

## Chapter 4 HW Packet Answers

1) a) 1 km    b)  $\frac{\sqrt{2}}{2}$  km    c)  $\frac{\sqrt{3}}{2}$  km    d)  $\frac{1}{2}$  km

e) 1 km below ground    f) 1 km above ground    g)  $\sin 13$     h)  $y = \sin x$

2) a)  $x = 13.9$     b)  $a = 6.43$   
 $b = 7.66$     c)  $x = 10.91$

3) a) 5    b)  $\frac{3}{2}$     c) 1    d) 0

4) a)  $-\sqrt{3}$     b)  $-\frac{\sqrt{3}}{2}$     c) undef.    d) 2

e)  $\frac{\sqrt{2}}{2}$     f)  $\frac{2\sqrt{3}}{3}$     g) -1    h)  $\frac{\sqrt{2}}{4}$

5) a) 1.52    b) 1.28    c) -0.76    d) 1.19

6) a)  $60^\circ$     b)  $5^\circ$     c)  $135^\circ$

7)  $A = 20.14 \text{ units}^2$      $P = 21.71 \text{ units}$

8) 84.1 ft.

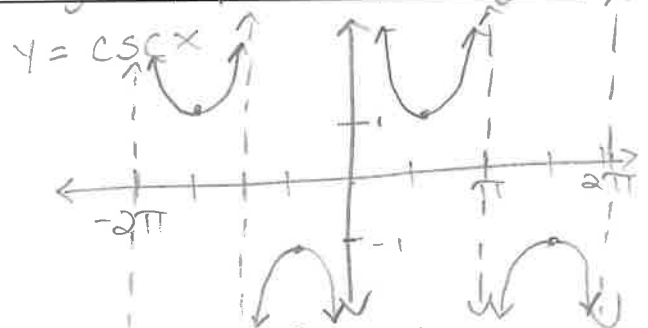
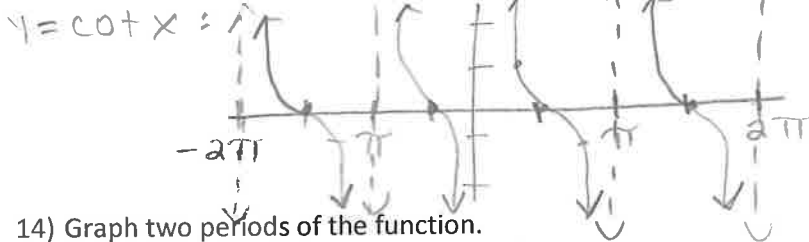
9) a) III    b) II    c) IV    d) III

10)  $\cos \theta = \frac{-3}{5}$      $\sec \theta = \frac{-5}{3}$     11) 8.03 mph  
 $\sin \theta = \frac{4}{5}$      $\csc \theta = \frac{5}{4}$   
 $\tan \theta = \frac{-4}{3}$      $\cot \theta = \frac{-3}{4}$

12) Complete the table.

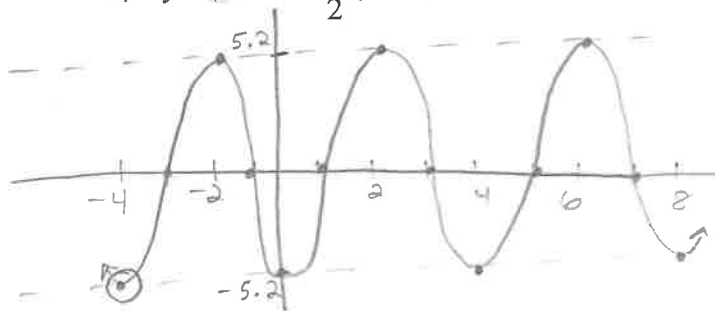
Feature	$y = \sin x$	$y = \cos x$	$y = \tan x$	$y = \cot x$	$y = \sec x$	$y = \csc x$
Domain	$\mathbb{R}$	$\mathbb{R}$	$x \neq \frac{\pi}{2} + \pi n$	$x \neq \pi n$	$x \neq \frac{\pi}{2} + \pi n$	$x \neq \pi n$
Vertical Asymptotes	none	none	$x = \frac{\pi}{2} + \pi n$	$x = \pi n$	$x = \frac{\pi}{2} + \pi n$	$x = \pi n$
Range	$[-1, 1]$	$[-1, 1]$	$\mathbb{R}$	$\mathbb{R}$	$(-\infty, -1] \cup [1, \infty)$	$(-\infty, -1] \cup [1, \infty)$
x-intercepts	$(\pi n, 0)$	$(\frac{\pi}{2} + \pi n, 0)$	$(\pi n, 0)$	$(\frac{\pi}{2} + \pi n, 0)$	none	none
y-intercept	$(0, 0)$	$(0, 1)$	$(0, 0)$	none	$(0, 1)$	none
Period	$2\pi$	$2\pi$	$\pi$	$\pi$	$2\pi$	$2\pi$
Amplitude	1	1	NA	NA	NA	NA
Even or Odd	odd	even	odd	odd	even	odd
Symmetry	origin	y-axis	origin	origin	y-axis	origin

