

Name: _____

Date: _____

Learning Goal 5.1	Graphing primary trigonometric functions, including transformations and characteristics
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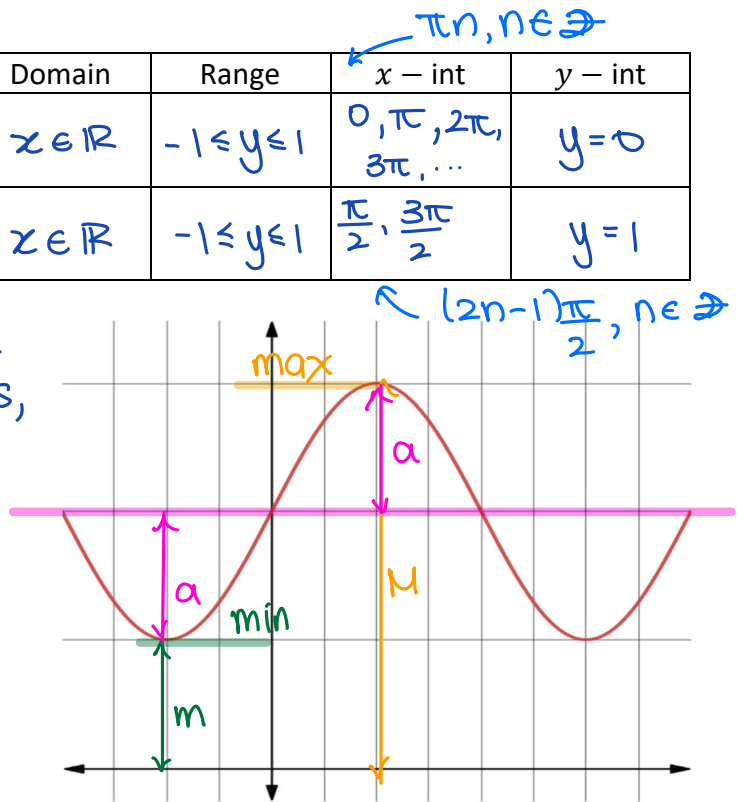
Periodic Functions - a function that repeats over a specific domain

Period - the length of one repeat.
 * for the base function, the period is 2π (one rotation)

	Period	Max	Min	Domain	Range	x - int	y - int
$y = \sin \theta$	2π	$y = 1$	$y = -1$	$x \in \mathbb{R}$	$-1 \leq y \leq 1$	$0, \pi, 2\pi, 3\pi, \dots$	$y = 0$
$y = \cos \theta$	2π	$y = 1$	$y = -1$	$x \in \mathbb{R}$	$-1 \leq y \leq 1$	$\frac{\pi}{2}, \frac{3\pi}{2}$	$y = 1$

Amplitude: The distance between the maximum and minimum values, divided by 2.
 $a = \frac{M - m}{2}$

or find the middle line, and amplitude is the distance from there to the max or min.

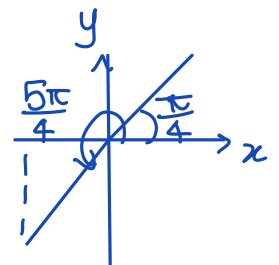


Example Referring to the previous graphs of the functions $y = \sin x$ and $y = \cos x$,
 a. How do the two functions appear to be related?

a translation by $\frac{\pi}{2}$ to the right.

b. What are the exact values of the coordinates of the points of intersection

at $\frac{\pi}{4} (45^\circ)$ and $\frac{5\pi}{4} (225^\circ)$
 $+2\pi n$ $+2\pi n$

