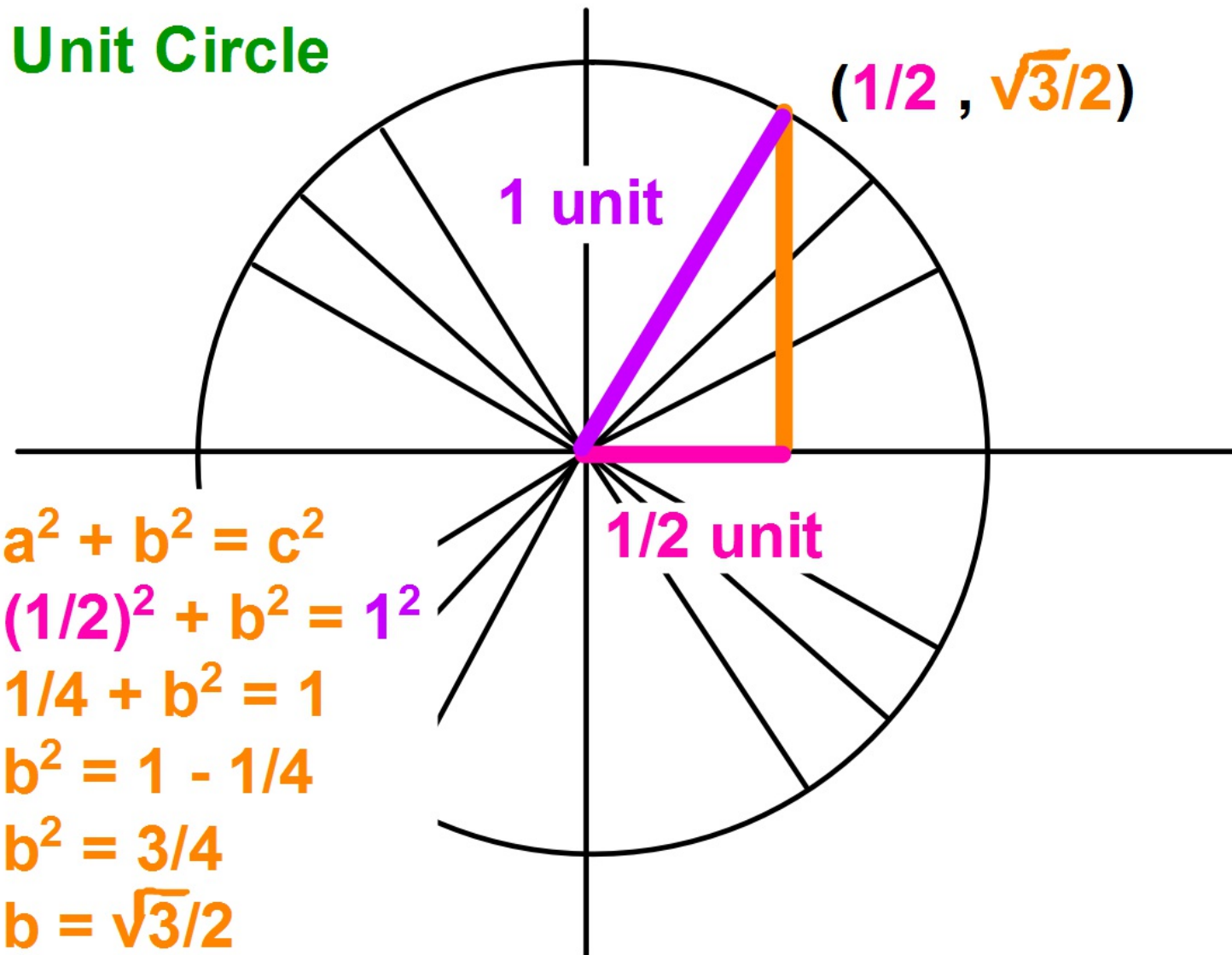
