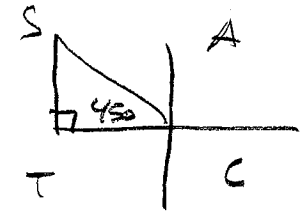
Answers

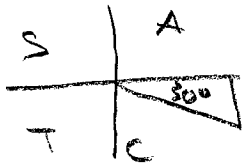
① $\sec\left(\frac{3\pi}{4}\right) = \sec(3 \cdot 45) = \sec(135°)$

$= \frac{1}{\cos(135°)} = \frac{1}{-\frac{\sqrt{2}}{2}} = -\frac{2}{\sqrt{2}}$ or $-\sqrt{2}$



② $\csc\left(\frac{11\pi}{6}\right) = \csc(11 \cdot 30) = \csc(330°)$

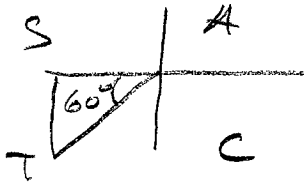
$= \frac{1}{\sin(330°)} = \frac{1}{-\frac{1}{2}} = -2$



③ $\tan\left(28\frac{\pi}{3}\right) = \tan(28 \cdot 60) = \tan(1680°)$

$= \tan(1320°) = \tan(9 \cdot 60°) = \tan(600°) = \tan(240°)$

$= \sqrt{3}$

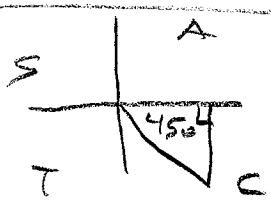


④ $\sin\left(19\frac{\pi}{2}\right) = \sin(19 \cdot 90) = \sin(1710°)$

$= \sin(4 \cdot 360 + 270°) = \sin 270° = -1$

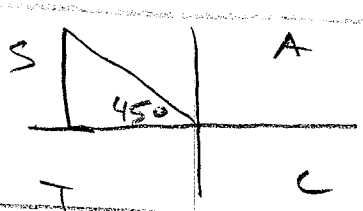
⑤ $\cos\left(\frac{7\pi}{4}\right) = \cos(7 \cdot 45°) = \cos(315°)$

$= \frac{\sqrt{2}}{2}$

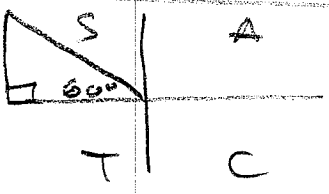


⑥ $\cot\left(\frac{11\pi}{4}\right) = \cot(11 \cdot 45) = \cot(495°)$

$= \cot(135°) = \frac{1}{\tan(135°)} = -1$

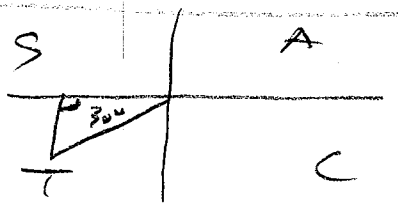


⑦ $\sin\left(4\frac{\pi}{3}\right) = \sin(4 \cdot 60) = \sin 240° = -\frac{\sqrt{3}}{2}$



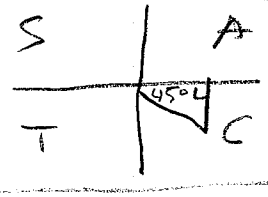
⑧ $\tan\left(-\frac{5\pi}{6}\right) = \tan(-5 \cdot 30°) = \tan(-150°)$

$= \frac{1}{\sqrt{3}}$



⑨ $\sec\left(\frac{-9\pi}{4}\right) = \sec(-9 \cdot 45°) = \sec(-405°)$

$= \sec(-45°) = \frac{1}{\cos(-45°)} = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}}$ or $\sqrt{2}$



⑩ $\csc\left(-17\frac{\pi}{2}\right) = \csc(-17 \cdot 90°) = \csc(-1530°) = \csc(-4 \cdot 360 - 90°) = \csc(-90°)$