13) Graph the parent functions of  $y = \cot x$  and  $y = \csc x$ .

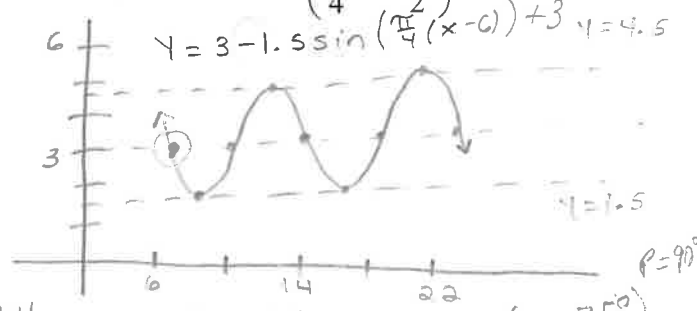


14) Graph two periods of the function.

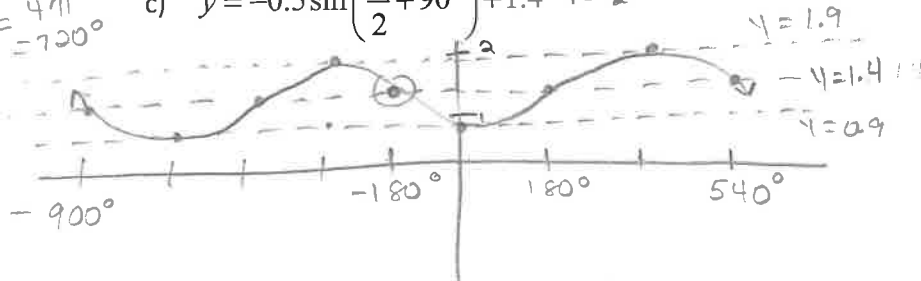
a)  $y = -5.2 \cos\left(\frac{\pi}{2}(x+4)\right)$   $p=4$



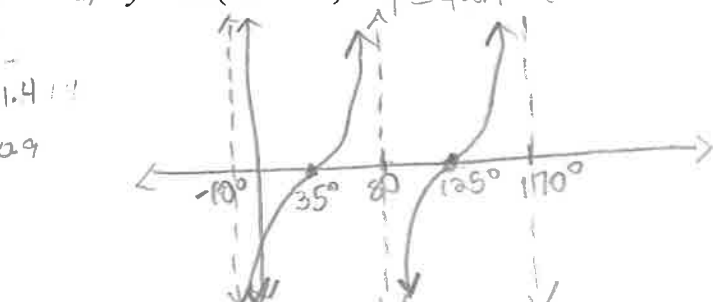
b)  $f(x) = 3 - 1.5 \sin\left(\frac{\pi}{4}x - \frac{3\pi}{2}\right)$   $p=8$



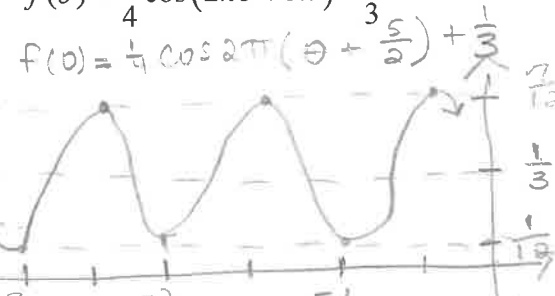
c)  $y = -0.5 \sin\left(\frac{\theta}{2} + 90^\circ\right) + 1.4$   $p = \frac{4\pi}{1} = 720^\circ$



