Name Schlansky
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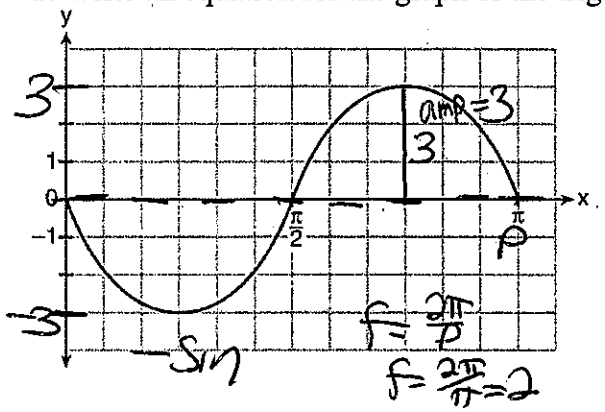
Date _____
Algebra II

Writing Equations of Sinusoidal Graphs

1. Write an equation for the graph of the trigonometric function shown below.



min+max / 2 = midline

−3+3 / 2 = midline

0/2 = midline

0 = midline

y = amp sin freq x shift

y = −3 sin 2x

2. The accompanying graph represents a portion of a sound wave.

Which equation best represents this graph?

(1) $y = 2\sin\frac{1}{2}x$ (3) $y = \sin 2x$

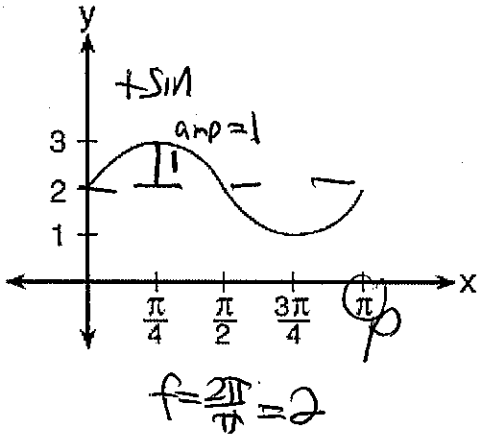
(2) $y = \sin\frac{1}{2}x + 2$ (4) $y = \sin 2x + 2$

mid = min+max / 2

mid = 1+3 / 2 = 2

y = amp sin freq x shift

y = 1 sin 2x + 2

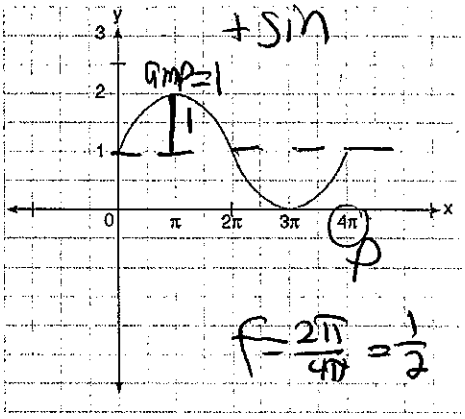


3. In physics class, Eva noticed the pattern shown in the accompanying diagram on an oscilloscope.

Which equation best represents the pattern shown on this oscilloscope?

(1) $y = \sin(\frac{1}{2}x) + 1$ (3) $y = 2\sin x + 1$

(2) $y = \sin x + 1$ (4) $y = 2\sin(-\frac{1}{2}x) + 1$



mid = min+max / 2

mid = 0+2 / 2

mid = 1

y = amp sin freq x shift

y = 1 sin 1/2 x + 1

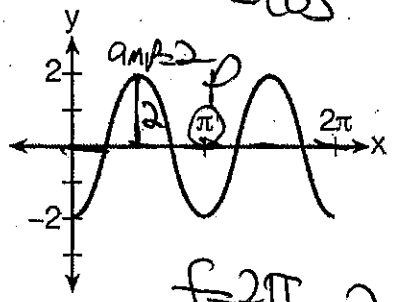
$y = amp\sin freq(x - shift)$

$y = -2\cos 2x$

$-\cos$

4. Which equation represents the graph below?

1) $y = -2\sin 2x$
2) $y = -2\sin\frac{1}{2}x$
3) $y = -2\cos 2x$
4) $y = -2\cos\frac{1}{2}x$