(11) $\tan^{-1}(-1) + \tan\left(\frac{\pi}{4}\right) = -\frac{\pi}{4} + 1$

(12) $\sec^{-1}(2) - \sin\left(\frac{\pi}{6}\right) = \cos^{-1}\left(\frac{1}{2}\right) - \sin\left(\frac{\pi}{6}\right) = \frac{\pi}{3} - \frac{1}{2}$

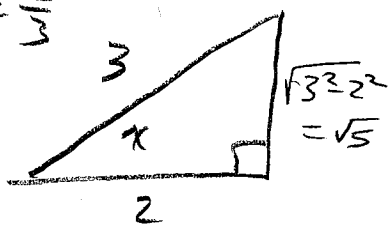
(13) $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) + \tan(\pi) = -\frac{\pi}{3} + 0 = -\frac{\pi}{3}$

(14) $\csc^{-1}(1) + \cot\left(\frac{3\pi}{4}\right) = \sin^{-1}\left(\frac{1}{1}\right) + \cot\left(\frac{3\pi}{4}\right) = \frac{\pi}{2} - 1$

(15) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) - \cos\left(\frac{\pi}{6}\right) = -\frac{\pi}{6} - \frac{\sqrt{3}}{2}$

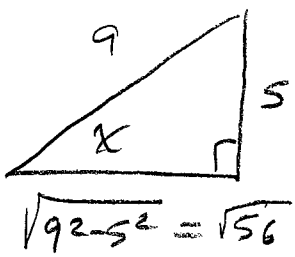
(16) $\sin\left(\text{Arccos}\left(\frac{2}{3}\right)\right) = \sin x$ where $\cos x = \frac{2}{3}$

$= \frac{\sqrt{5}}{3}$



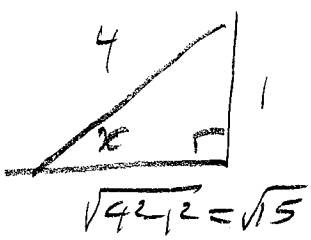
(17) $\tan\left(\sin^{-1}\left(\frac{5}{9}\right)\right) = \tan x$ where $\sin x = \frac{5}{9}$

$= \frac{5}{\sqrt{56}}$



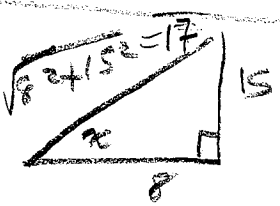
(18) $\sec\left(\csc^{-1}(4)\right) = \sec x$ where $\csc x = 4$ or $\sin x = \frac{1}{4}$

$= \frac{4}{\sqrt{15}}$



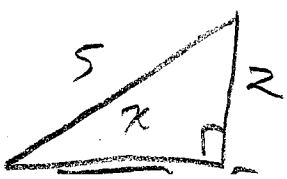
(19) $\cos\left(\text{Arctan}\left(\frac{15}{8}\right)\right) = \cos x$ where $\tan x = \frac{15}{8}$

$= \frac{8}{17}$



(20) $\cot\left(\sin^{-1}\left(\frac{2}{5}\right)\right) = \cot x$ where $\sin x = \frac{2}{5}$

$= \frac{\sqrt{21}}{2}$



(21) $\sin x - 1 = 0 \rightarrow \sin x = 1 \rightarrow x = \frac{\pi}{2} + 2\pi n$, where n = integer

(22) $\tan x - 1 = 0 \rightarrow \tan x = 1 \rightarrow x = \frac{\pi}{4} + 2\pi n$, n = integer
$\frac{5\pi}{4} + 2\pi n$, n = integer

(23) $2\cos x + 1 = 0 \rightarrow \cos x = -\frac{1}{2} \rightarrow x = \frac{2\pi}{3} + 2\pi n$, n = integer
$\frac{4\pi}{3} + 2\pi n$, n = integer

(24) $\sec x - 2 = 0 \rightarrow \sec x = 2 \rightarrow \cos x = \frac{1}{2} \rightarrow x = \frac{\pi}{3}$, n = integer
$\frac{5\pi}{3}$, n = integer

(25) $4\cos^2 x - 1 = 0 \rightarrow \cos^2 x = \frac{1}{4} \rightarrow \cos x = \pm\frac{1}{2} \rightarrow x = \frac{\pi}{3}$, n = integer
$\frac{2\pi}{3}$, n = integer
$\frac{4\pi}{3}$, n = integer
$\frac{5\pi}{3}$, n = integer

(26) $\cos(3x) = \frac{\sqrt{3}}{2}$.

