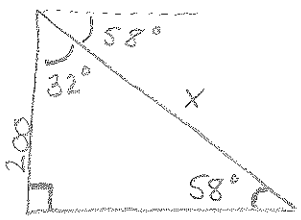
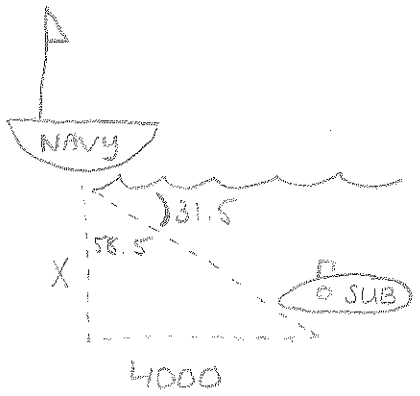
Chapter 4 Review Answer Key

① 

$\sin 58 = \frac{200}{x}$

$x = \frac{200}{\sin 58}$ = 235.835 ft

② 

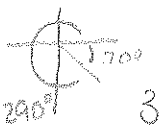
$\tan 58.5 = \frac{4000}{x}$

$\frac{4000}{\tan 58.5} = x$

x = 2451.2 ft

★ You might interpret "4000 ft away" as the hypotenuse, that's okay! Your answer will be different.

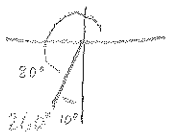
③ a. $290° \cdot \frac{\pi}{180} = \frac{290\pi}{180} = \frac{29\pi}{18}$ (wrote in Radians)



$\frac{36\pi}{18} - \frac{29\pi}{18} = \frac{7\pi}{18}$

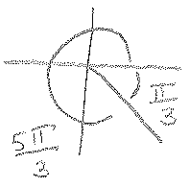
★ Remember, Ref. Angles fall between 0 and $\frac{\pi}{2}$ and are always positive.

b. $\frac{13\pi}{9}$ is 260°



$80° \cdot \frac{\pi}{180} = \frac{8\pi}{18} = \frac{4\pi}{9}$

c. $\frac{5\pi}{3}$



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

d. $\frac{7\pi}{6} = \frac{\pi}{6}$

④ a. $\frac{5\pi}{4} \rightarrow \left(\frac{-\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$

$\sin = -\frac{\sqrt{2}}{2}$ $\quad \csc = -\frac{2}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2}$

$\cos = -\frac{\sqrt{2}}{2}$ $\quad \sec = -\sqrt{2}$

$\tan = 1$ $\quad \cot = 1$

b. $\frac{\pi}{3} \rightarrow \left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

$\sin = \frac{\sqrt{3}}{2}$ $\quad \csc = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

$\cos = \frac{1}{2}$ $\quad \sec = 2$

$\tan = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$ $\quad \cot = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

(5) a. $\frac{11\pi}{6}$ and $\frac{7\pi}{6}$

NO COTERMINAL ANGLES!

b. $\frac{\pi}{2}$ and $\frac{3\pi}{2}$

c. $\frac{\pi}{2}, \frac{3\pi}{2}$

d. $\frac{\pi}{4}$ and $\frac{7\pi}{4}$

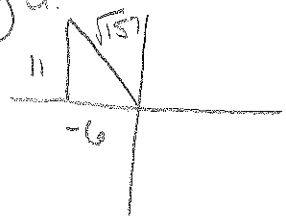
(6) a. III

b. IV

c. I

d. III

(7) a.



$-6^2 + 11^2 = c^2$

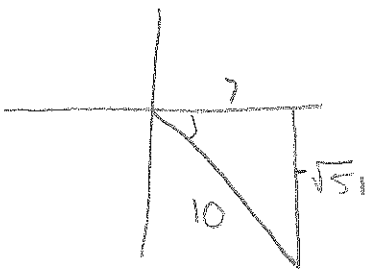
$36 + 121 = c^2$

$157 = c^2$

$c = \sqrt{157}$

$\sec\theta = \frac{\sqrt{157}}{-6}$

b.