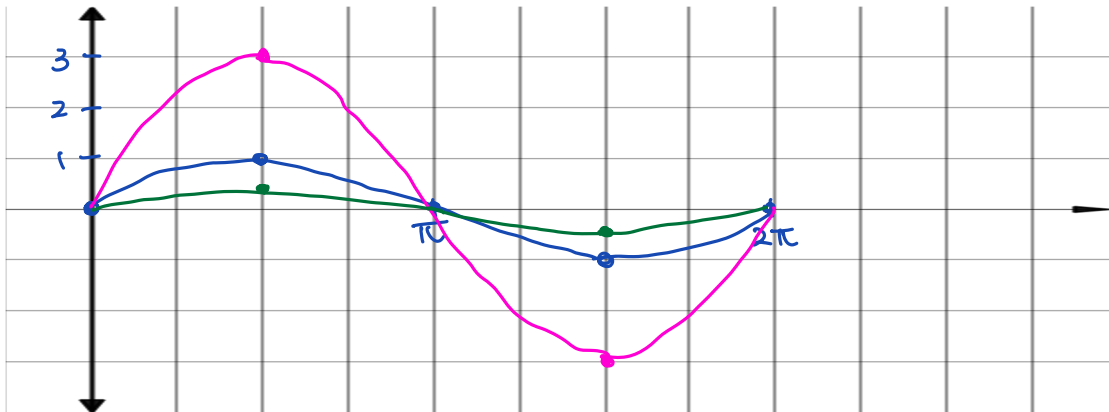


Example Graph (with the use of technology) the functions

- $y = \sin x$,
- $y = 3 \sin x$ and
- $y = \frac{1}{2} \sin x$

on the same axis for $0 \leq x \leq 2\pi$ and complete the table.
What do you observe?

	Amplitude	Period
$y = \sin x$	1	2π
$y = 3 \sin x$	3	2π
$y = \frac{1}{2} \sin x$	$\frac{1}{2}$	2π



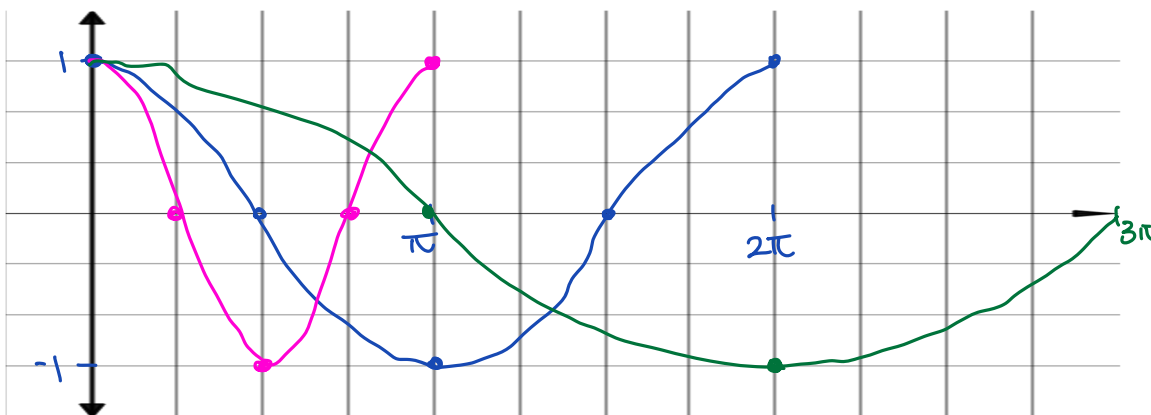
↑ vertical stretch

Example Graph (with the use of technology) the functions

- $y = \cos x$,
- $y = \cos 2x$ and
- $y = \cos(\frac{1}{2}x)$

on the same axis for $0 \leq x \leq 2\pi$ and complete the table.
What do you observe?

	Amplitude	Period
$y = \cos x$	1	2π
$y = \cos 2x$	1	π
$y = \cos(\frac{1}{2}x)$	1	4π



↑ horizontal stretch

Summary For the functions of the forms $y = a \sin(b\theta)$ and $y = a \cos(b\theta)$, where $a, b \neq 0$,

- a (amplitude) - vertical stretch
- b (period) - horizontal stretch.