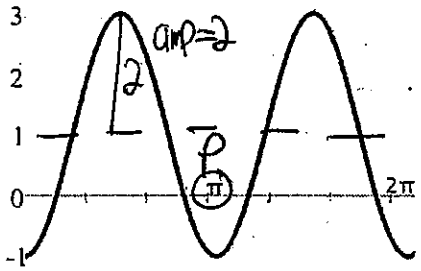
$mid = \frac{min + max}{2}$

$mid = \frac{-2+2}{2}$

$mid = 0$

$f = \frac{2\pi}{\pi} = 2$

5. Write the equation of the sinusoidal function shown below:



$mid = \frac{min + max}{2}$

$mid = \frac{-1+3}{2}$

$mid = 1$

$-\cos$

$f = \frac{2\pi}{\pi} = 2$

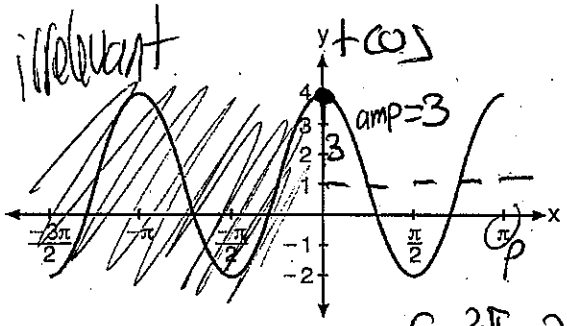
$y = amp\sin freq(x - shift)$

$y = -2\cos 2x + 1$

6. What is the equation of the graph given below.

$y = amp\sin freq(x - shift)$

$y = 3\cos 2x + 1$



$y + \cos$

$mid = \frac{min + max}{2}$

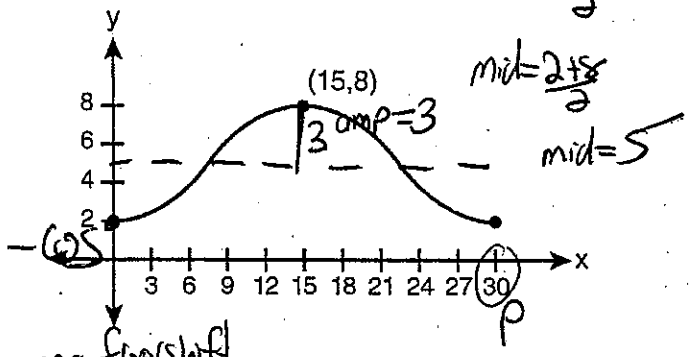
$mid = \frac{-2+4}{2}$

$mid = 1$

$f = \frac{2\pi}{\pi} = 2$

7. Which equation is graphed in the diagram below?

1) $y = 3\cos\left(\frac{\pi}{30}x\right) + 8$
2) $y = 3\cos\left(\frac{\pi}{15}x\right) + 5$
3) $y = -3\cos\left(\frac{\pi}{30}x\right) + 8$
4) $y = -3\cos\left(\frac{\pi}{15}x\right) + 5$



$mid = \frac{min + max}{2}$

$mid = \frac{2+8}{2}$

$mid = 5$

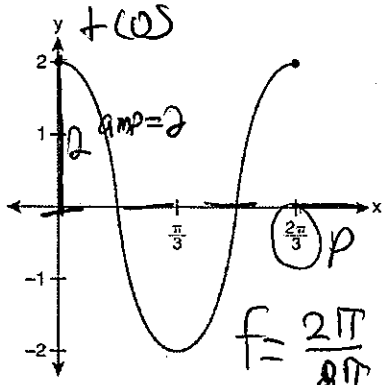
$-\cos$

$y = amp\sin freq(x - shift)$

$y = -3\cos\frac{\pi}{15}x + 5$

$f = \frac{2\pi}{30} = \frac{\pi}{15}$

8. Which equation is represented by the graph below?



mid = min+max / 2

1) $y = 2\cos 3x$
2) $y = 2\sin 3x$
3) $y = 2\cos\frac{2\pi}{3}x$
4) $y = 2\sin\frac{2\pi}{3}x$

mid = -2+2 / 2

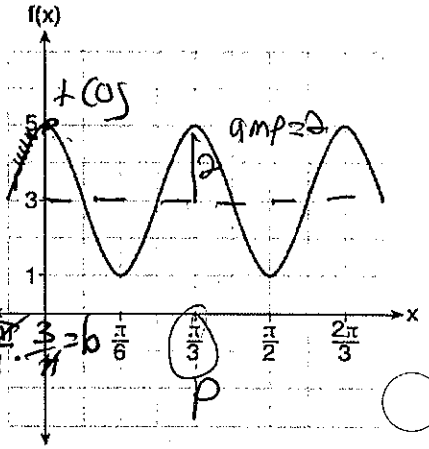
mid = 0

y = amp sin freq x shift

y = 2cos3x

$f = \frac{2\pi}{\frac{2\pi}{3}}$ $\frac{2\pi}{1}\cdot\frac{3}{2\pi} = 3$

9. The function $f(x) = a\cos bx + c$ is plotted on the graph shown below.



mid = min+max / 2

mid = $\frac{1+5}{2} = 3$

What are the values of a, b, and c?