$3x = \frac{\pi}{6}, \frac{\pi}{6} + 2\pi, \frac{\pi}{6} + 4\pi = \frac{\pi}{6}, \frac{13\pi}{6}, \frac{25\pi}{6}$; $x = \frac{\pi}{18}, \frac{13\pi}{18}, \frac{25\pi}{18}$
$= \frac{11\pi}{6}, \frac{11\pi}{6} + 2\pi, \frac{11\pi}{6} + 4\pi = \frac{19\pi}{6}, \frac{23\pi}{6}, \frac{35\pi}{6}$; $x = \frac{11\pi}{18}, \frac{23\pi}{18}, \frac{35\pi}{18}$

(27) $\tan(2x) = -1 \rightarrow 2x = \frac{3\pi}{4}, \frac{7\pi}{4}, \frac{3\pi}{4} + 2\pi, \frac{7\pi}{4} + 2\pi$
$2x = \frac{3\pi}{4}, \frac{7\pi}{4}, \frac{11\pi}{4}, \frac{15\pi}{4}$; $x = \frac{3\pi}{8}, \frac{7\pi}{8}, \frac{11\pi}{8}, \frac{15\pi}{8}$

(28) $\sin(3x) = \frac{\sqrt{3}}{2} \rightarrow 3x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{\pi}{3} + 2\pi, \frac{2\pi}{3} + 2\pi, \frac{\pi}{3} + 4\pi, \frac{2\pi}{3} + 4\pi$

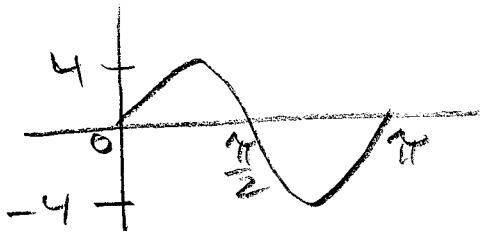
$3x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}, \frac{13\pi}{3}, \frac{14\pi}{3}$; $x = \frac{\pi}{9}, \frac{2\pi}{9}, \frac{7\pi}{9}, \frac{8\pi}{9}, \frac{13\pi}{9}, \frac{14\pi}{9}$

(29) $\sec(2x)=1 \Rightarrow \cos(2x)=\frac{1}{1}=1$ $\quad 2x=0, 2\pi, 4\pi$
$x=0, \pi, 2\pi$

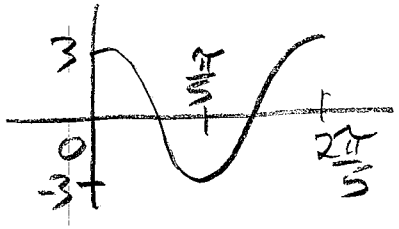
(30) $\tan(3x)=\frac{1}{\sqrt{3}} \Rightarrow 3x=\frac{\pi}{6}, \frac{7\pi}{6}, \frac{\pi}{6}+2\pi, \frac{7\pi}{6}+2\pi, \frac{\pi}{6}+4\pi, \frac{7\pi}{6}+4\pi$

$3x=\frac{\pi}{6}, \frac{7\pi}{6}, \frac{13\pi}{6}, \frac{19\pi}{6}, \frac{25\pi}{6}, \frac{31\pi}{6}$; $x=\frac{\pi}{18}, \frac{7\pi}{18}, \frac{13\pi}{18}, \frac{19\pi}{18}, \frac{25\pi}{18}, \frac{31\pi}{18}$

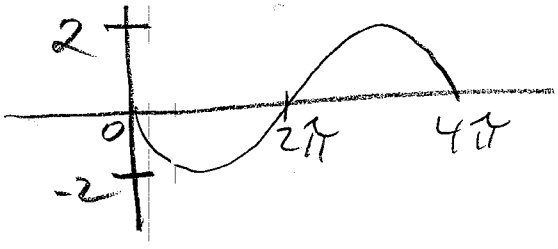
(31) $y=4\sin(2x)$ Amp=4, Period $=\frac{2\pi}{2}=\pi$



