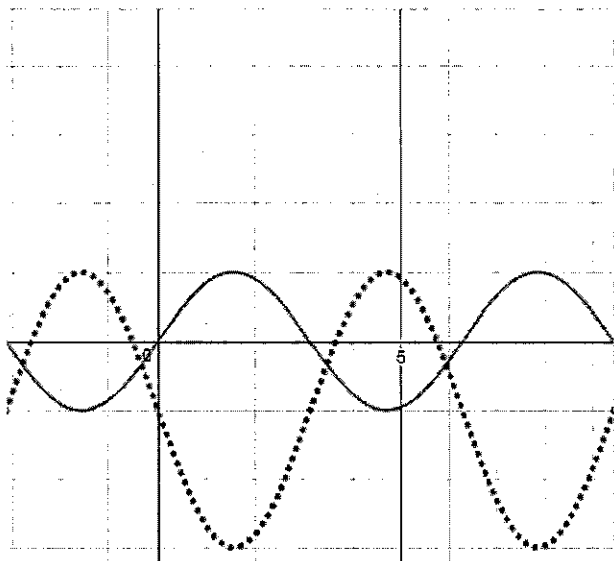


Writing Trig Functions in Radians

1.



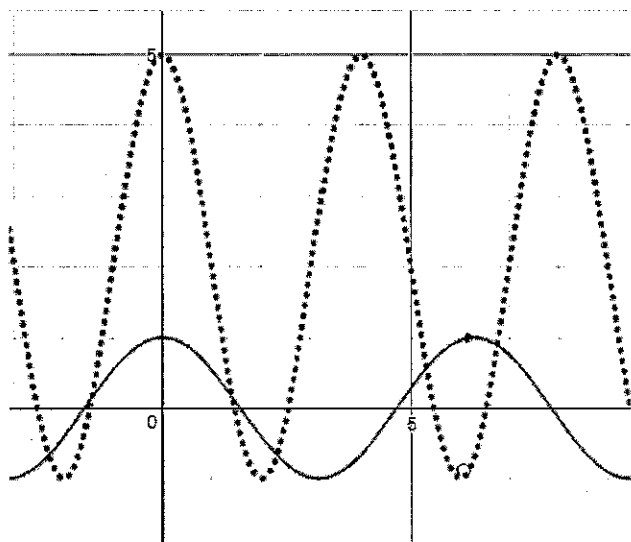
The solid graph shows the parent $y = \sin x$. For the dotted curve, find:

1. Amplitude 2
2. Frequency and Period 1, 2π
3. Midline -1
4. Horizontal Translation. 0
5. What is the equation for the dotted curve?

$$-2 \sin x - 1$$

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2.



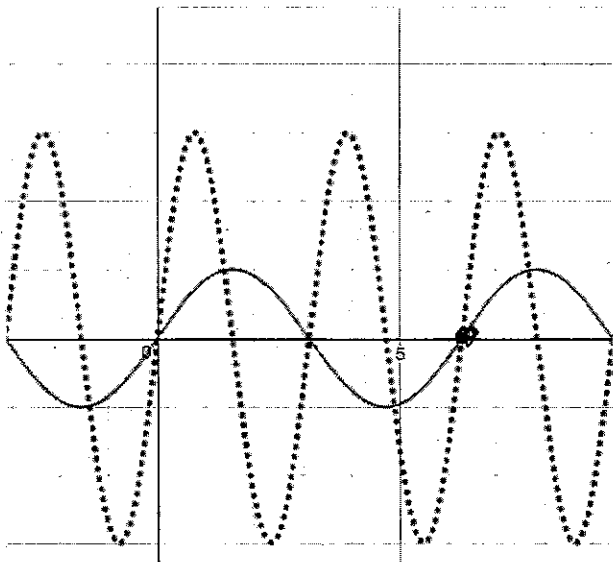
The solid graph shows the parent $y = \cos x$. For the dotted curve, find:

1. Amplitude 3
2. Frequency and Period 1.5, $\frac{2\pi}{1.5}$ or $\frac{4\pi}{3}$
3. Midline 2
4. Horizontal Translation. 0
5. What is the equation for the dotted curve?

$$3 \cos 1.5x + 2$$

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3.



