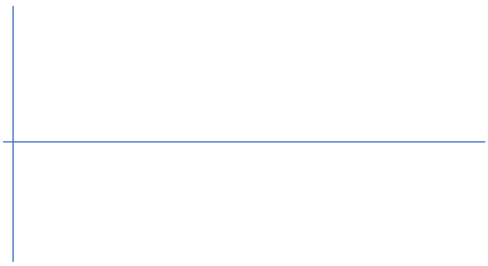
These are easy to describe with _____. A vertical shift can be represented by $y =$ _____ and the latter by $y =$ _____. They can be carried out at the same time, for example, $y =$ _____ would represent a _____ by _____. It is crucial to remember that for the domain, the _____ is always changed.

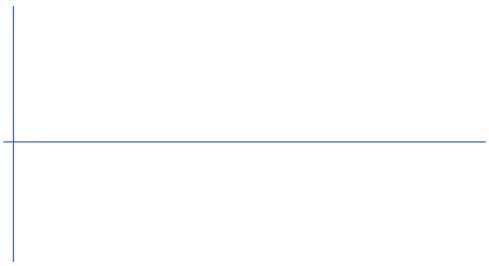
There are also _____. These can be vertical or _____ transformations.

The function $y =$ _____, would represent a vertical _____ of the function, and for $y =$ _____ this would represent a _____ _____ of the function. Again, for the domain, it is tricky because _____ can be thought of more as a _____.

Transformations also include reflections. $y =$ _____ is a reflection in the _____- axis and $y =$ _____ is a reflection in the _____ - axis.

2. Sketch $y = \sin x$ for $0 \leq x \leq 360$ Sketch $y = \cos x$ for $0 \leq x \leq 360$





3. Based on your graphs, determine the value of y the following (NO CALCULATOR ALLOWED):

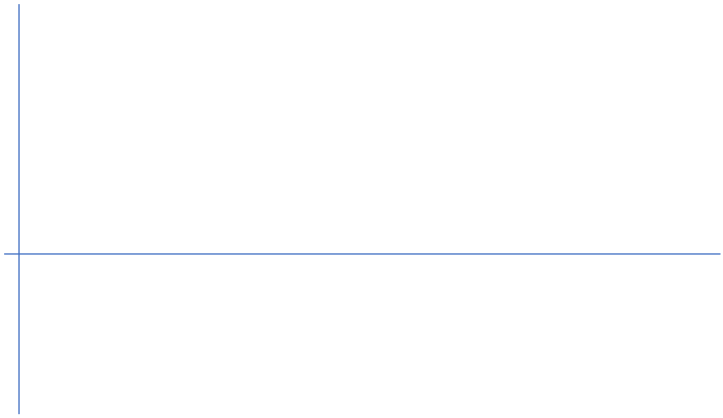
a) $y = \sin 0$ b) $y = \sin 90$ c) $y = \sin 180$ d) $y = \sin 270$ e) $y = \sin 360$

a) $y = \cos 0$ b) $y = \cos 90$ c) $y = \cos 180$ d) $y = \cos 270$ e) $y = \cos 360$

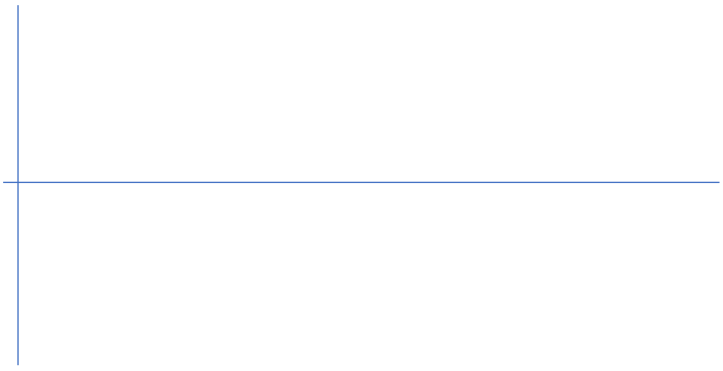
4. Transformations can also be carried out on trig functions. Based on Q1, what type of transformation is $y = 4\sin x$? **Using your answers from Q3**, sketch this function for $0 \leq x \leq 360$, using a suitable range.

This type of transformation is special in trig, because it determines the _____ of the function.

5. Based on Q1, what type of transformation is $y = \sin(x) + 1$? **Using your answers from Q3**, sketch this function for $0 \leq x \leq 360$, using a suitable range.

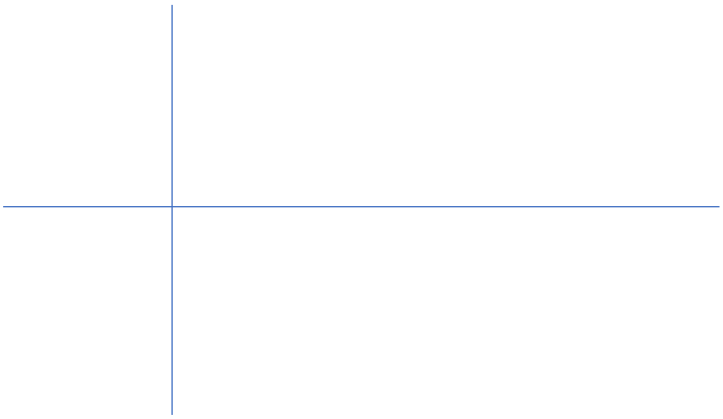


6. Based on Q1, what type of transformation is $y = \sin(3x)$? **Using your answers from Q3**, sketch this function for $0 \leq x \leq 360$, using a suitable range.



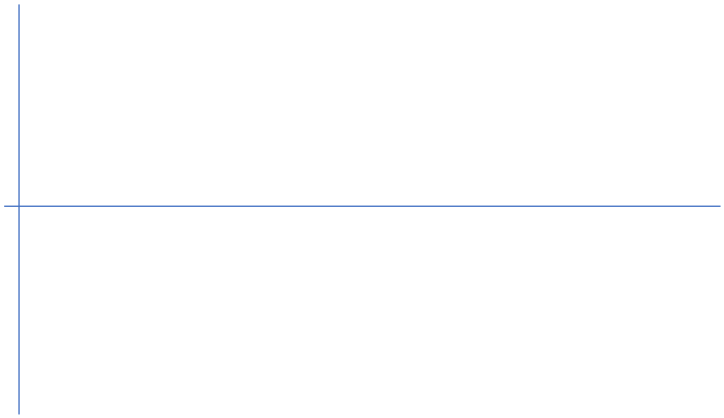
This type of transformation is special in trig because it determines the _____ of the function. The formula is:

7. Based on Q1, what type of transformation is $y = \sin(x + \pi)$? **Using your answers from Q3**, sketch this function for $0 \leq x \leq 360$, using a suitable range.



This can be called a _____ shift.

8. Based on Q1, what type of transformation is $y = -\sin(x)$? **Using your answers from Q3**, sketch this function for $0 \leq x \leq 360$, using a suitable range.



9. For each of the following, describe the transformations the functions have undergone using appropriate language. Sketch each function for $0 \leq x \leq 360$, using a suitable range.

a) $y = \sin x \ => y = 3\sin(4x) - 1$

$b)\ y = \cos x \ \Rightarrow\ y = -2\cos(3x) + 1$

10. For a) and b) above, state the amplitude and the period