PreCalculus
WS: 4.5 – 4.6 Review

Name Key 2016
Date 11/3, 11/4 **Block** 1A, 2B

In 1 – 3, choose the best answer.

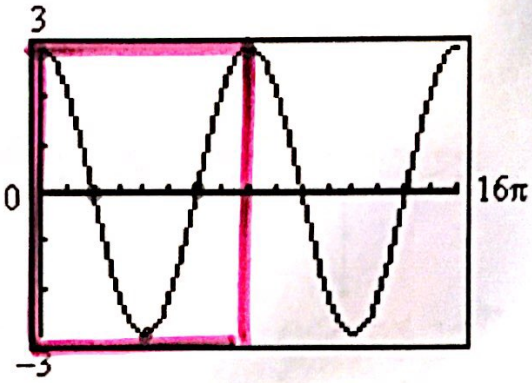
1. Which one of the equations below matches the graph?

~~(A)~~ $y = -3\sin 4x$

(B) $y = 3\cos 4x$

~~(C)~~ $y = 3\sin\frac{1}{4}x$

(D) $y = 3\cos\frac{1}{4}x$



cosine (starts @ max)
amp = 3, not reflected
Period = 8π
$\frac{2\pi}{b} = \frac{8\pi}{1}$
$\frac{8\pi b}{8\pi} = \frac{2\pi}{8\pi}$
$b = \frac{1}{4}$

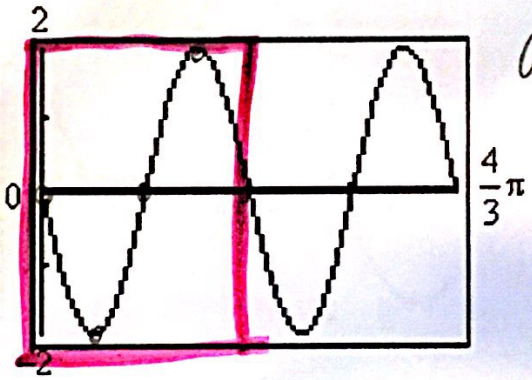
2. Which one of the equations below matches the graph?

~~(A)~~ $y = -2\cos 3x$

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

(C) $y = -2\sin 3x$

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



sine (starts @ zero)
amp = 2, reflected
period = $\frac{2\pi}{3}$
$\frac{2\pi}{b} = \frac{2\pi}{3}$ $b = 3$

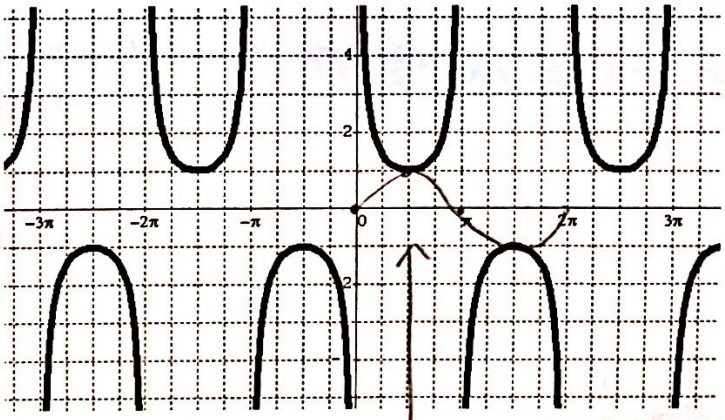
3. Which one of the equations matches the graph?

~~(A)~~ $y = \cot x$

~~(B)~~ $y = \sec x$

(C) $y = \csc x$

(D) $y = \csc x + 1$



- sketch curve if helpful
- since the curve I sketched is sine, the graph must be a csc graph

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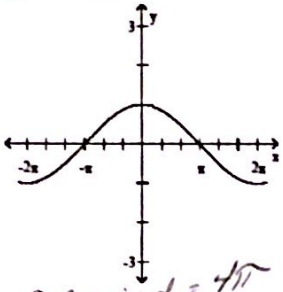
In 4 - 5, match the given function to its graph.