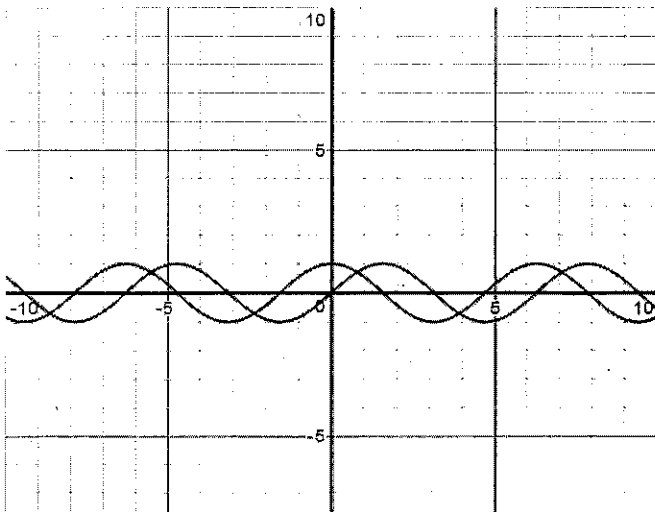
The solid graph shows the parent $y = \sin x$. For the dotted curve, find:

1. Amplitude 3
2. Frequency and Period 2, π
3. Midline 0
4. Horizontal Translation. 0
5. What is the equation for the dotted curve?

$$3 \sin 2x$$

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4.



1. Which curve shown is $y = \sin(x)$? $y = \cos(x)$?
How do you know?

2. Explain why $\sin(x) = \cos\left(x - \frac{\pi}{2}\right)$.

3. Is $\sin(2x) = \cos\left(2\left(x - \frac{\pi}{2}\right)\right)$? Explain why or why not.

1) $\sin(x)$ goes through $(0,0)$
 $\cos(x)$ goes through $(0,1)$
 2) If you shift cosine by $\frac{\pi}{2}$ horizontally, it lands on sine. Same with the unit circle.
 3) No. $\sin(2x) = \cos(2x - \frac{\pi}{2})$.
 Order of operations.

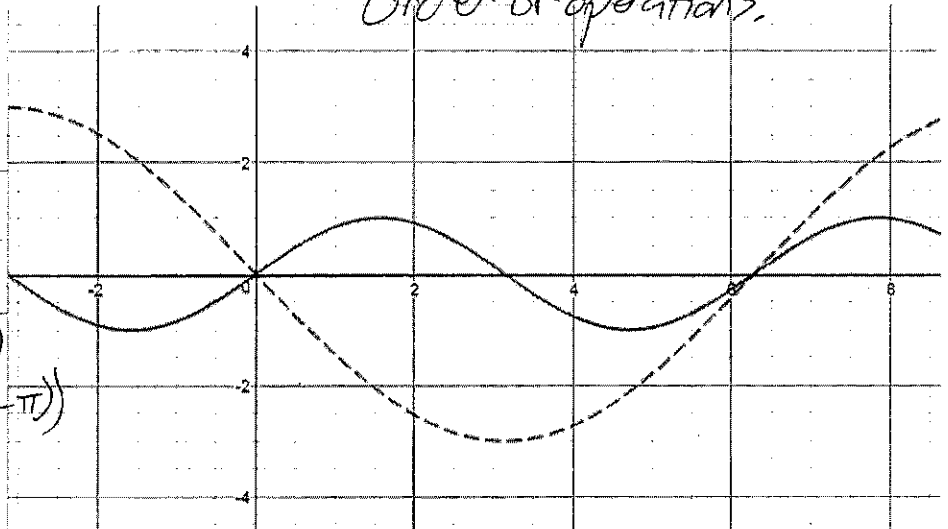
5.

