

$f(x) = a \sin b(x-c) + d$ $f(x) = a \cos b(x-c) + d$

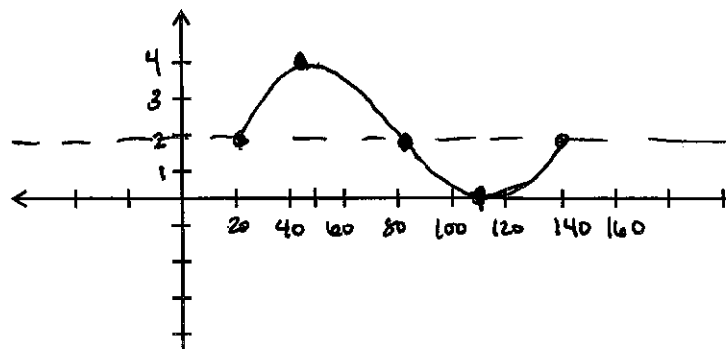
GPS PreCalculus: Unit 4: Graphing Trig Functions
 Quiz Review: Graphing Trig Functions/Writing Equations

Name Key
 Date _____ Day _____

1. $f(x) = 2 \sin(3x - 60^\circ) + 2$

$|a|$ Amplitude: 2
 $360/b$ Period: 120
 d Vertical Shift: 2
 $(x-c)$ Horizontal Shift 20
 Start: 20
 End: 140
 Increments: 30
 Period/4

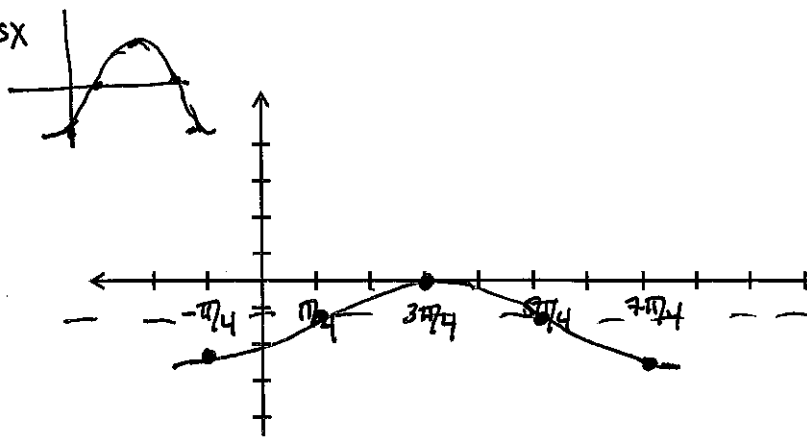
x	f(x)	
20	2	SA
50	4	
80	2	SA
110	0	
140	2	SA



2. $f(x) = -\cos(x + \frac{\pi}{4}) - 1$

$2\pi/b$ Amplitude: 1
 Period: 2π
 Vertical Shift: -1
 Horizontal Shift $-\pi/4$
 Start: $-\pi/4$
 End: $7\pi/4$ $-\pi/4 + 2\pi$
 Increments: $\pi/2$
 $2\pi/4 = \pi/2$
 Period/4

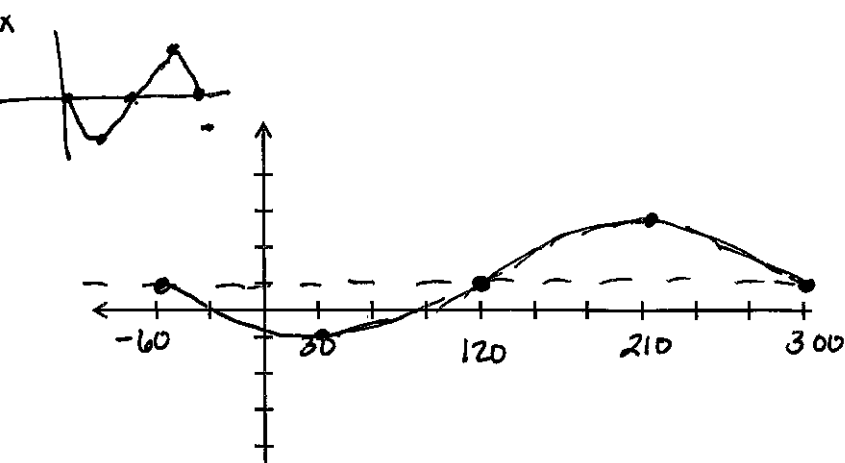
x	f(x)
$-\pi/4$	-2
$\pi/4$	-1
$3\pi/4$	0
$5\pi/4$	-1
$7\pi/4$	-2



3. $f(x) = -2 \sin(x + 60^\circ) + 1$

Amplitude: 2
 Period: 360
 Vertical Shift: 1
 Horizontal Shift -60
 Start: -60
 End: 300
 Increments: 90
 $360/4$

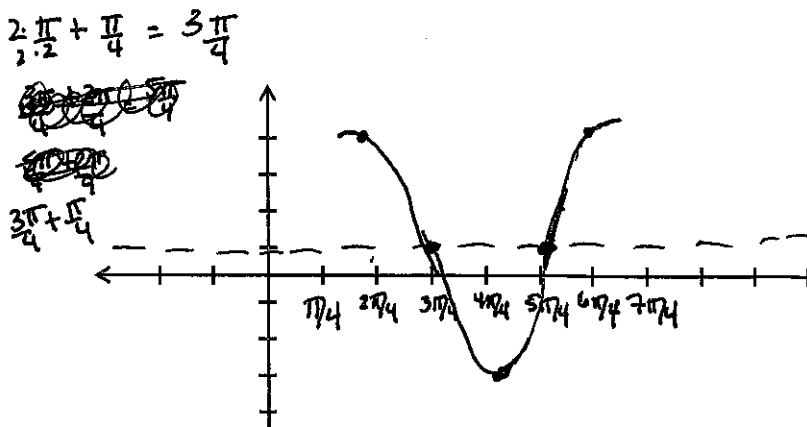
x	f(x)
-60	1
30	-1
120	1
210	3
300	1



4. $f(x) = 3 \cos(2x - \pi) + 1$

$2\pi/2$ Amplitude: 3
 Period: π
 Vertical Shift: 1
 Horizontal Shift $\pi/2$
 Start: $\pi/2$
 End: $3\pi/2$
 Increments: $\pi/2$