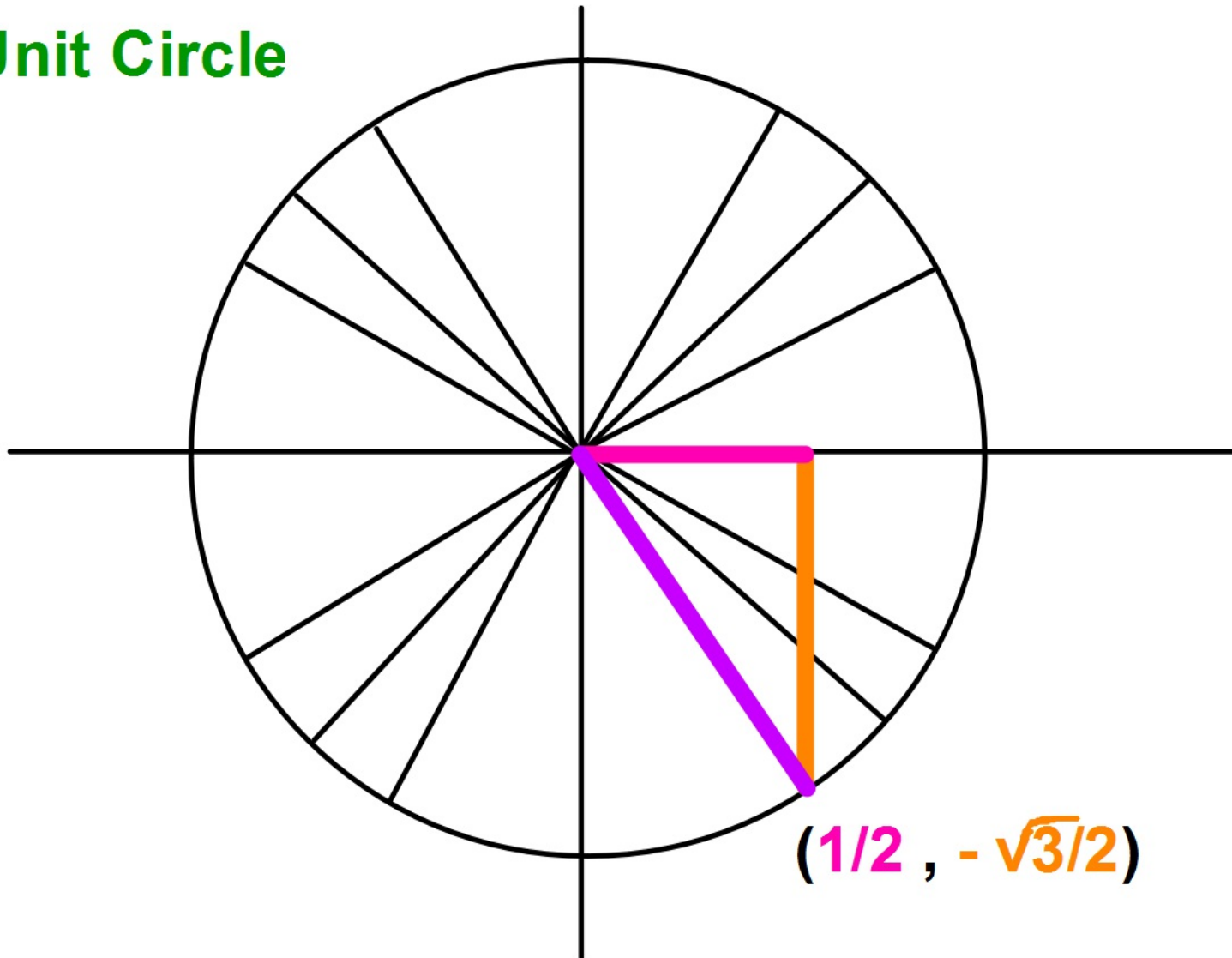