The blue graph is $y = \sin(x)$. Change the # in the lines below to create the dashed function.

2 $f(x) = \# \sin(\#x)$

3 $g(x) = \# \cos(\#(x - \#))$

4 $f(x) = -3 \sin\left(\frac{1}{2}x\right)$
 $g(x) = -3 \cos\left(\frac{1}{2}(x - \pi)\right)$



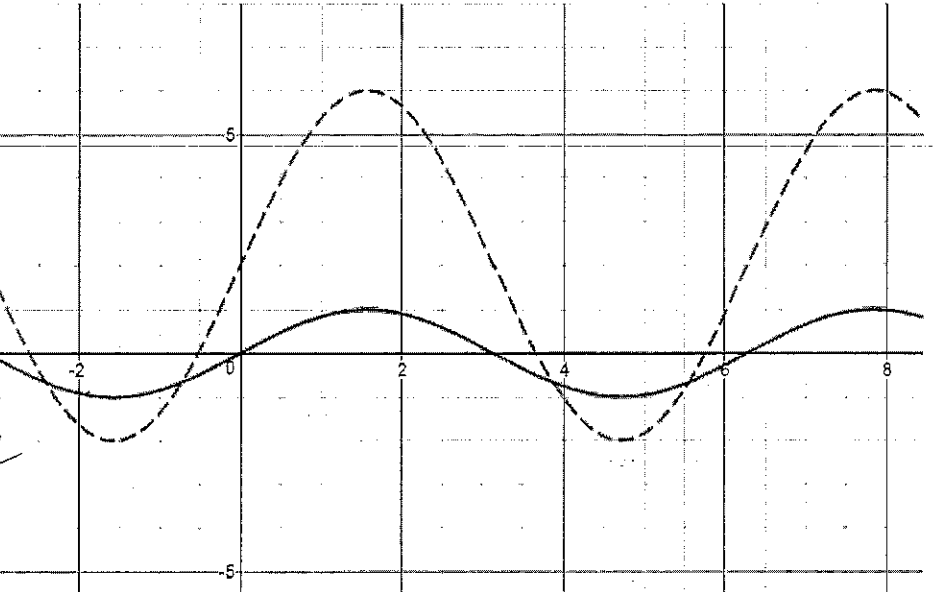
6.

The blue graph is $y = \sin(x)$. Change the # in the line below to create the dashed function.

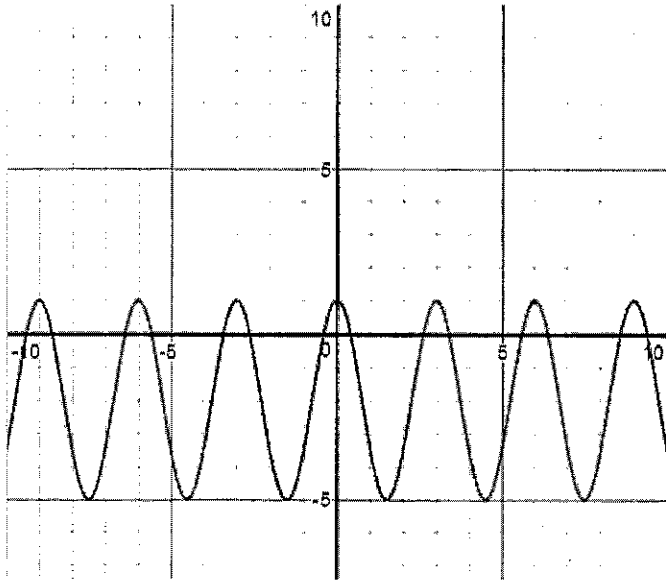
2 $f(x) = \# \sin(x) + \#$

3 $g(x) = \# \cos(x - \#) + \#$

4 $f(x) = 4 \sin x + 2$
 $g(x) = 4 \cos\left(x - \frac{\pi}{2}\right) + 2$



10.