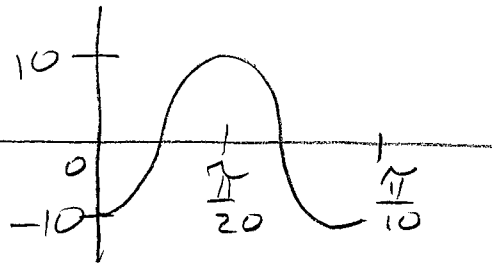
(32) $y=3\cos(5x)$ Amp=3, Period $=\frac{2\pi}{5}$



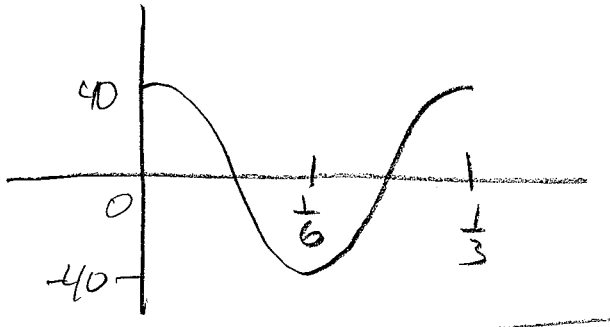
(33) $y=-2\sin(\frac{1}{2}x)$ Amp=2, Period $=\frac{2\pi}{\frac{1}{2}}=4\pi$, flipped



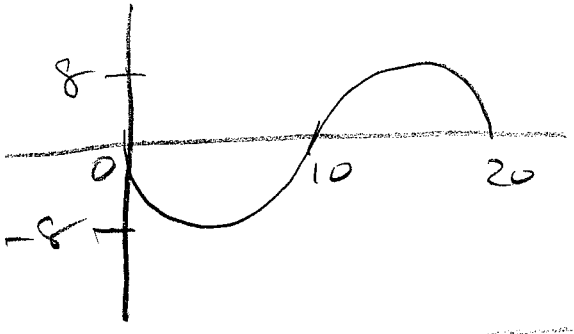
(34) $y = -10\cos(20x)$ Amp = 10 period = $\frac{2\pi}{20} = \frac{\pi}{10}$, flipped



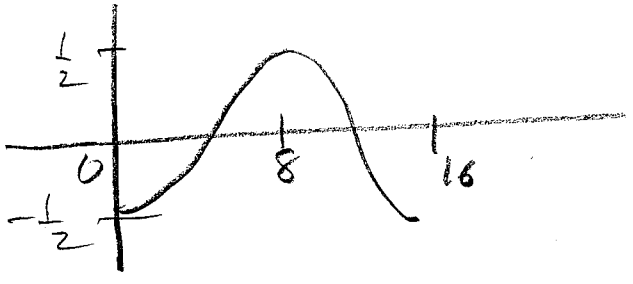
(35) $y = 40\cos(6\pi x)$ Amp = 40, Period = $\frac{2\pi}{6\pi} = \frac{1}{3}$



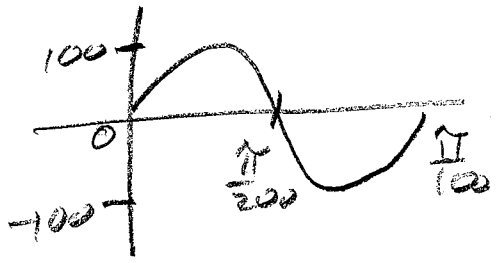
(36) $y = -8\sin(\frac{\pi}{10}x)$ Amp = 8, Period = $\frac{2\pi}{\frac{\pi}{10}} = 20$, flipped



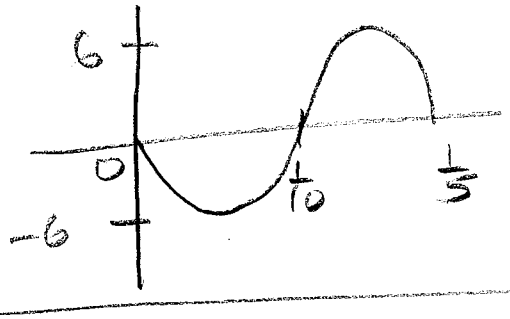
(37) $y = -\frac{1}{2}\cos(\frac{\pi}{8}x)$ Amp = $\frac{1}{2}$, Period = $\frac{2\pi}{\frac{\pi}{8}} = 16$, flipped