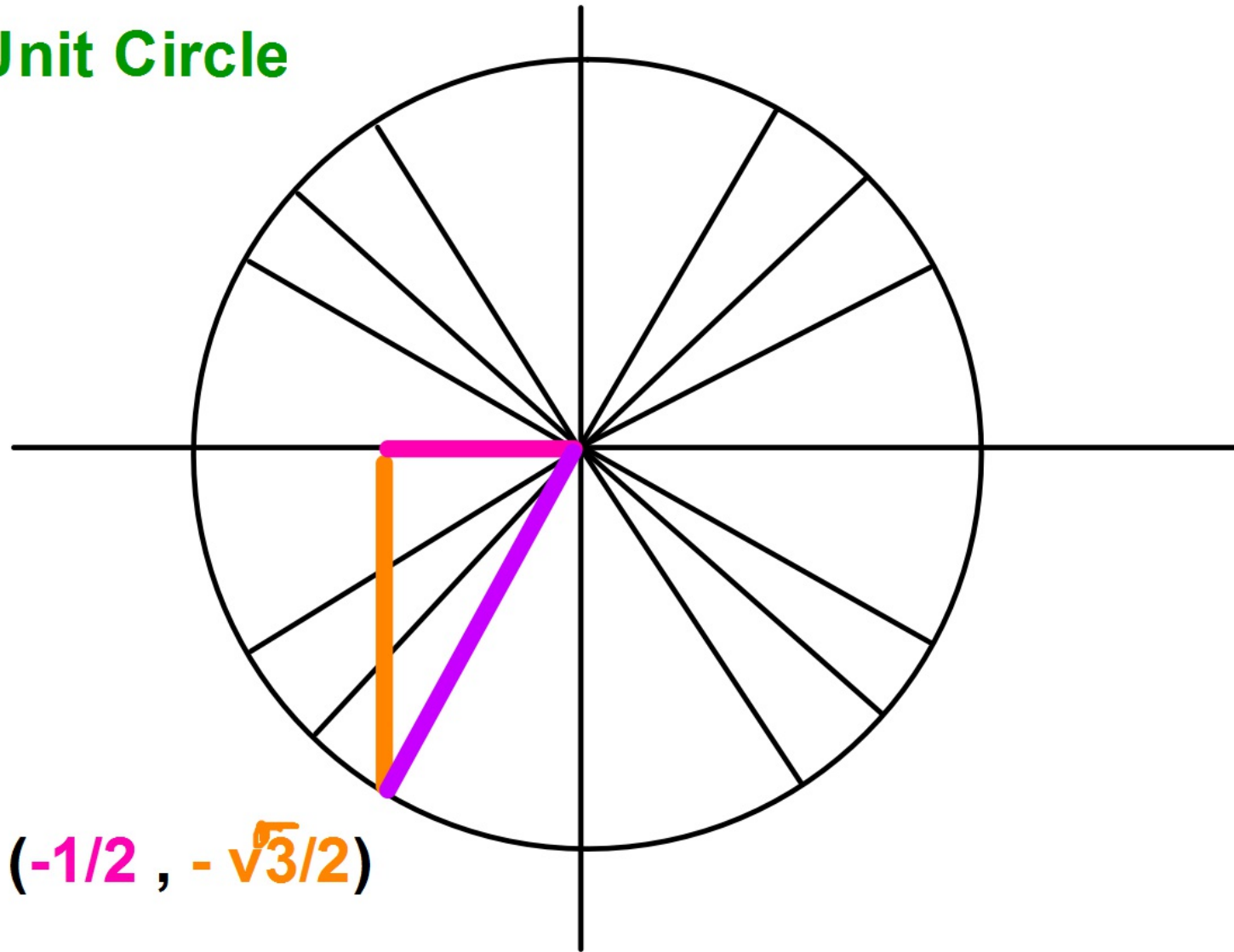
Unit Circle



Unit Circle



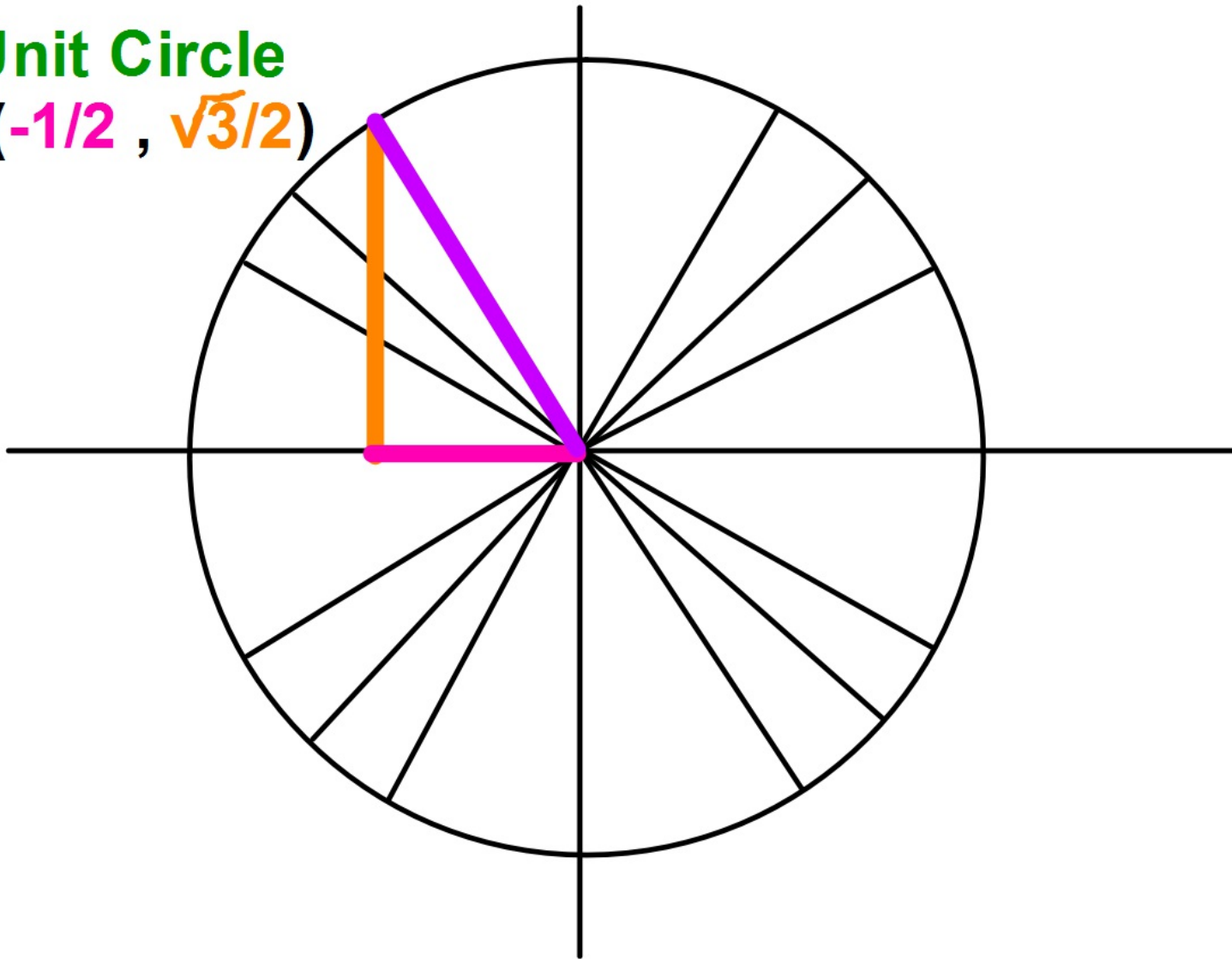
Unit Circle



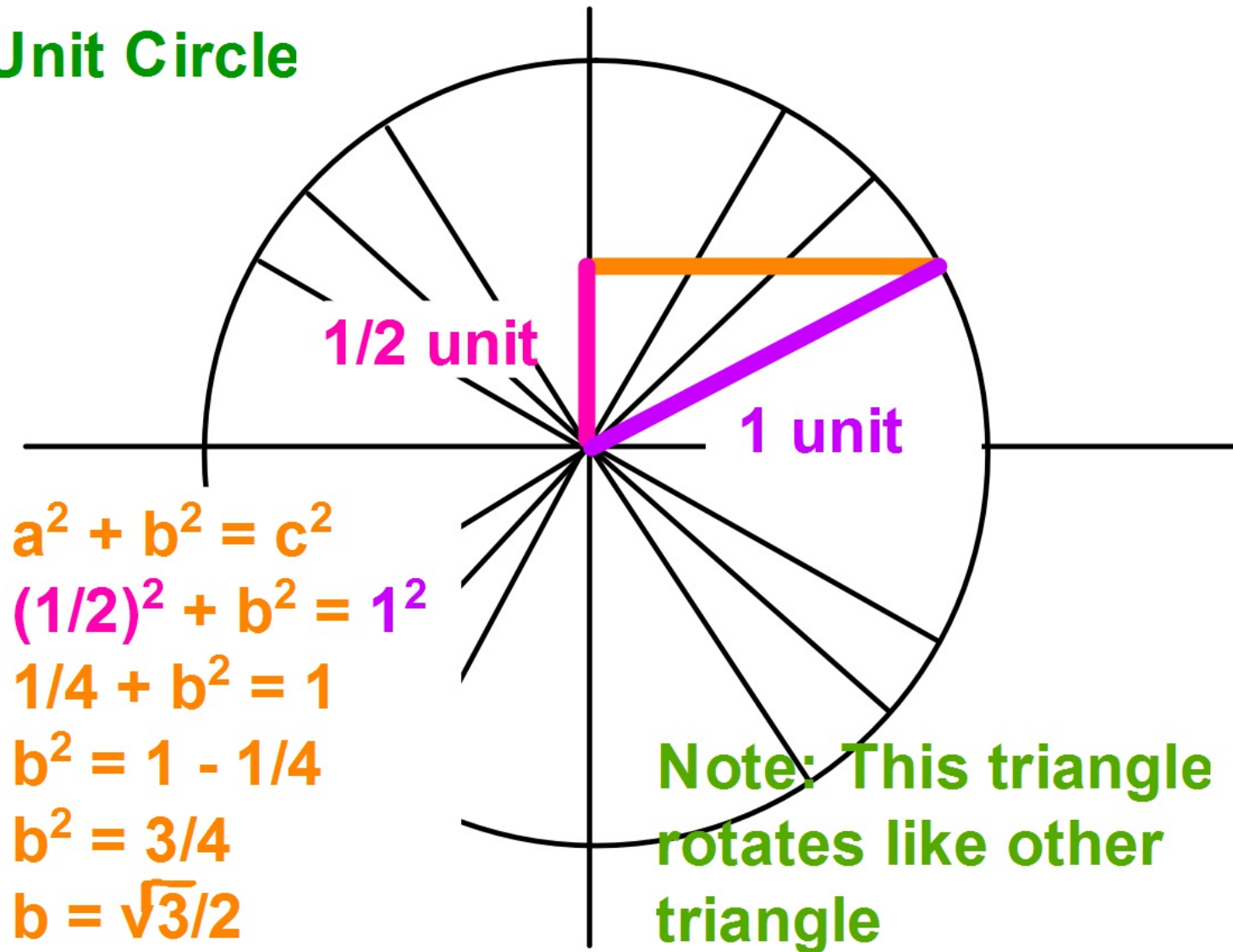