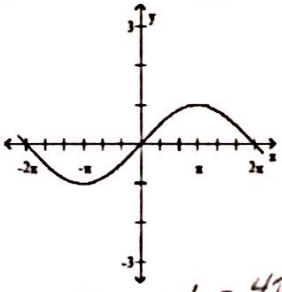
4. 1) $y = \sin\frac{1}{2}x$ B 2) $y = \frac{1}{2}\cos x$ D 3) $y = \frac{1}{2}\sin x$ C 4) $y = \cos\frac{1}{2}x$ A

A



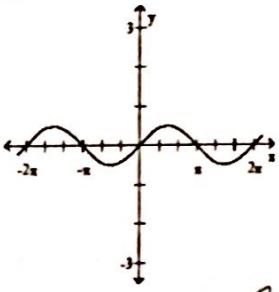
period = 4π
amp = 1
cosine

B



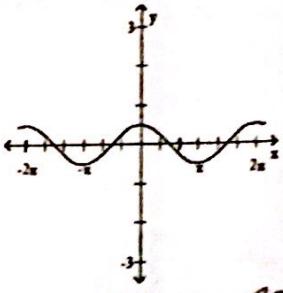
period = 4π
amp = 1
sine

C



period = 2π
sine
amp = 1/2

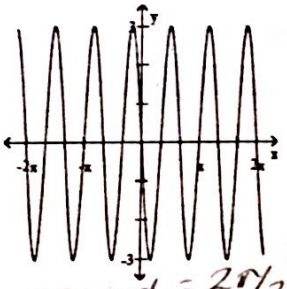
D



period = 2π
cosine
amp = 1/2

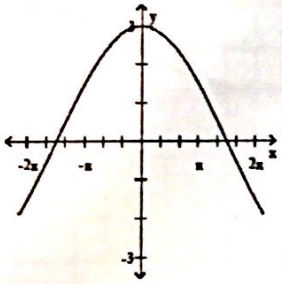
5. 1) $y = -3\sin 3x$ A 2) $y = -3\sin\frac{1}{3}x$ C 3) $y = 3\cos 3x$ D 4) $y = 3\cos\frac{1}{3}x$ B

A



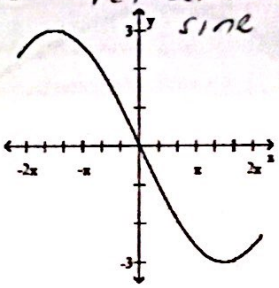
amp = 3 period = $2\pi/3$
reflected sine

B



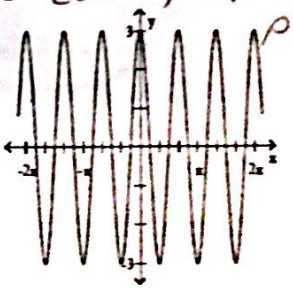
C

reflected sine



D

cosine, amp = 3, per = $\frac{2\pi}{3}$



6. Find the period of $y = \frac{5}{8}\left(\frac{8\pi}{3}x\right)$.

period $= \frac{2\pi}{b} = \frac{2\pi}{8\pi/3} = 2\pi \cdot \frac{3}{8\pi} = \frac{3}{4}$

7. Write the equation of a sine function that has the given characteristics.

Amplitude: 5, Period: 4π, Phase Shift: $-\frac{\pi}{4}$

$y = 5\sin(1/2x + \frac{\pi}{8})$

period $= \frac{2\pi}{b}$

$\frac{2\pi}{b} = \frac{4\pi}{1}$

$4\pi b = 2\pi$ → $b = \frac{1}{2}$

phase shift:

$\frac{c}{b} = \frac{-\pi}{4}$

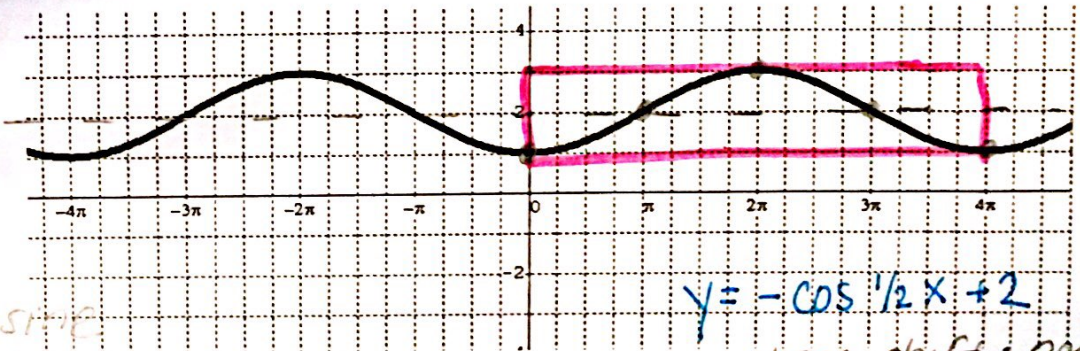
$\frac{c}{1/2} = \frac{-\pi}{4}$

$\frac{4c}{4} = \frac{-1/2\pi}{4}$

$c = \frac{-\pi}{8}$

* 8. Write ***three different equations*** that could produce the graph below.