x	f(x)
$\pi/2$	4
$3\pi/4$	1
$4\pi/4$	-3
$5\pi/4$	1
$3\pi/2$	4



$2x - \pi = 0$
 $2x = \pi$
 $x = \pi/2$

$2\pi/2 + \pi/2 = 3\pi/2$

5. $f(x) = -2 \cos(3x - 90^\circ) - 2$

360/3

Amplitude: 2

Period: 120

Vertical Shift: -2

Horizontal Shift: 30

Start: 30

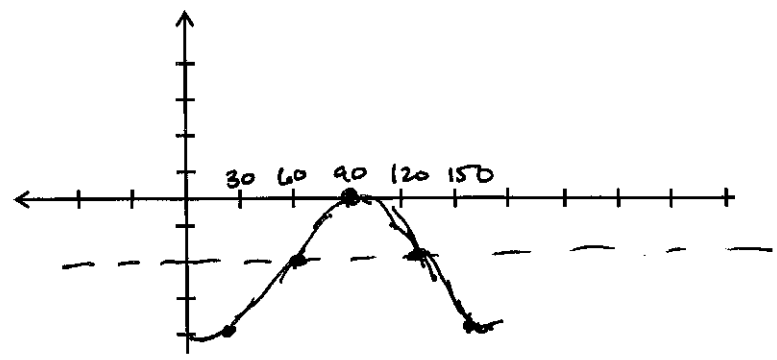
End: 150

Increments: 30

$3x - 90 = 0$
 $3x = 90$
 $x = 30$

120/4

x	f(x)
30	-4
60	-2
90	0
120	-2
150	-4



6. $f(x) = 3 \sin(x + \pi) + 1$

Amplitude: 3

Period: 2π

Vertical Shift: 1

Horizontal Shift: -π

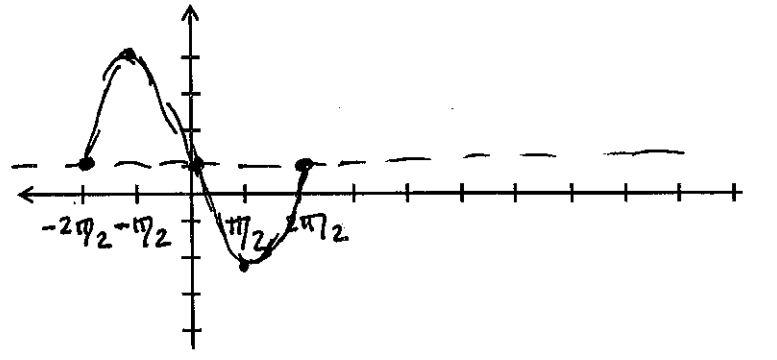
Start: -π

End: π

Increments: π/2

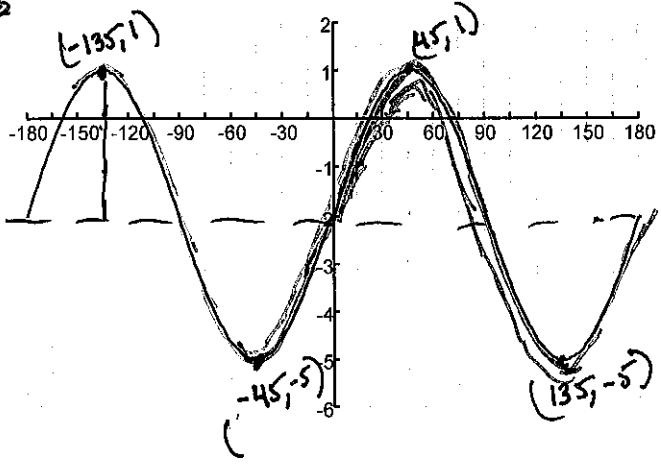
$2 - \frac{\pi}{2} + \frac{\pi}{2} = -\frac{\pi}{2}$
 $-\pi/2 + \pi/2$

x	f(x)
-π	1
-π/2	4
0	1
π/2	-2
π	1



7. Write a negative (-) cosine equation, a positive (+) cosine equation, a negative (-) sine equation, and a positive (+) sine equation for the following trig graph

a = 3
 b =
 c = -2
 d = -2



(-) cos x =	$-3 \cos 2(x + 45) - 2$
(+) cos x =	$3 \cos 2(x - 135) - 2$
(-) sin x =	$-3 \sin 2(x + 90) - 2$
(+) sin x =	$3 \sin 2(x - 0) - 2$

8. **Steamboat Problem:** A point on a paddlewheel of a boat turns in such a way that its distance, d, from the water's surface was a sinusoidal function of time. At 3 seconds, the point was at its highest, 15 feet above the water's surface. The wheel has a diameter of 20 feet and it completes a revolution once every 10 seconds.

a. Sketch a graph of this sinusoid.

$f(x) = 10 \cos \pi/5(x - 3) + 5$

b. Write an equation of the sinusoid.

a = 10
 b = π/5
 c = 3
 d = 5

period = 10
 $10 = \frac{2\pi}{b}$
 $\frac{10b}{10} = \frac{2\pi}{10}$
 $b = \pi/5$

