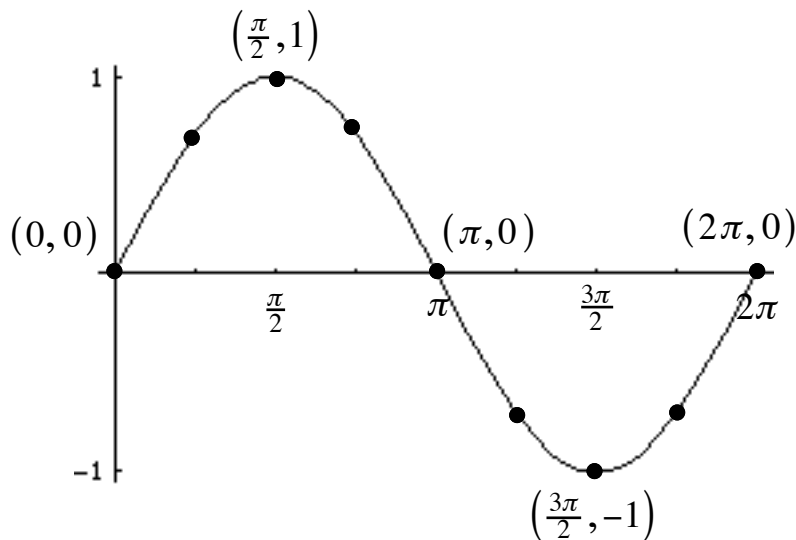


§4.5 Graphs of Sine and Cosine Functions

Graph of $y = \sin x$

x	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
$y = \sin x$									



- since the domain of $y = \sin x$ is all real numbers, the graph repeats infinitely to the left and the right
- one period (or cycle) of the graph is on $[0, 2\pi]$

Graphing trigonometric functions on TI calculator

MODE all choices on left should be highlighted, radians

WINDOW

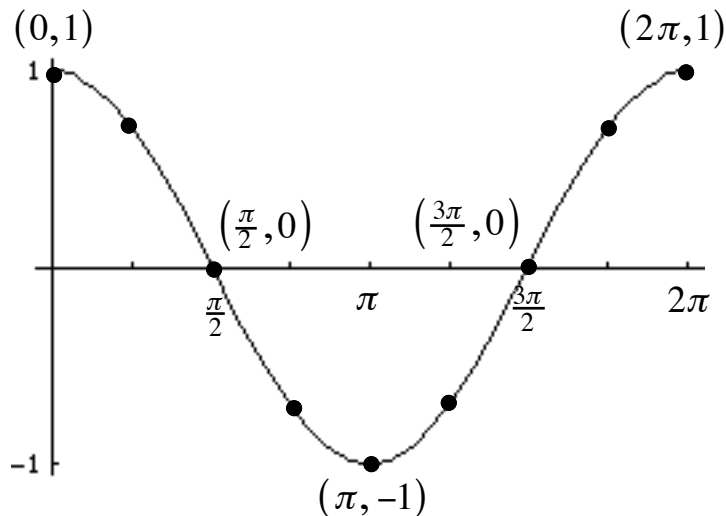
xmin	-2π
xmax	2π
xscl	$\pi/2$ (tick marks)
ymin	-2
ymax	2
yscl	1

Example: Graph $y = \sin x$ on your calculator. Draw the axes and label properly.

Example: Sketch the graph of $y = 2 \sin x$ on the interval $[-\pi, 4\pi]$.
Remember key points.

Graph of $y = \cos x$

x	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
$y = \cos x$									



- since the domain of $y = \cos x$ is all real numbers, the graph repeats infinitely to the left and the right

- one period (or cycle) of the graph is on $[0, 2\pi]$

Amplitude

Compare the graph $y = \sin x$ to each of the following:
(Vertical Shrinking and Stretching)

Examples: 1. $y = 2 \sin x$ 2. $y = -3 \sin x$ 3. $y = \frac{1}{2} \sin x$

Period Compare the graph $y = \cos x$ to each of the following:
(Horizontal Stretching)

Examples: 1. $y = \cos 2x$ 2. $y = \cos \frac{1}{2}x$ 3. $y = -2 \cos 3x$

Formulas for General Form

$$y = d + a \sin(bx - c) \text{ and } y = d + a \cos(bx - c)$$

$$\text{amplitude} = |a|$$

$$\text{period (of sine and cosine)} = \frac{2\pi}{b}$$

$$\text{tick marks} = \frac{\text{period}}{4}$$

$$\text{endpoints} \quad \text{Solve: } bx - c = 0 \qquad bx - c = 2\pi$$

$$\text{vertical shift} = d$$

Example: Horizontal Translation

Sketch the graph of $y = \frac{1}{2} \sin\left(x - \frac{\pi}{3}\right)$

Example: Horizontal Translation

Sketch the graph of $y = -3\cos(2\pi x + 4\pi)$

Example: Vertical Translation

Sketch the graph of $y = 2 + 3\cos(2x)$