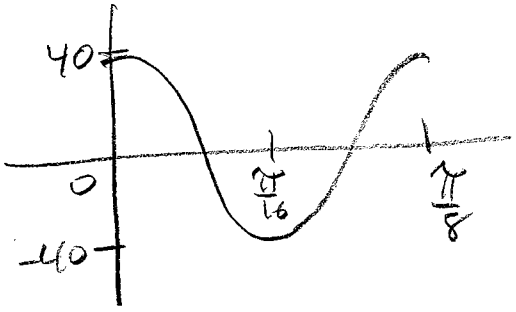
(38) $y = 100\sin(200x)$ Amp $= 100$ Period $= \frac{2\pi}{200} = \frac{\pi}{100}$



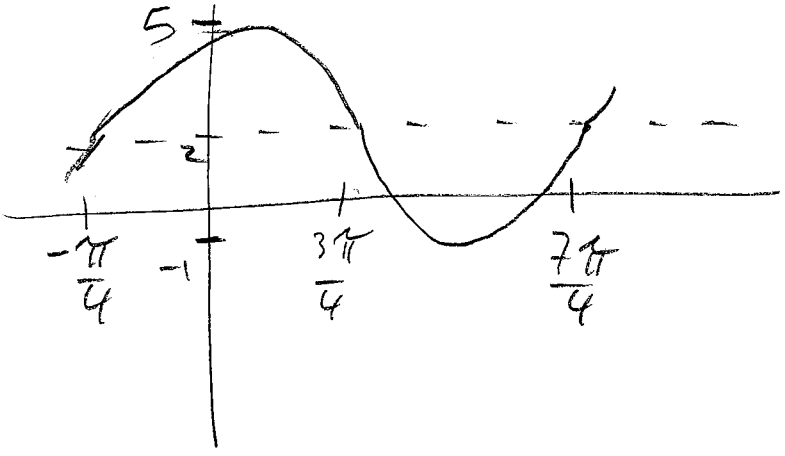
(39) $y = -6\sin(10\pi x)$ Amp $= 6$, Period $= \frac{2\pi}{10\pi} = \frac{1}{5}$, flipped



(40) $y = 40\cos(16x)$ Amp $= 40$, Period $= \frac{2\pi}{16} = \frac{\pi}{8}$

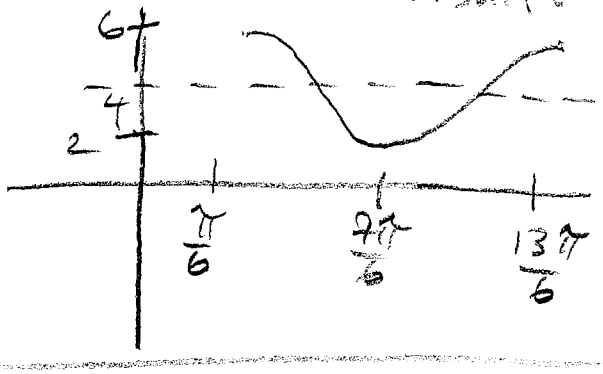


(41) $y = 2 + 3\sin(x + \frac{\pi}{4})$ Amp $= 3$ Period $= 2\pi$
Vert shift $= 2$ up Horiz Shift $= \frac{\pi}{4}$ left



(42) $y = 4 + 2\cos\left(x - \frac{\pi}{6}\right)$ Amp = 2 Period = 2π

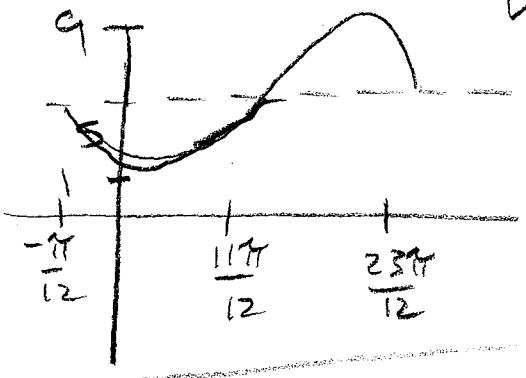
V. Shift = 4 up H. Shift = $\frac{\pi}{6}$ right



