KEY

Station 1 – Coterminal and Reference Angles

Determine the angle between 0 and 2π that is coterminal with the given angle. Sketch each angle in the unit circle.

a. $\theta = \frac{15\pi}{6}$ b. $\theta = -\frac{4\pi}{3}$ c. $\theta = -\frac{\pi}{3}$ d. $\theta = \frac{9\pi}{4}$

$\frac{15\pi}{6} - 2\pi = \frac{3\pi}{6} = \frac{\pi}{2}$ $-\frac{4\pi}{3} + 2\pi = \frac{2\pi}{3}$ $-\frac{\pi}{3} + 2\pi = \frac{5\pi}{3}$ $\frac{9\pi}{4} - 2\pi = \frac{\pi}{4}$

$\frac{\pi}{2}$ $\frac{2\pi}{3}$ $\frac{5\pi}{3}$ $\frac{\pi}{4}$

Describe how you find a coterminal angle:

Determine the reference angle for each of the angles given.

a. $\theta = \frac{15\pi}{6}$ $\frac{\pi}{6}$ b. $\theta = -\frac{4\pi}{3}$ $\frac{\pi}{3}$ c. $\theta = -\frac{\pi}{3}$ $\frac{\pi}{3}$ d. $\theta = \frac{9\pi}{4}$ $\frac{\pi}{4}$

Describe how you find a reference angle:

Determine the exact value of the given trigonometric expression.

a. $\cos\frac{11\pi}{6} = \frac{\sqrt{3}}{2}$ b. $\sin\frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$ c. $\cos -\frac{5\pi}{6} = -\frac{\sqrt{3}}{2}$

Extension:

Can you find two different angles for θ that give you the same value when calculating $\sin\theta$? How about $\cos\theta$?

$\sin\theta$ → same y-value

$\frac{\pi}{4}$; $\frac{3\pi}{4}$

$\frac{\pi}{6}$; $\frac{5\pi}{6}$

...

$\cos\theta$ → same x-value

$\frac{\pi}{4}$; $-\frac{\pi}{4}$

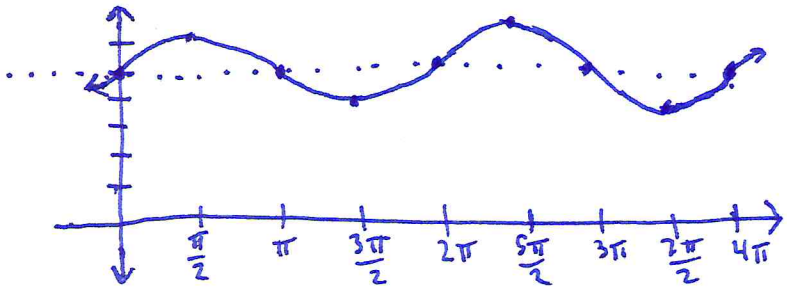
$\frac{\pi}{6}$; $-\frac{\pi}{6}$

...

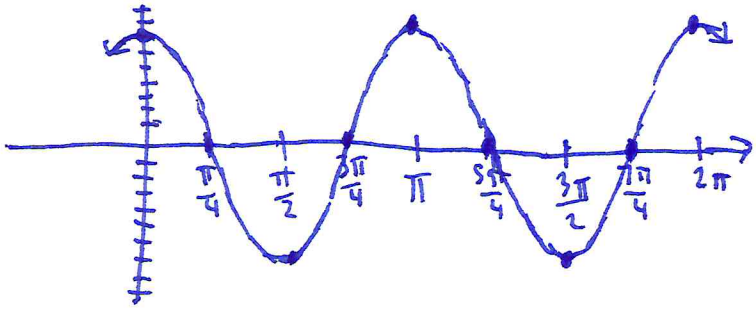
KEY

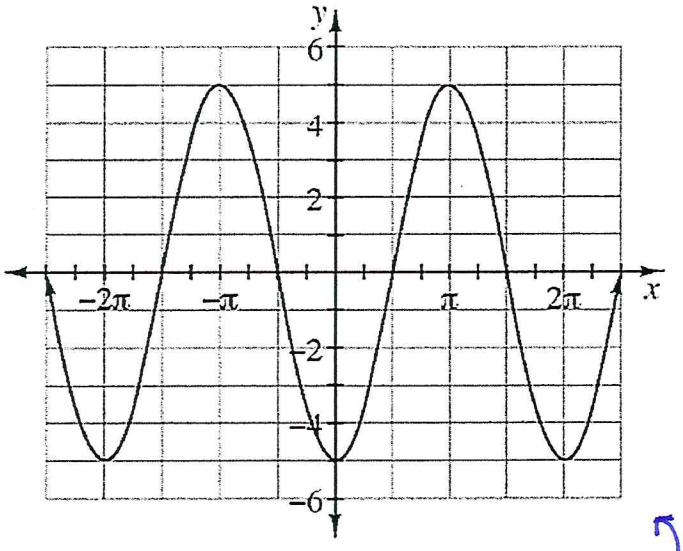
Station 2- Graphing and Transforming

Graph two complete cycles of $y = \sin(x) + 5$.