other possible answers shown on next page



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

cosine
height = 1, reflected → a = -1
period = 4π, b = 1/2 (see work for #7)
phase shift: none
vertical shift: up 2 → d = 2

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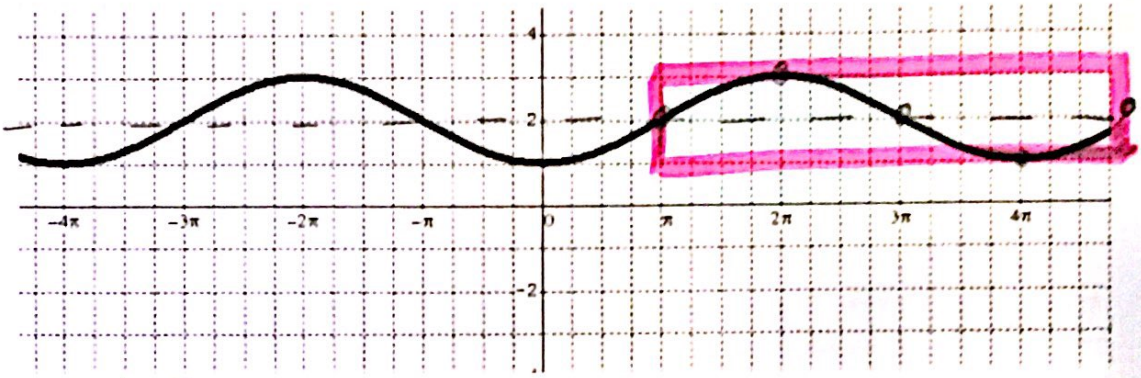
Additional answers

#8

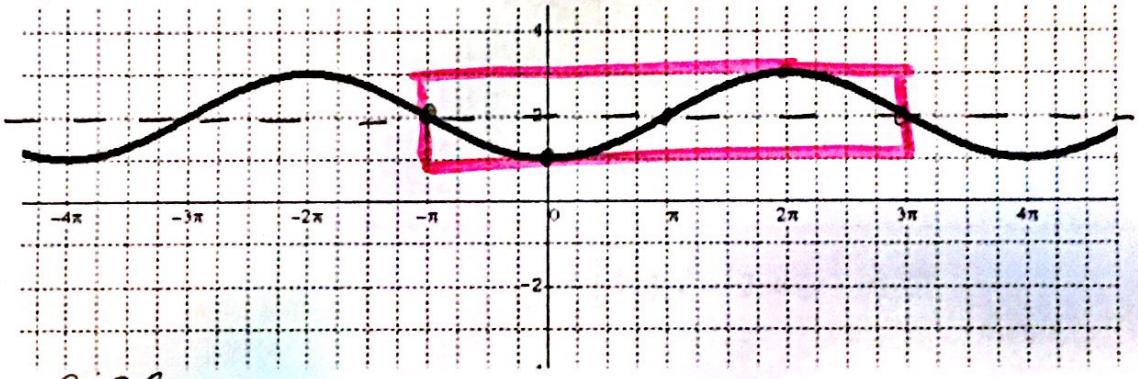


sine
height = 1, no reflection → $a = 1$
period = 4π, $b = 1/2$
$\frac{c}{b}$ → phase shift = π
$\frac{c}{1/2} = \pi$ $c = \frac{\pi}{2}$

$d = 2$

$y = \sin\left(\frac{1}{2}x - \frac{\pi}{2}\right) + 2$

#8

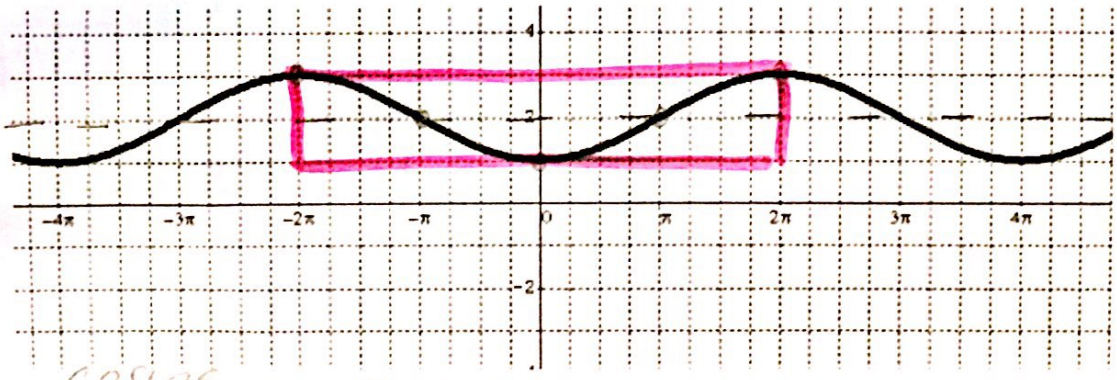


sine
height = 1, reflected → $a = -1$
period = 4π, $b = 1/2$
$\frac{c}{b}$ phase shift = $-\pi$
$\frac{c}{1/2} = -\pi$ → $c = \frac{-\pi}{2}$