1. The graph shows the functions $f(x)$. Find an equation for $f(x)$.

2. Use the graph to evaluate:

a. $f(3)$ |

b. $f(5.25)$ - 2

3. Use the graph to solve:

a. $f(x) = 1$, $0 \leq x \leq 7$ (hint: 3 solutions) $x = 0, 3, 6$

b. $f(x) = -5$, $-10 \leq x \leq -3$ $x = -7.5, -4.5, -1.5$

Dynamic Teacher

11.

Write a note:

How can you use the graph to evaluate trigonometric functions? solve trigonometric equations?

Find intersection points.

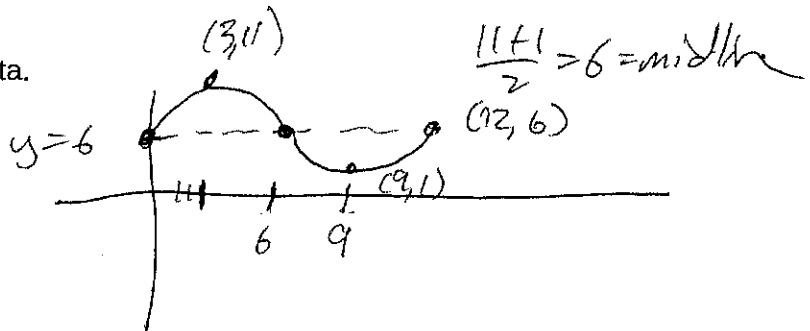
12. Write two equations to fit the given data.

The function $f(x)$:

Starts on the midline

Reaches its first maximum at (3, 11)

Reaches its first minimum at (9, 1)



$$f(x) = 5 \sin\left(\frac{2\pi}{12}x\right) + 6$$

$$f(x) = 5 \cos\left(\frac{2\pi}{12}x - \frac{\pi}{2}\right) + 6$$

Solve the following equations using any method. Give all solutions.

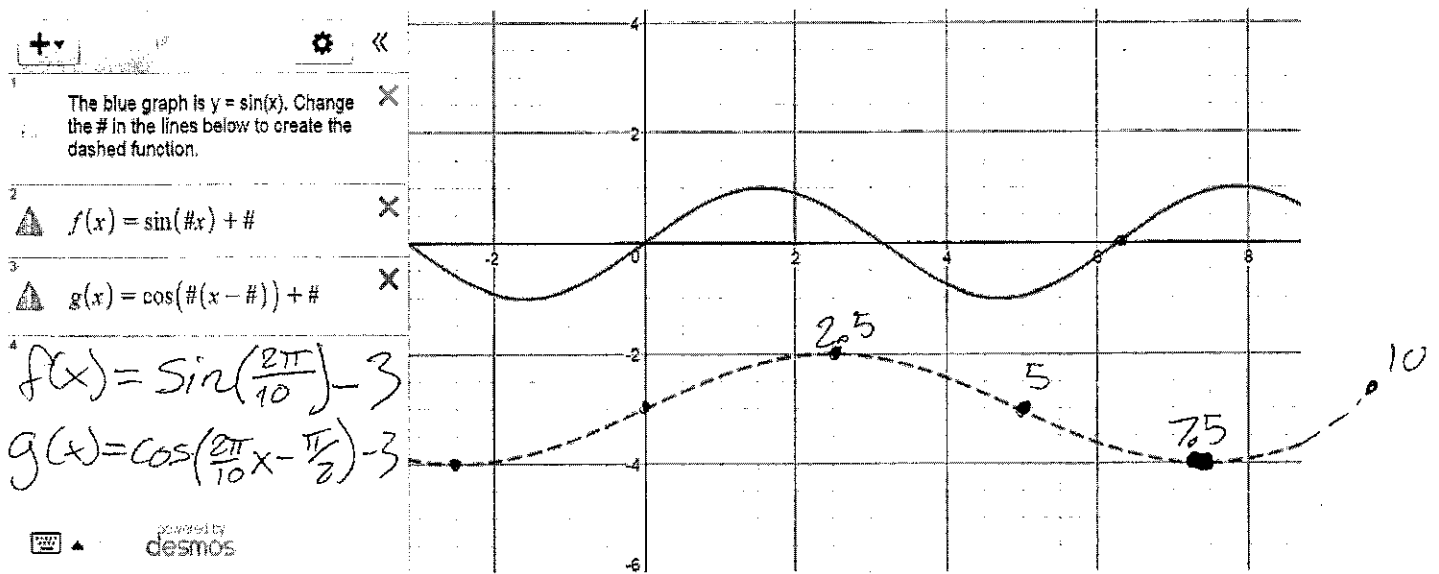
a. $f(x) = 1$ $x = 9 + 12x$ ← Add full period