(43) $y = 5 - 4\sin\left(x + \frac{\pi}{12}\right)$ Amp = 4 Period = 2π

V. Shift = 5 up H. Shift = $\frac{\pi}{12}$ left

flipped



(44) $y = 3 - 6\cos 4\left(x - \frac{\pi}{10}\right)$ Amp = 6 Period = $\frac{2\pi}{4} = \frac{\pi}{2}$

V. Shift = 3 up H. Shift = $\frac{\pi}{10}$ right

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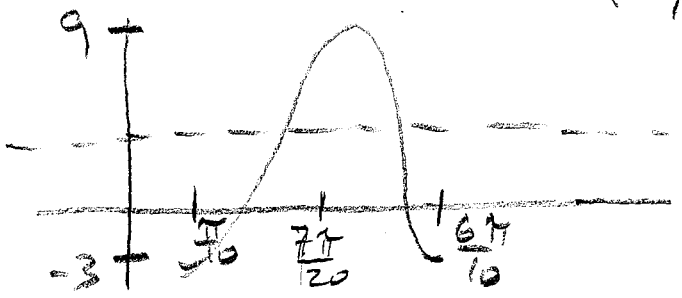
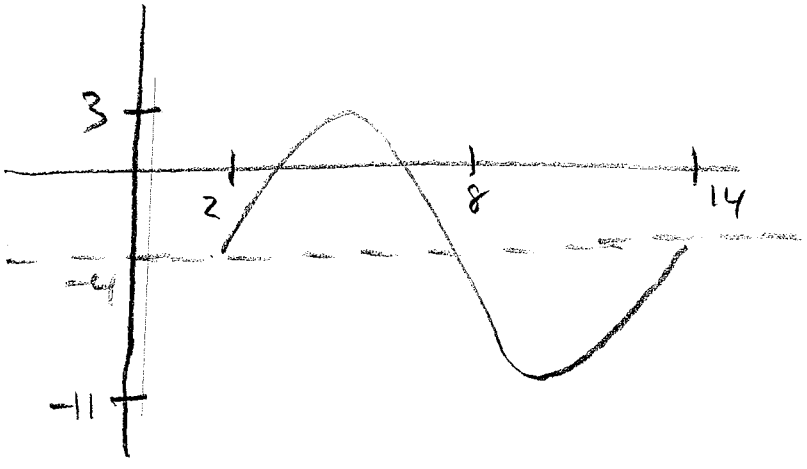


(45) $y = -4 + 7\sin\frac{\pi}{6}(x - 2)$ Amp = 7 Period = $\frac{2\pi}{\frac{\pi}{6}} = 12$