$d = 2$

$y = -\sin\left(\frac{1}{2}x + \frac{\pi}{2}\right) + 2$

#8



cosine
height = 1, not reflected
period = 4π, $b = 1/2$
$\frac{c}{b}$ phase shift = -2π
$\frac{c}{1/2} = -2\pi$ $c = -\pi$

$d = 2$

$y = \cos\left(\frac{1}{2}x + \pi\right) + 2$

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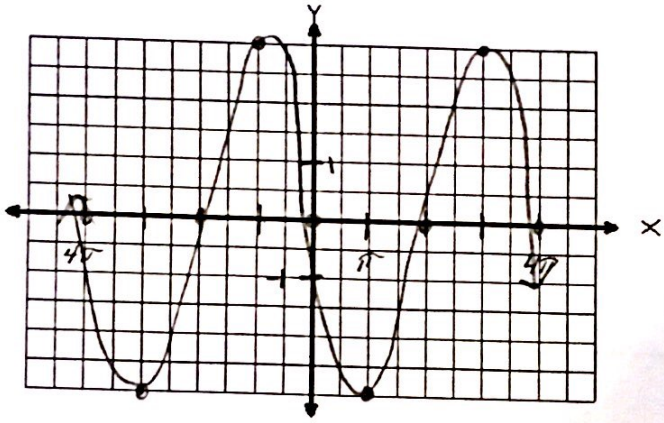
In 9 - 14, sketch the graph of each function. Identify any and all transformations of the parent graph first, and be sure to include two full periods.

9.) $y = -3\sin\left(\frac{1}{2}x\right)$

amp = 3, reflected

period $= \frac{2\pi}{1/2} = 2\pi \cdot 2 = 4\pi$



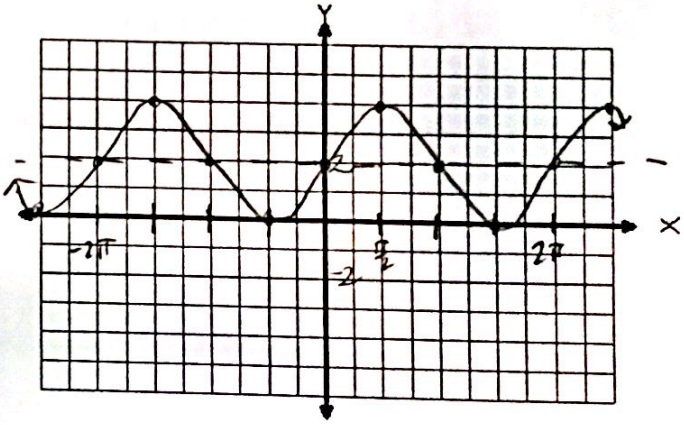
10.) $y = 2\cos\left(x - \frac{\pi}{2}\right) + 2$

amp = 2

period = 2π

phase shift: right $\frac{\pi}{2}$

vertical shift up 2



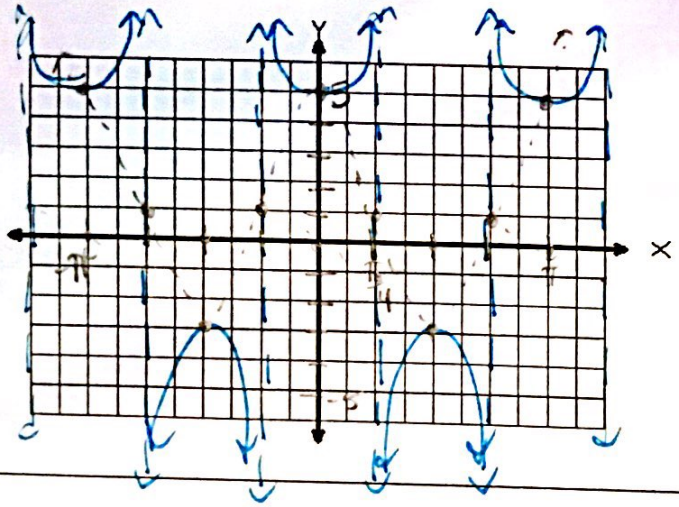
11.) $y = 4\csc\left(2x + \frac{\pi}{2}\right) + 1$