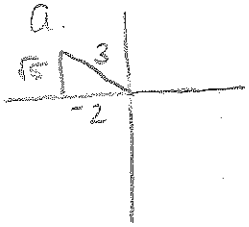


$7^2 + b^2 = 10^2$

$b^2 = 51$

$\tan\theta = \frac{-\sqrt{51}}{7}$

(8) a.



$4 + b^2 = 9$

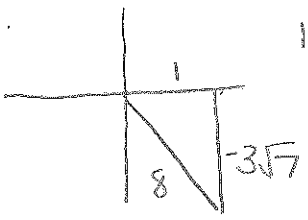
$b = \sqrt{5}$

$\cos\theta = \frac{-2}{3}$ $\quad \csc\theta = \frac{3}{\sqrt{5}}$ or $\frac{3\sqrt{5}}{5}$

$\sec\theta = \frac{-3}{2}$ $\quad \tan\theta = \frac{-\sqrt{5}}{2}$

$\sin\theta = \frac{\sqrt{5}}{3}$ $\quad \cot\theta = \frac{-2}{\sqrt{5}}$ or $\frac{-2\sqrt{5}}{5}$

b.



$1^2 + b^2 = 64$

$b^2 = 63$

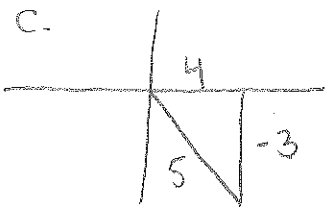
$b = 3\sqrt{7}$

$\cos\theta = \frac{1}{8}$ $\quad \sec\theta = 8$

$\sin\theta = \frac{-3\sqrt{7}}{8}$ $\quad \csc\theta = \frac{-8}{3\sqrt{7}}$ or $\frac{-8\sqrt{7}}{21}$

$\tan\theta = -3\sqrt{7}$ $\quad \cot\theta = \frac{-1}{3\sqrt{7}}$ or $\frac{-\sqrt{7}}{21}$

c.



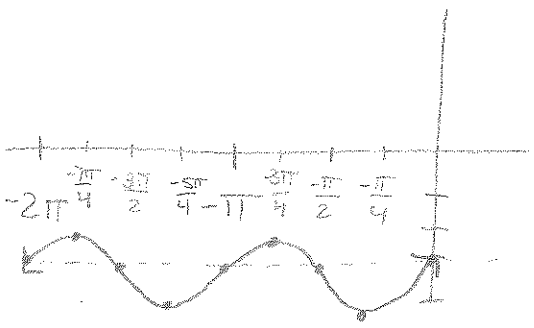
$\cos\theta = \frac{4}{5}$ $\quad \tan\theta = \frac{-3}{4}$ $\quad \csc\theta = \frac{-5}{3}$

$\sin\theta = \frac{-3}{5}$ $\quad \sec\theta = \frac{5}{4}$ $\quad \cot\theta = \frac{-4}{3}$

9. a. $y = \sin 2(x + 2\pi) - 3$

Amp = 1 P.S. = -2π

Period = π V.S. = $\downarrow 3$



b. $y = 6\cos(4\theta + \frac{\pi}{3})$

$y = 6\cos 4(\theta + \frac{\pi}{12})$

Amp = 6

Period = $\frac{\pi}{2}$ P.S. = $\leftarrow \frac{\pi}{12}$

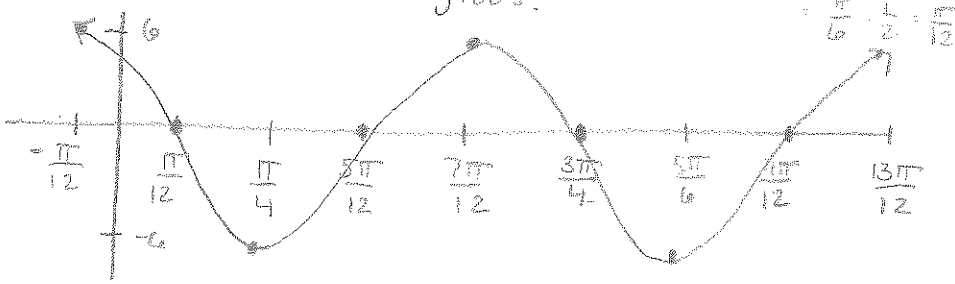
$\frac{\pi}{12} + \frac{6\pi}{12} = \frac{7\pi}{12}$

$\frac{\pi}{12} + \frac{2\pi}{12} = \frac{6\pi}{12} = \frac{\pi}{2}$, $\frac{\pi}{4}$

$\frac{-\pi}{12} + \frac{\pi}{4} = \frac{-\pi}{12} + \frac{3\pi}{12}$

$\frac{\pi}{6} + \frac{1}{2} = \frac{\pi}{12}$

y-ices.

