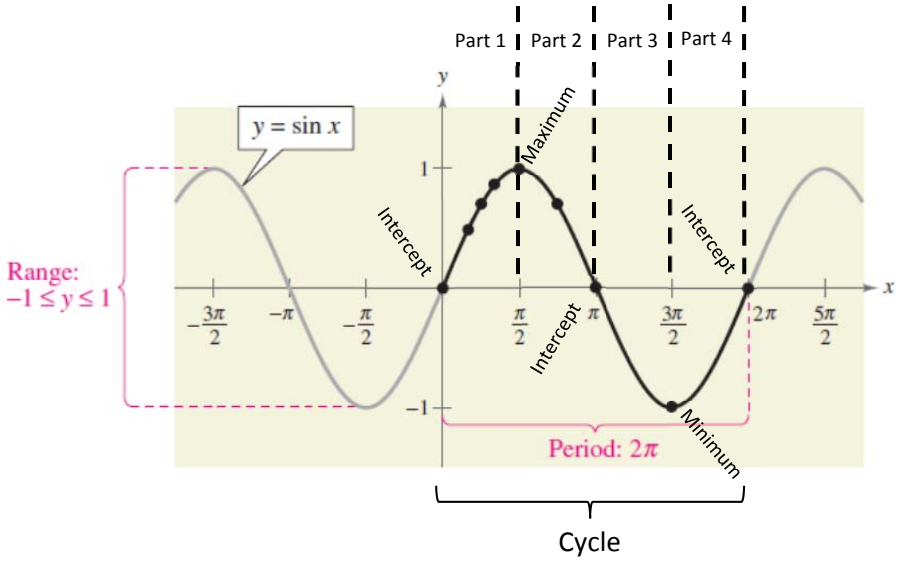
Pg. 321 4.5A – Graphs of Sine and Cosine Functions

The graph of a sine function is an oscillation known as a sine curve.

Parent function of sine: sin x



5 Key Graphing Points

1) Intercepts (3 per cycle)
2) Maximum (1 per cycle)
3) Minimum (1 per cycle)

Note: Cycle is divided into 4 parts. Normal cycle of sine is 2π. Thus, each part is $\frac{2\pi}{4}$ or $\frac{\pi}{2}$ units wide.

General equation of sine: $y = a\sin(bx - c) + d$

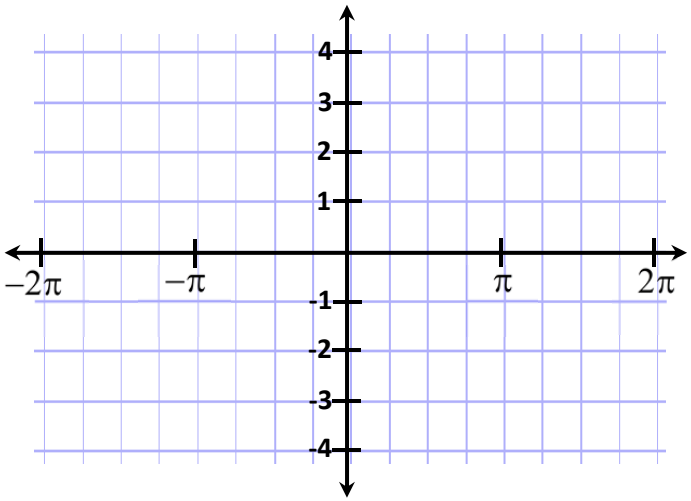
The _____ is half the distance between the maximum and minimum.

Amplitude: $|a|$ **Note:** We take the absolute value because distance is always positive.

If $|a| > 1$, graph is vertically stretched. If $|a| < 1$, then the graph is vertically shrunk.

Ex 1:

Graph $y = 3\sin x$



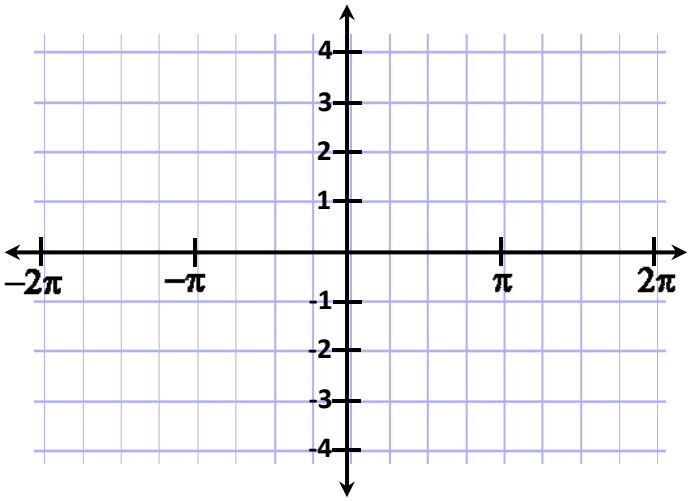
General equation of sine: $y = a\sin(bx - c) + d$

The _____ of a sine function is one complete cycle of the graph.