Graph two complete cycles of $y = 7\cos(2x)$.





$y = -5\cos x$

Write an equation for the trigonometric function graphed below.

Extension:

Can you write two equations for the graph in the previous problem, one using cos and the other using sin?

$y = -5\cos x$

$y = 5\sin\left(x + \frac{\pi}{2}\right)$

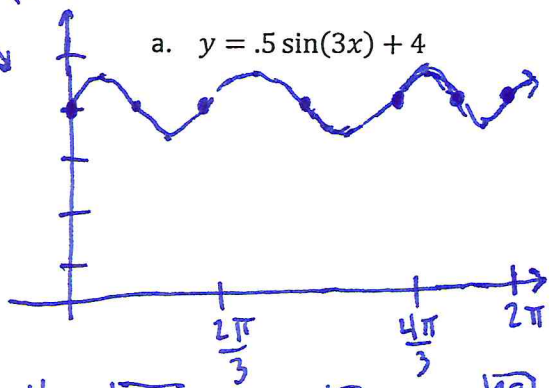
KEY

Station 3- Features of Trig Functions

Graph the equation. Then identify and label the graph with the midline, amplitude, period, and number of cycles within 2π for each of the following equations.

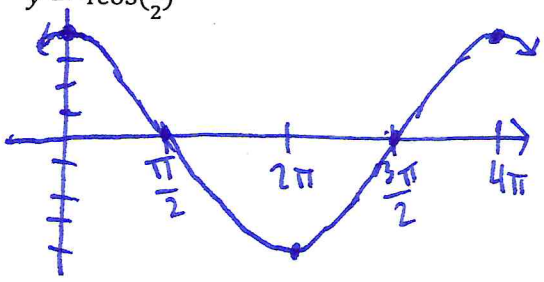
should be evenly spaced

a. $y = .5\sin(3x) + 4$



midline: $y=4$ Amp: $\frac{1}{2}$ Period: $\frac{2\pi}{3}$ # of Cycles: 3

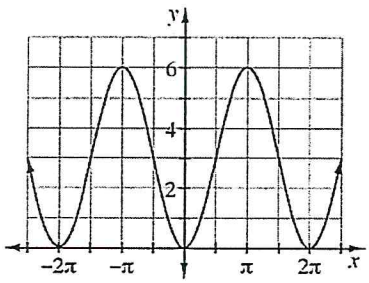
b. $y = 4\cos(\frac{x}{2})$



midline: $y=0$ Amp: 4 Period: 4π # of cycles: 1

Identify the equation of the midline, the amplitude, the period, and the number of cycles within 2π for each of the following graphs.

a.



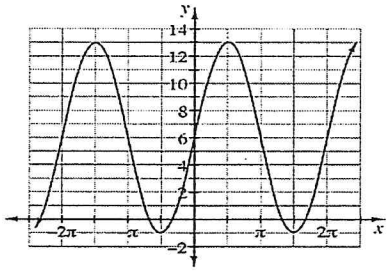
Midline: $y=3$

Amplitude: 3

Period: 2π

# of Cycles in 2π: 1

b.



Midline: $y=6$

Amplitude: 7

Period: 2π

# of Cycles in 2π: 1

Extension:

Identify where you look in a basic trigonometric equation to find the midline, amplitude, period, and # of cycles in 2π.