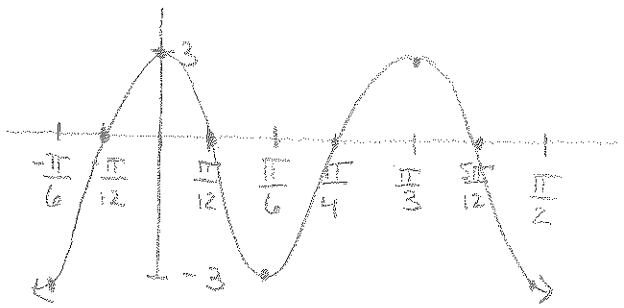


c. $y = -3\cos(6x + \pi)$

$y = -3\cos 6(x + \frac{\pi}{6})$

Amp = 3 P.S. = $-\frac{\pi}{6}$

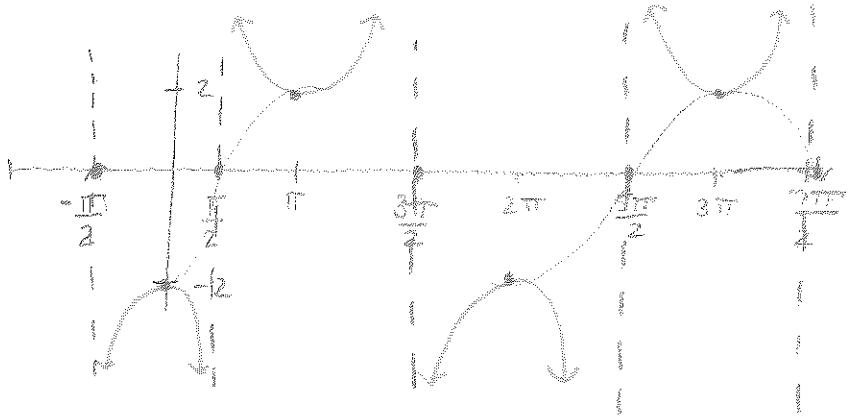
Period = $\frac{2\pi}{6} = \frac{\pi}{3}$