b. $f(x) = 11$ $x = 3 + 12x$ ←

c. $f(x) = 6$ $x = 0 + 6x$ ← Add half period.

d. $f(x) = 8.5$ $x = 1 + 12x$ AND $x = 5 + 12x$

7.



8.

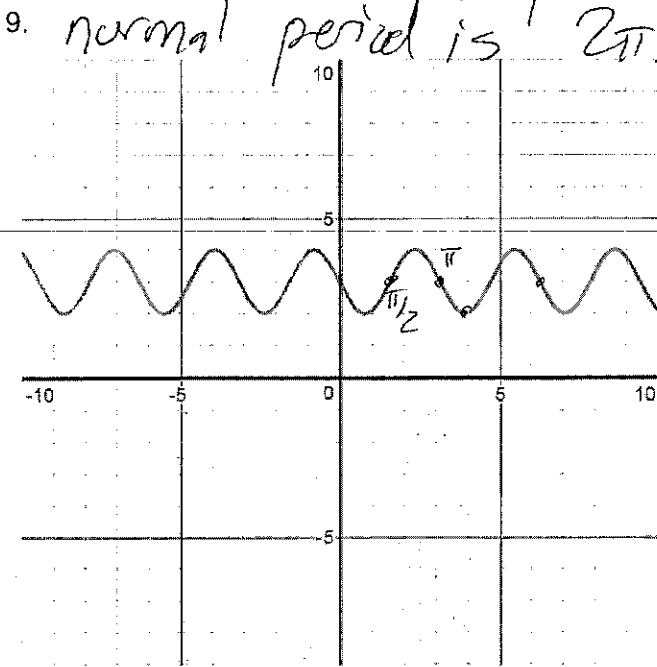
Make sure you write in your notes:

1. How do you use the amplitude, period, horizontal shift and midline to write a trigonometric function in radian mode? How is this different from degree mode?

Radian mode has period 2π , degree mode has 360° .

2. Explain the equation: $\text{Frequency} = \frac{2\pi}{\text{Period}}$ (in radian mode)

Frequency is the number of rotations in a normal period. In radian mode, the normal period is 2π .



1. The graph shows the functions $g(x)$. Find an equation for $g(x)$.

$$g(x) = -\sin(2x) + 3$$

2. Use the graph to evaluate:

a. $g\left(\frac{\pi}{2}\right) = -\sin\left(2 \cdot \frac{\pi}{2}\right) + 3 = -\sin(\pi) + 3 = 3$

b. $g\left(\frac{7\pi}{4}\right) = -\sin\left(2 \cdot \frac{7\pi}{4}\right) + 3 = -\sin\left(\frac{7\pi}{2}\right) + 3 =$

3. Use the graph to solve:

a. $g(x) = 2, 0 \leq x \leq 2\pi$ (hint: 3 solutions)

$$-(+1) + 3 = 2$$

b. $g(x) = 3, -\pi \leq x \leq \pi$

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a) $x = \frac{\pi}{4}, \frac{7\pi}{4}, \frac{3\pi}{2}$

b) $x = -\frac{\pi}{4}, \frac{\pi}{2}$