$$y = A\cos(Bx - h) + k$$

A: Amp

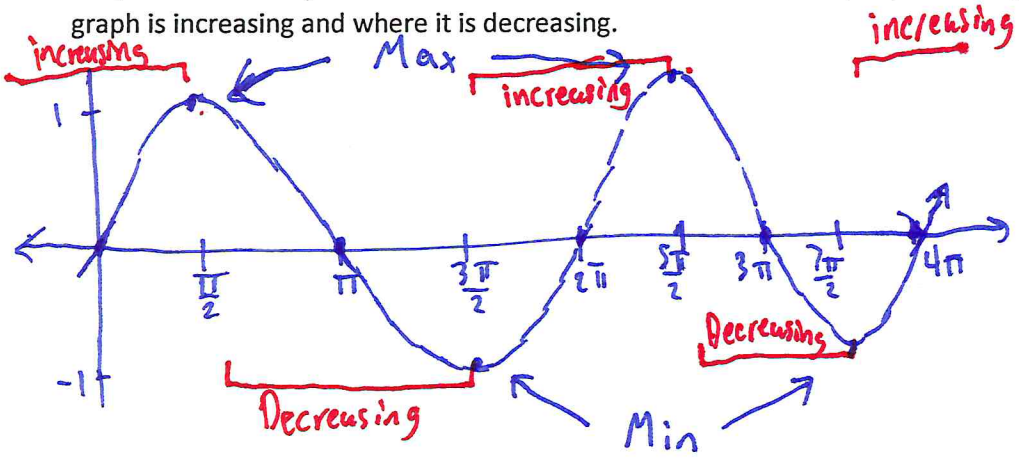
B: # of cycles, Period $= \frac{2\pi}{B}$

k: midline ($y=k$)

KEY

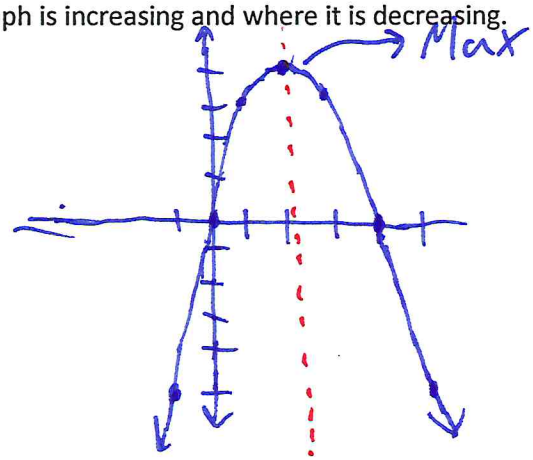
Station 4 – Characteristics of Functions

Graph the function $y = sinx$. Label the maximum and minimum points on the graph. Identify where the graph is increasing and where it is decreasing.



Infinitely many Mins & Maxes

Graph the function $y = -(x - 2)^2 + 4$. Label the maximum and minimum points on the graph. Identify where the graph is increasing and where it is decreasing.

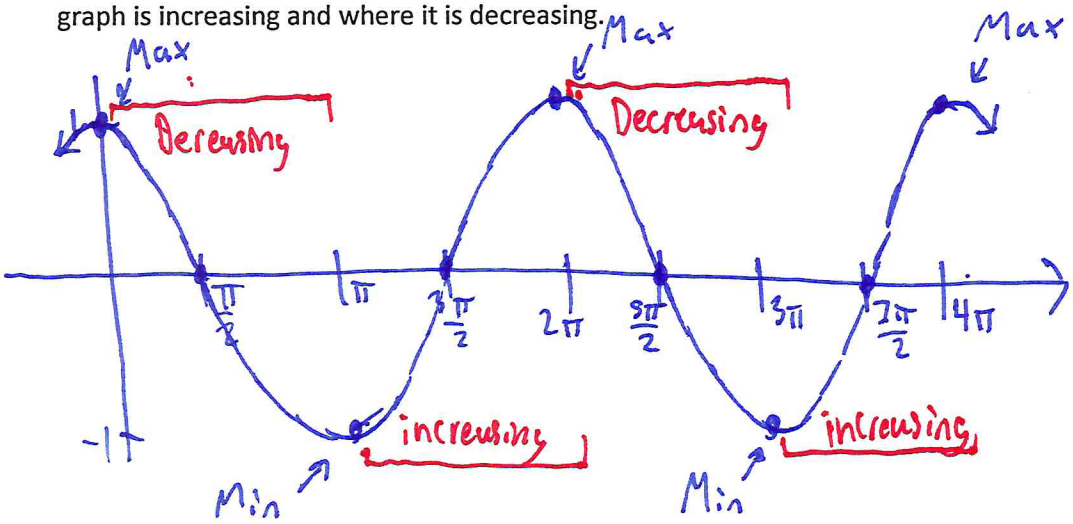


Increasing: $(-\infty, 2)$

Decreasing: $(2, \infty)$

Increasing ← : → Decreasing

Graph the function $y = cosx$. Label the maximum and minimum points on the graph. Identify where the graph is increasing and where it is decreasing.



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