V. shift = 4 down H. Shift = 2 right



(46) $y = 5 - 2\cos(4x - \pi)$

$= 5 - 2\cos 4\left(x - \frac{\pi}{4}\right)$

Amp = 2 Period = $\frac{2\pi}{4} = \frac{\pi}{2}$

V. Shift = 5 up H. Shift = $\frac{\pi}{4}$ right

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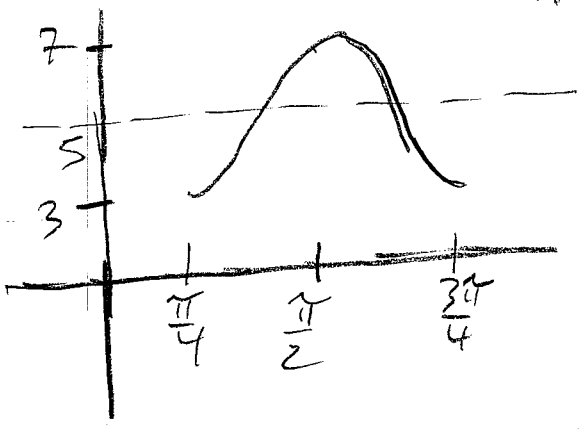
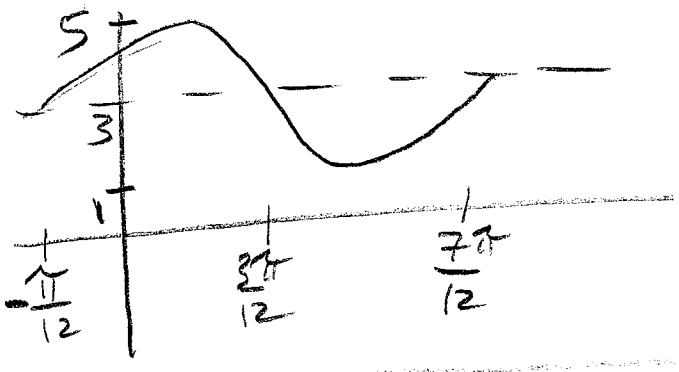


(47) $y = 3 + 2\sin\left(3x + \frac{\pi}{4}\right)$

$= 3 + 2\sin 3\left(x + \frac{\pi}{12}\right)$

Amp = 2 Period = $\frac{2\pi}{3}$

V. Shift = 3 up H. Shift = $\frac{\pi}{12}$ left

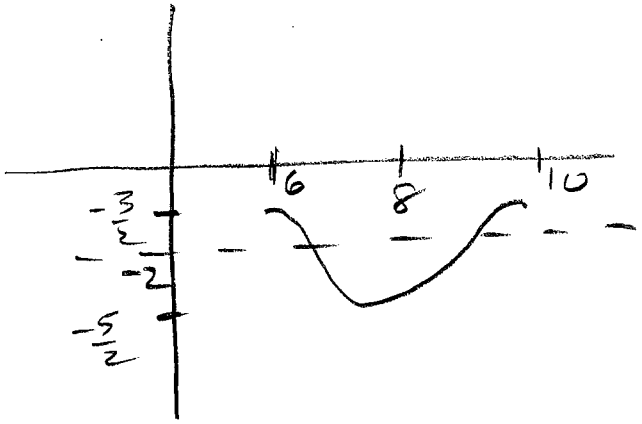


(48) $y = -2 + \frac{1}{2}\cos\left(\frac{\pi}{2}x - 3\pi\right)$

$= -2 + \frac{1}{2}\cos\frac{\pi}{2}(x - 6)$

Amp = $\frac{1}{2}$ Period = $\frac{2\pi}{\frac{\pi}{2}} = 4$

V. Shift = 2 down H. Shift = 6 right



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

$= 1 - \sin \pi\left(x - \frac{1}{2}\right)$ V. shift = 1 up H. Shift $= \frac{1}{2}$ right

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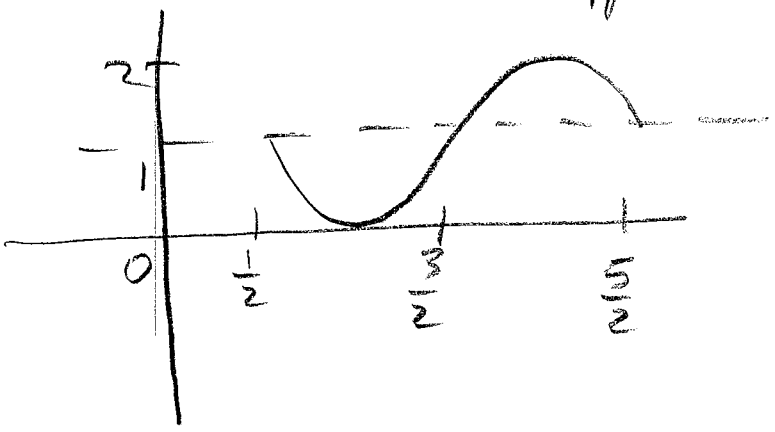

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(50) $y = -10 + 4\cos\left(2x + \frac{\pi}{3}\right)$ Amp=4 Period $= \frac{2\pi}{2} = \pi$

$= -10 + 4\cos 2\left(x + \frac{\pi}{6}\right)$ V. shift = 10 down H. Shift $= \frac{\pi}{6}$ left