

p328 Chapter Test

① $x - 3y = 9 \rightarrow 3y = x - 9 \rightarrow y = \frac{1}{3}x - 3$
 $m = \frac{1}{3} \rightarrow$ acute because m is positive
 $m = \tan^{-1}(\frac{1}{3}) \approx 18^\circ$

2. $5 \cos \theta = -1; 0^\circ < \theta < 360^\circ$
 $\cos \theta = -\frac{1}{5}$; cosine is neg in QII & QIII
 QII: $\theta = 180^\circ - \cos^{-1}(\frac{1}{5}) = 101.5^\circ$
 QIII: $\theta = 180^\circ + \cos^{-1}(\frac{1}{5}) = 258.5^\circ$

3. $3 - \csc x = 7$; $0 \leq \theta < 2\pi$
 $\csc x = -4 \rightarrow \sin x = -\frac{1}{4}$; sine is \ominus in QIII & QIV
 QIII: $x = \pi + \sin^{-1}(\frac{1}{4}) \approx 3.39$
 QIV: $x = 2\pi - \sin^{-1}(\frac{1}{4}) \approx 6.03$

4. $2 \sin 3x = \sqrt{2}$; $0 \leq x < 2\pi$
 $\sin 3x = \frac{\sqrt{2}}{2}$; sine is + in QI & QII

Q I: $3x = \frac{\pi}{4} + 2n\pi$	Q II: $3x = \frac{3\pi}{4} + 2n\pi$
$x = \frac{\pi}{12} + \frac{2n\pi}{3} \cdot \frac{1}{3}$	$x = \frac{3\pi}{12} + \frac{2n\pi}{3} \cdot \frac{1}{3}$
$x = \frac{\pi}{12} + \frac{8n\pi}{12}$	$x = \frac{3\pi}{12} + \frac{8n\pi}{12}$

$n=0$ $x = \frac{\pi}{12}$	$x = \frac{3\pi}{12} = \frac{\pi}{4}$
$n=1$ $x = \frac{9\pi}{12} = \frac{3\pi}{4}$	$x = \frac{11\pi}{12}$
$n=2$ $x = \frac{17\pi}{12}$	$x = \frac{19\pi}{12}$

$x = \frac{\pi}{12}; \frac{\pi}{4}; \frac{3\pi}{4}; \frac{11\pi}{12}; \frac{17\pi}{12}; \frac{19\pi}{12}$

5. $y = 3 \sin \frac{x}{2} \rightarrow y = 3 \sin \frac{1}{2}x + 0$

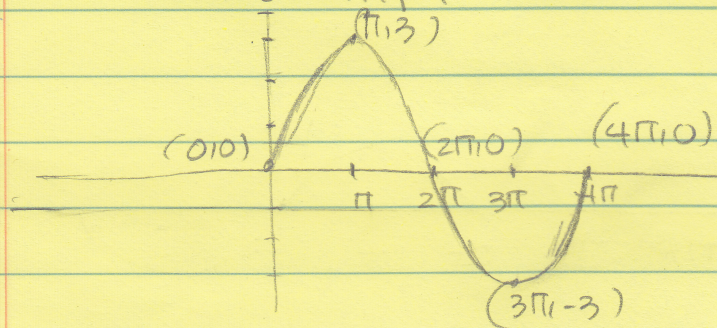
AOW: $y = 0$

Amp = 3

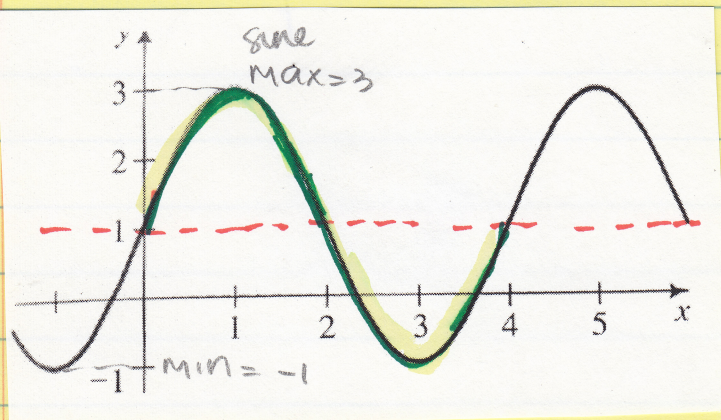
$B = \frac{1}{2} \Rightarrow \text{Period} = \frac{2\pi}{\frac{1}{2}} = 2\pi \cdot \frac{2}{1} = 4\pi$