d. $f(x) = -2\csc(x + \frac{\pi}{2})$

amp = 2 period = 2π

P.S. = $-\frac{\pi}{2}$

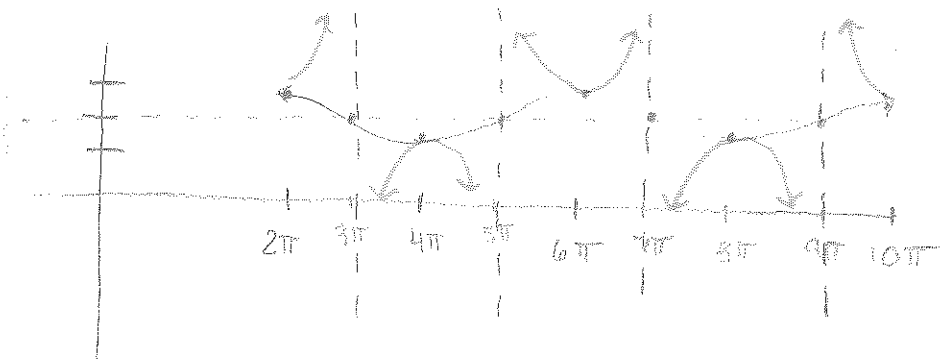


e. $f(x) = 2 + \frac{1}{4}\sec(\frac{1}{2}x - \pi)$

$f(x) = \frac{1}{4}\sec\frac{1}{2}(x - 2\pi) + 2$

Amp = $\frac{1}{4}$ period = 4π P.S. Right 2π

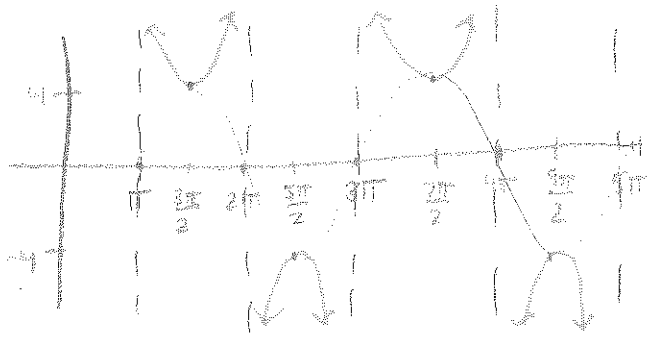
V.S. Up 2



f. $y = 4\csc(\pi - x)$

CORRECTION! $y = 4\csc(x - \pi)$

amp = 4 period = 2π P.S. $\rightarrow \pi$



10. a. $y = \frac{1}{2}\cot\left(\frac{\pi}{4}x + \frac{\pi}{4}\right)$

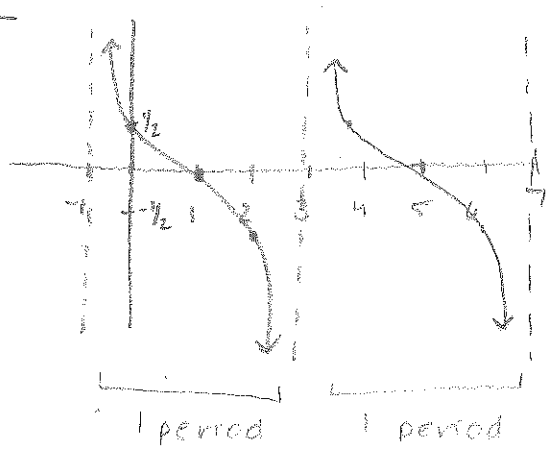
$0 < \frac{\pi}{4}x + \frac{\pi}{4} < \pi$