$(-1/2, -\sqrt{3}/2)$

Unit Circle

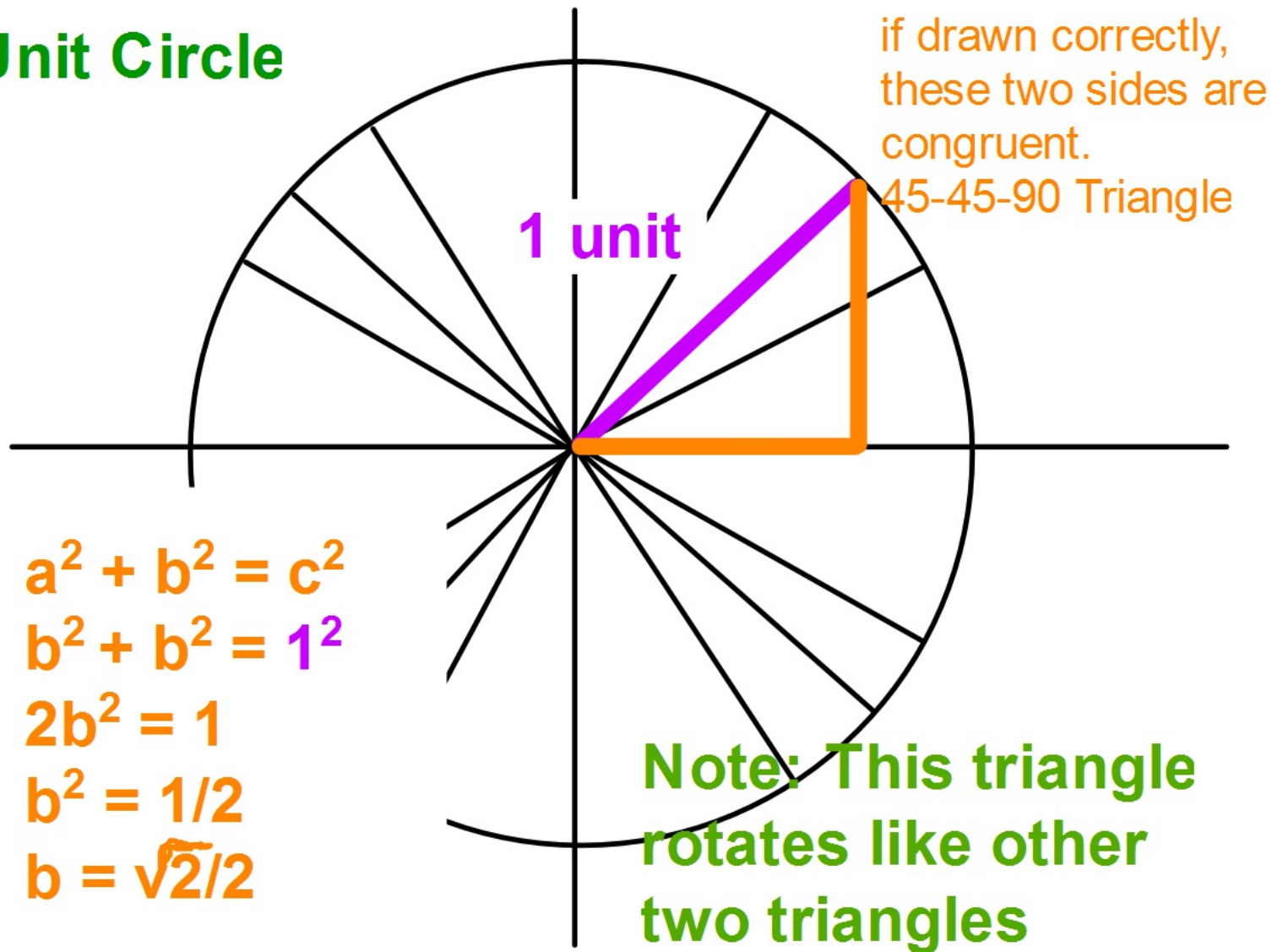
$(-1/2, \sqrt{3}/2)$

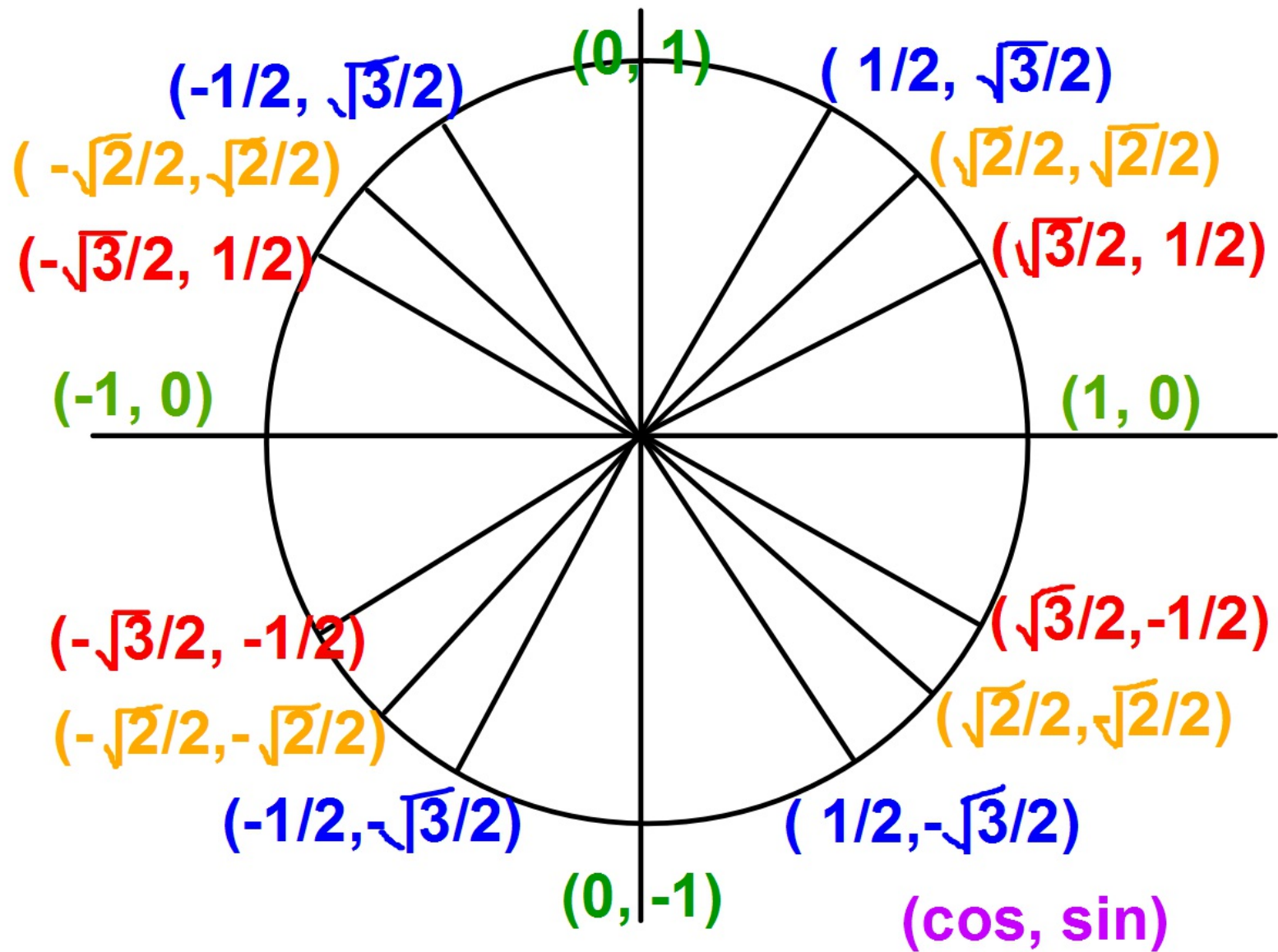


Unit Circle



Unit Circle





Find the exact value of each trigonometric function, if defined. If not defined, write *undefined*. (Example 2)

9. $\sin \frac{\pi}{2}$

10. $\tan 2\pi$

11. $\cot(-180^\circ)$

12. $\csc 270^\circ$

13. $\cos(-270^\circ)$

Sketch each angle. Then find its reference angle.