The normal period for sine is 2π. **Period:** $\frac{\text{Normal Period}}{b} = \frac{2\pi}{b}$

Ex 2:

Graph $y = \sin(2x)$



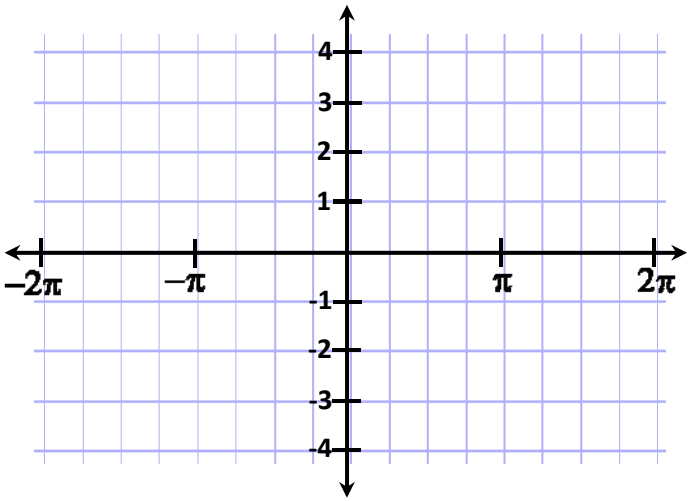
General equation of sine: $y = a\sin(bx - c) + d$

The _____ is the distance the graph is translated horizontally. In other words, the starting point is shifted horizontally.

Phase Shift: START Solve for bx – c = 0 FINISH x + Period

Ex 3:

Graph $y = \sin\left(x - \frac{\pi}{2}\right)$

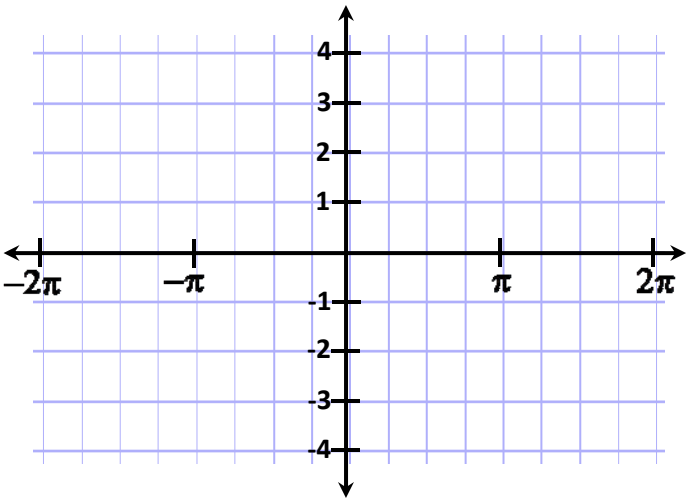


General equation of sine: $y = a\sin(bx - c) + d$

The _____ is the distance the graph is shifted vertically.

Vertical Translation: d

Ex 4:
Graph $y = \sin x + 2$



Bring It All Together: $y = a\sin(bx - c) + d$

Amplitude: $|a|$

Period: $\frac{2\pi}{b}$

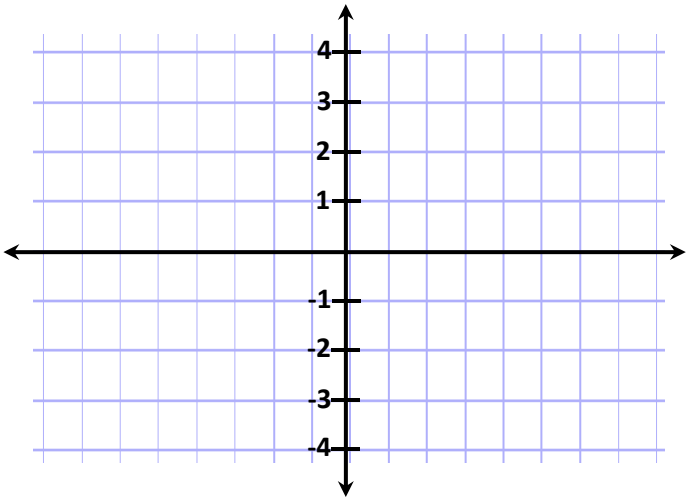
Vertical Translation

Phase Shift: $bx - c = 0$

Ex 4:

Graph $y = -3\sin\left(2x + \frac{\pi}{4}\right) - 1$

Important:
1st Reflect
2nd Shift



Assignment 4.5A Pg. 328 **REQUIRED:** Vocab #'s 1-5

Problem Set #'s 1, 5, 7, 9, 13, 15, 21, 25, 27, 31, 35, 43, 45, 49, 57, 61, 67, 69