Scale: $4\pi/4 = \pi$

Phase shift: none



6



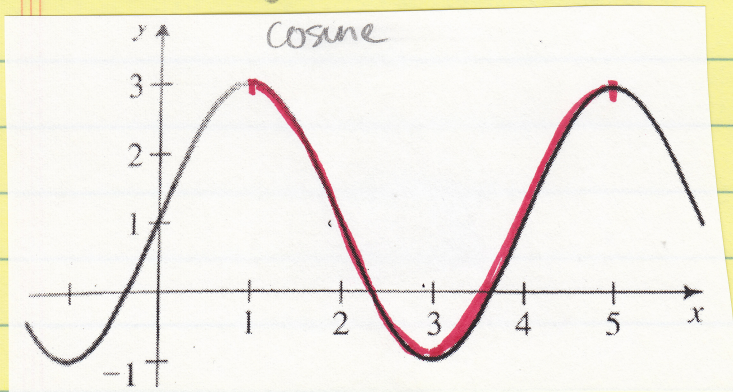
Amp = $\frac{3 - (-1)}{2} = 2$

AOW: $y = \frac{3 + (-1)}{2} = 1$

period = $\frac{4}{1} = \frac{2\pi}{B}$

$4B = 2\pi \Rightarrow B = \frac{\pi}{2}$

sine: $y = 2 \sin \frac{\pi}{2}x + 1$



cosine

Phase shift: Right 1

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

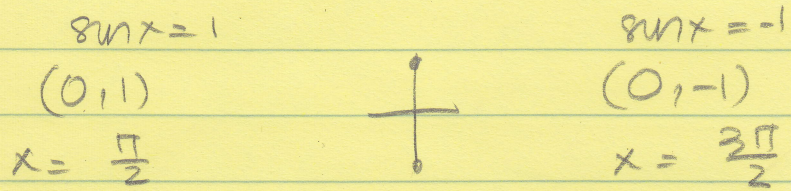
9. $2\cos x = \sin x \rightarrow \tan x = \frac{\sin x}{\cos x} = \frac{2\cos x}{\cos x} = 2$

\tan is pos in QI & QIII

I: $x = \tan^{-1} 2 \approx 1.11$

III: $x = \pi + \tan^{-1} 2 \approx 4.25$

b. $\sec x = \csc x \rightarrow \frac{1}{\cos x} = \frac{1}{\sin x} \rightarrow \sin^2 x = 1$
 $\sin x = \pm 1$



10. $2\cos^2 \theta + 3\sin \theta - 3 = 0$ $\sin^2 \theta + \cos^2 \theta = 1 \rightarrow \cos^2 \theta = 1 - \sin^2 \theta$

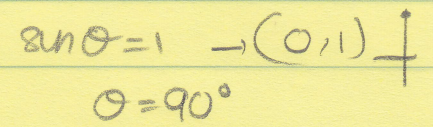
$2(1 - \sin^2 \theta) + 3\sin \theta - 3 = 0$

$2 - 2\sin^2 \theta + 3\sin \theta - 3 = 0 \rightarrow 2\sin^2 \theta - 3\sin \theta + 1 = 0$

$2\sin \theta$	-	1
$\sin \theta$	-	1

$(2\sin \theta - 1)(\sin \theta - 1) = 0$

$\sin \theta = \frac{1}{2}$



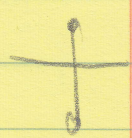
I: $\theta = 30^\circ$

II: $\theta = 150^\circ$

b. $\cos \theta \cot \theta = 2 \cos \theta \rightarrow \cos \theta \cot \theta - 2 \cos \theta = 0$
 $\cos \theta (\cot \theta - 2) = 0$

$\cos \theta = 0$

$\cot \theta = 2 \rightarrow \tan \theta = \frac{1}{2} \rightarrow$ QI, III



$(0, 1) \rightarrow \theta = 90^\circ$

$(0, -1) \rightarrow \theta = 270^\circ$

I: $\theta = \tan^{-1}(\frac{1}{2}) \approx 26.6^\circ$

III: $\theta = 180^\circ + \tan^{-1}(\frac{1}{2}) \approx 206.6^\circ$