a = 4

period = π

phase shift: left $\frac{\pi}{4}$ $\left(-\frac{\pi}{4}\right)$

vertical shift up 1



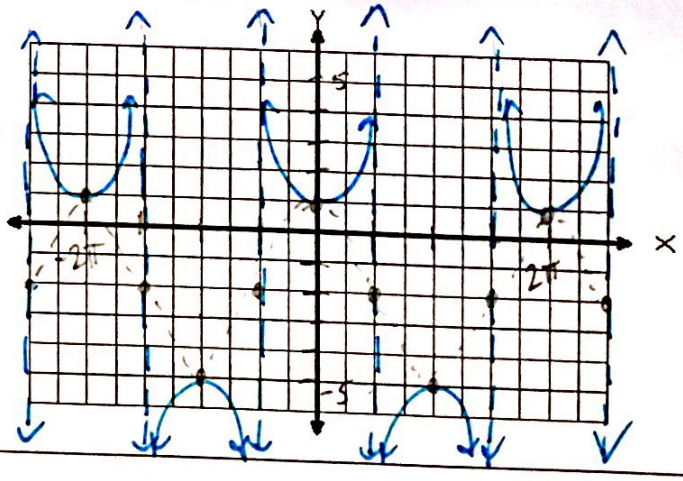
12.) $y = -3\sec(x + \pi) - 2$

a = -3 (reflected)

period = 2π

phase shift: left π $(-\pi)$

vertical shift down 2



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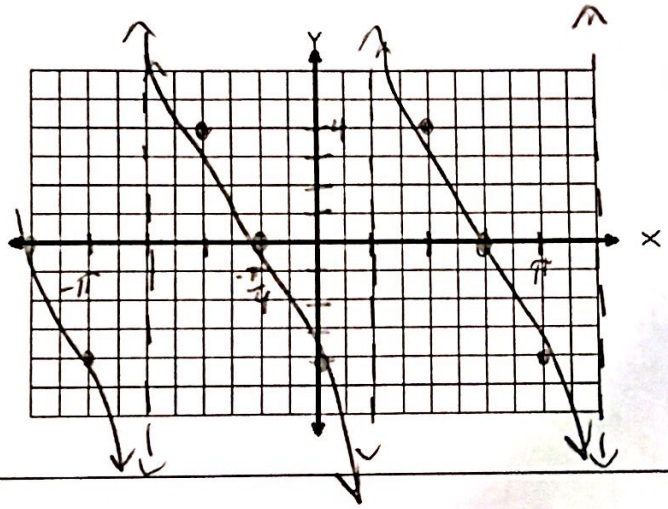
13.) $y = -4\tan\left(x + \frac{\pi}{4}\right)$

$a = 4$, reflected

period $= \pi$

phase shift left $\frac{\pi}{4}$ $\left(-\frac{\pi}{4}\right)$



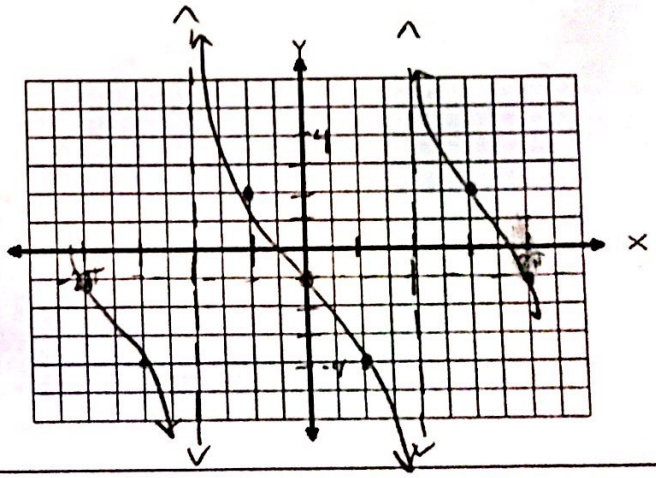
14.) $y = 3\cot\left(\frac{1}{2}x + \frac{\pi}{2}\right) - 1$

$a = 3$

period $= \frac{\pi}{1/2} = 2\pi$

phase shift $= \frac{-\pi/2}{1/2} = -\pi$ (left π)

vertical shift down 1



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