1) $a = 2, b = 6, c = 3$
2) $a = 2, b = 3, c = 1$
3) $a = 4, b = 6, c = 5$
4) $a = 4, b = \frac{\pi}{3}, c = 3$

y = amp sin freq x shift

y = 2cos6x + 3

a b c

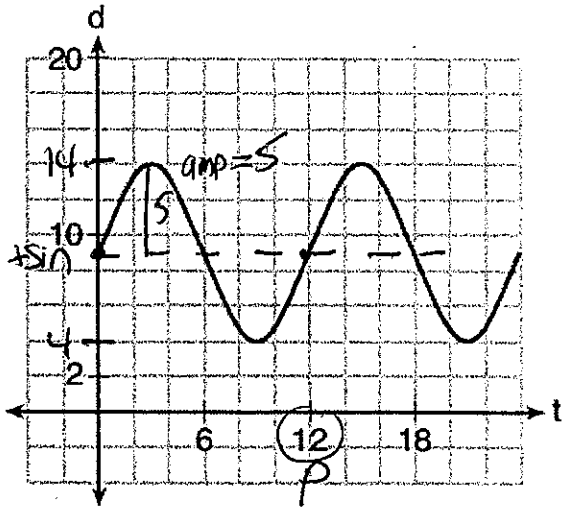
$f = \frac{2\pi}{\pi} = \frac{2\pi}{1}\cdot\frac{3}{\pi} = b$

$f = \frac{2\pi}{3}$

10. The depth of the water at a marker 20 feet from the shore in a bay is depicted in the graph below.

If the depth, d, is measured in feet and time, t, is measured in hours since midnight, what is an equation for the depth of the water at the marker?

1) $d = 5\cos\left(\frac{\pi}{6}t\right) + 9$
2) $d = 9\cos\left(\frac{\pi}{6}t\right) + 5$
3) $d = 9\sin\left(\frac{\pi}{6}t\right) + 5$
4) $d = 5\sin\left(\frac{\pi}{6}t\right) + 9$



mid = min+max / 2

mid = $\frac{4+14}{2} = 9$

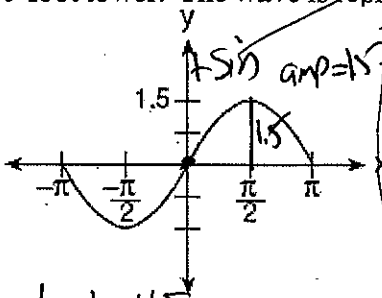
y = amp sin freq x shift

y = 5sin$\frac{\pi}{6}$x + 9

$f = \frac{2\pi}{12} = \frac{\pi}{6}$

11. A radio transmitter sends a radio wave from the top of a 50-foot tower. The wave is represented by the accompanying graph. $y = amp\sin freq x shift$

$y = 1.5\sin 1x + 0$



+sin amp=1.5 $\frac{1}{2}$ wave to π

1 wave to 2π

$p = 2\pi$

$f = \frac{2\pi}{2\pi} = 1$

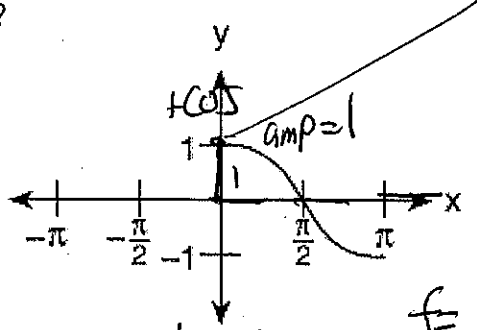
$mid = \frac{-1.5+1.5}{2} = 0$

What is the equation of this radio wave?

(1) $y = \sin x$ (3) $y = \sin 1.5x$

(2) $y = 1.5 \sin x$ (4) $y = 2 \sin x$

12. Which equation is represented by the accompanying graph?



+cos amp=1

$f = 1$

$mid = \frac{-1+1}{2} = 0$

(1) $y = \cos x$ (3) $y = \cos 2x$

(2) $y = \cos\frac{1}{2}x$ (4) $y = \frac{1}{2}\cos x$

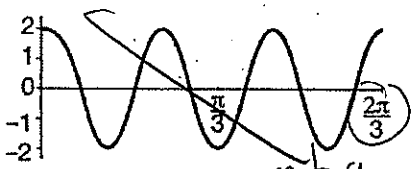
$y = amp\sin freq x shift$

$y = 1\cos 1x + 0$

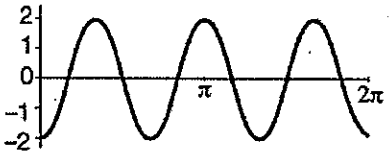
13. Which graph represents a cosine function with no horizontal shift, an amplitude of 2, and a period of $\frac{2\pi}{3}$?

if 3 waves take 2π,

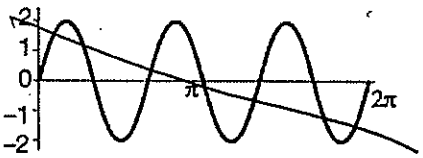
1 wave is $\frac{2\pi}{3}$



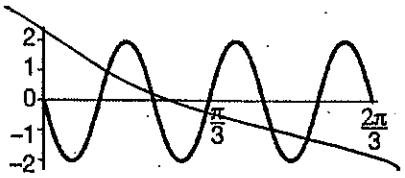
(1) not a period of $\frac{2\pi}{3}$



(3)



(2) not cosine



(4) not cosine