$\frac{-\pi}{4} < \frac{\pi}{4}x < \frac{3\pi}{4}$

$\frac{-\pi}{4}\cdot\frac{4}{\pi} < x < \frac{3\pi}{4}\cdot\frac{4}{\pi}$

$-1 < x < 3$

Period = 4



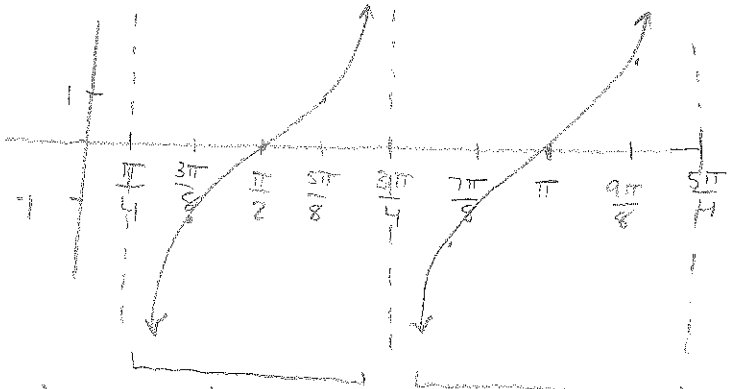
b. $y = \tan(2x - \pi)$

$\frac{-\pi}{2} < 2x - \pi < \frac{\pi}{2}$

$\frac{\pi}{2} < 2x < \frac{3\pi}{2}$

$\frac{\pi}{4} < x < \frac{3\pi}{4}$

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



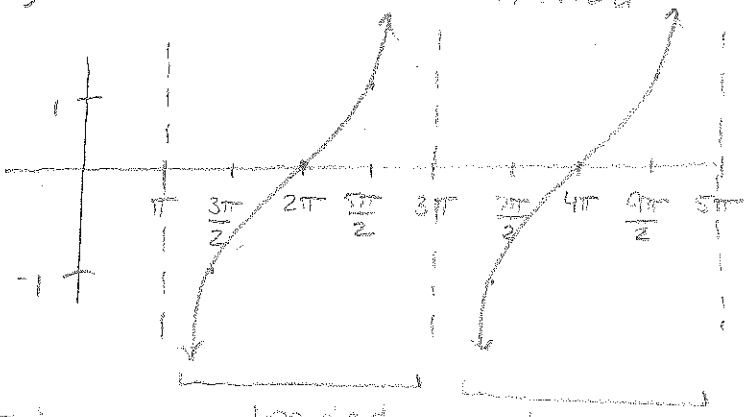
c. $y = \tan\left(\frac{x}{2} + \pi\right)$

$\frac{-\pi}{2} < \frac{x}{2} + \pi < \frac{\pi}{2}$

$\frac{\pi}{2} < x < \frac{3\pi}{2}$

$\pi < x < 3\pi$

Period = 2π



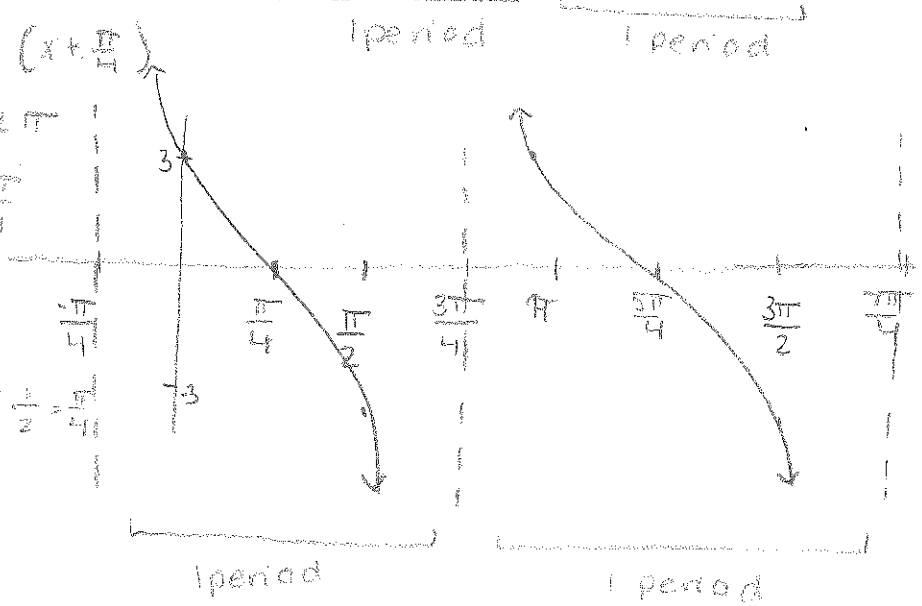
d. $y = 3\cot\left(x + \frac{\pi}{4}\right)$

$0 < x + \frac{\pi}{4} < \pi$

$\frac{-\pi}{4} < x < \frac{3\pi}{4}$

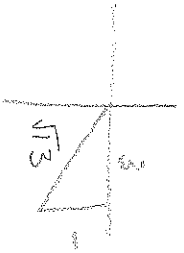
Period = π

$\frac{-\pi}{4}, \frac{3\pi}{4}, \frac{2\pi}{4}, \frac{\pi}{2}, \frac{1}{2}, \frac{\pi}{4}$



11. a. $\cos^{-1}\left(\tan\left(\frac{3\pi}{4}\right)\right) = \cos^{-1}(-1) = \pi$

b. $\sec\left[\arctan\left(\frac{2}{\sqrt{13}}\right)\right] =$

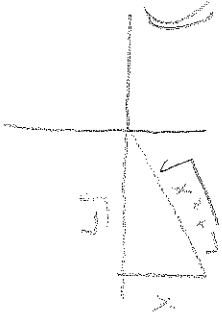


$\frac{\sqrt{13}}{3}$

c. $\csc\left(\arctan\left(\frac{x}{\sqrt{5}}\right)\right) = c$

$x^2 + (\sqrt{5})^2 = c^2$

$1 + \frac{x^2}{5} = \frac{c^2}{5}$



$\frac{\sqrt{x^2+5}}{x}$