15. $\tan \pi$

17. 135°

18. 210°

19. $\frac{7\pi}{12}$

20. $\frac{11\pi}{3}$

21. -405°

Find the exact value of each expression. (Example)

23. $\frac{5\pi}{6}$

25. $\cos \frac{4\pi}{3}$

26. $\tan \frac{7\pi}{6}$

27. $\sin \frac{3\pi}{4}$

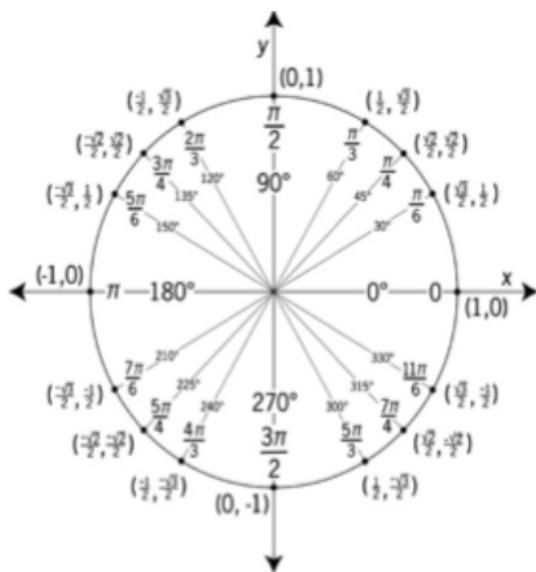
28. $\cot(-45^\circ)$

29. $\csc 390^\circ$

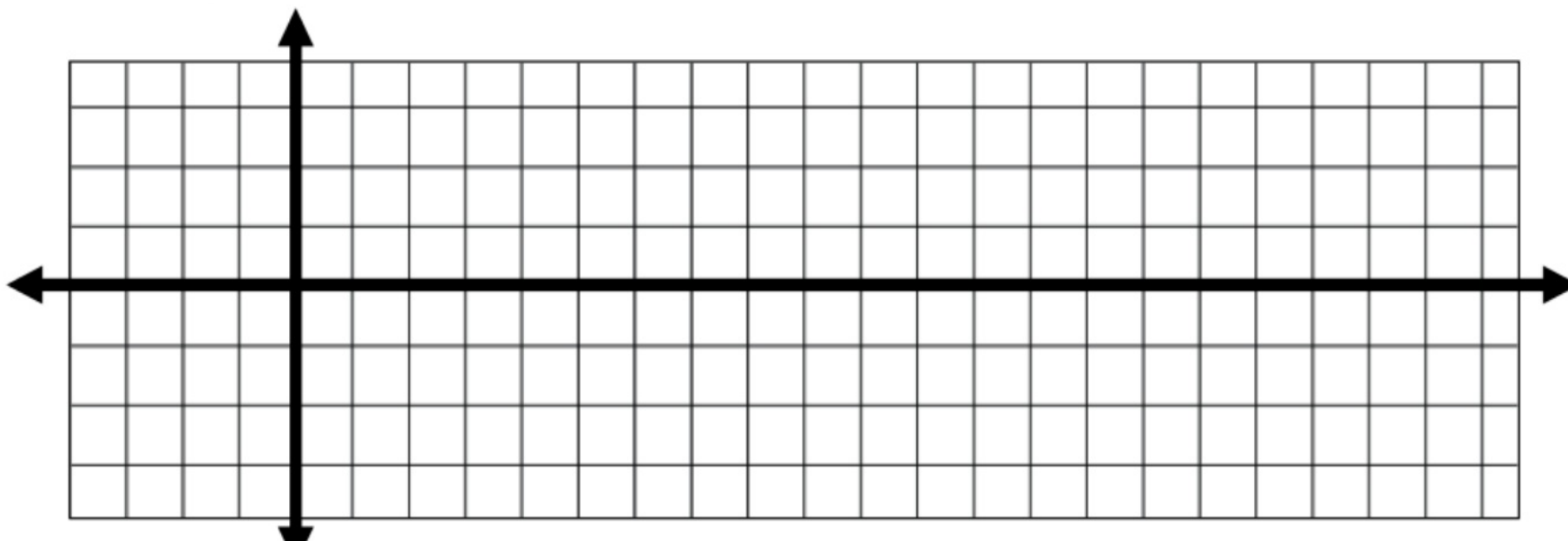
30. $\sec(-150^\circ)$

31. $\tan \frac{11\pi}{6}$

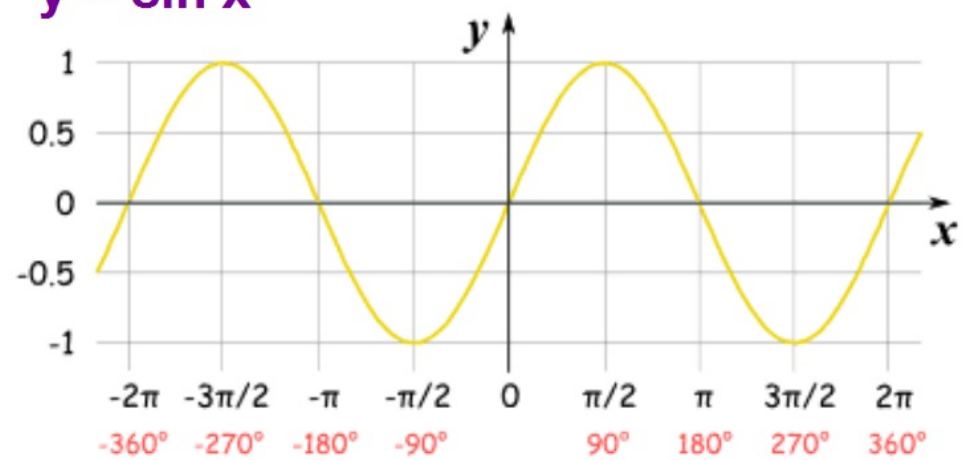
32. $\sin 300^\circ$



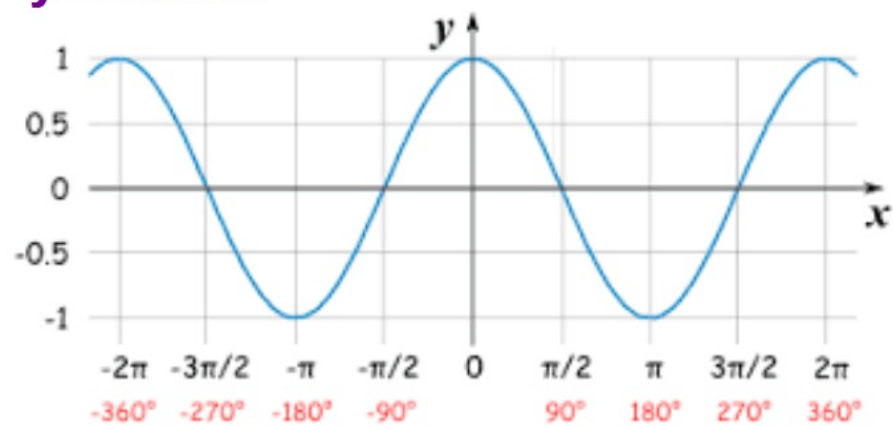
x (radians or degrees)									
$f(x) = \sin(x)$									



$$y = \sin x$$



$$y = \cos x$$



Graphing Sine and Cosine

Sine $\rightarrow y = a \sin (bx + c) + d$

Cosine $\rightarrow y = a \cos (bx + c) + d$

Amplitude

Half the height of the graph.

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

Period

The distance that is covered between repeating parts of a graph.

$$\text{period} = 2\pi / |b|$$

Frequency

Number of cycles the graph has over one unit interval.

$$\text{Frequency} = 1/\text{period} \quad \text{or} \quad |b|/2\pi$$

Phase Shift

The distance that the graph differs from the standard graph.

$$\text{Phase shift} = -c/|b|$$

Vertical Shift

Movement up or down.

+ d is up - d is down

Find the amplitude, period, frequency, and phase shift of the following.

1. $y = 3 \sin (x - \pi/4)$

Amplitude



Period



Frequency



Phase Shift



Assignment

State the amplitude, period, frequency, phase shift, and vertical shift for each function.

Then graph two periods of the function.

1. $y = 3 \sin (x - \pi/4)$ ← Graph

2. $y = \cos (x/3 + \pi/2)$

3. $y = 0.25 \cos x + 3$

4. $y = \sin 3x - 2$

5. $y = \cos (x - 3\pi/2) - 1$