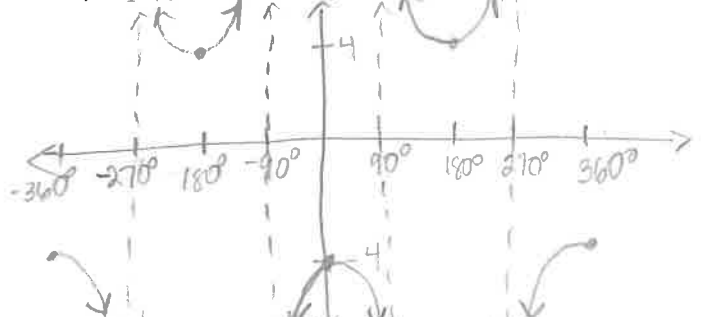
d)  $y = \tan(2x - 70^\circ)$   $y = \tan 2(x - 35^\circ)$



e)  $f(\theta) = \frac{1}{4} \cos(2\pi\theta + 5\pi) + \frac{1}{3}$   $p=1$



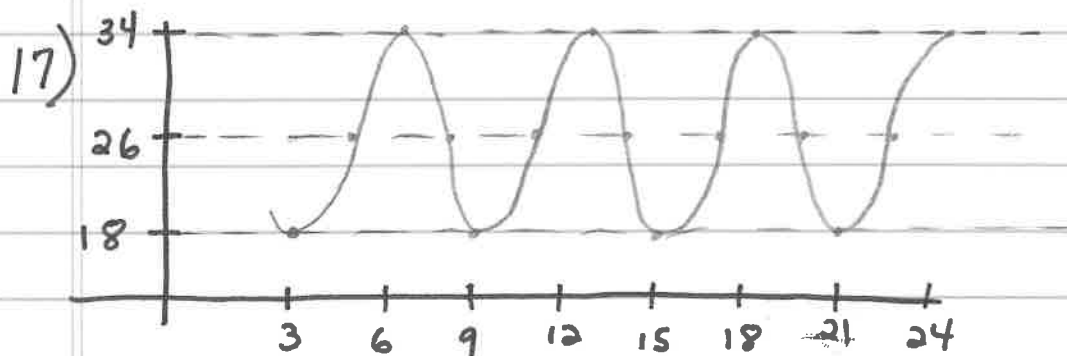
f)  $p(t) = -4 \sec(-t)$  (in degrees)



15)  $y = 6 \sin(2(x-60^\circ)) + 3$     b)  $y = 3 \sin\left(\frac{\pi}{4}(x-2)\right) + 5$

a)  $y = 6 \cos(2(x-105^\circ)) + 3$      $y = 3 \cos\left(\frac{\pi}{4}(x-4)\right) + 5$

16) You get on 15.49 ft. above the ground  
 One rotation takes 275 seconds  
 The diameter of the Ferris wheel is 64 ft.



b)  $y = 26 + 8 \cos \frac{\pi}{3} x$

c) 2AM-4AM, 8AM-10AM, 2PM-4PM, 8PM-10PM

18) a)  $-\frac{\pi}{3}$     b)  $\frac{\pi}{6}$     c)  $\frac{3\pi}{4}$     d)  $\frac{\pi}{3}$

e)  $\frac{\pi}{2}$     f)  $-\frac{\pi}{4}$     g)  $\frac{\pi}{3}$     h)  $\pi$

19) Determine the exact value in degrees.

a)  $\arccos\left(\frac{\sqrt{2}}{2}\right) = 45^\circ$     b)  $\tan^{-1}(0) = 0^\circ$     c)  $\operatorname{arccsc}(2) = 30^\circ$     d)  $\sec^{-1}\left(\frac{2\sqrt{3}}{3}\right) = 30^\circ$

20) In each equation below, circle the angle measure and put a square around the trigonometric ratio.

a)  $\sin 45^\circ = \frac{\sqrt{2}}{2}$     b)  $\cos \frac{5\pi}{6} = \frac{-\sqrt{3}}{2}$     c)  $\arctan(1) = \frac{\pi}{4}$

d)  $\csc^{-1}\left(\frac{2\sqrt{3}}{3}\right) = \frac{\pi}{3}$     e)  $\sec^{-1}(a) = b$     f)  $\cot(z) = w$

21) Fill out the chart below.

	Domain	Range
$y = \cos^{-1} x$	$[-1, 1]$	$[0, \pi]$
$f(x) = \arcsin x$	$[-1, 1]$	$\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
$g(x) = \operatorname{arccot} x$	$\mathbb{R}$	$(0, \pi)$

22) Use your calculator to estimate each (in degrees).

a)  $\sin^{-1}(0.42)$

$24.8^\circ$

b)  $\arctan(-2.3)$

$-66.5^\circ$

c)  $\csc^{-1}\left(\frac{5}{2}\right) = 23.6^\circ$   
 $= \sin^{-1}\left(\frac{2}{5}\right)$

$$23) a) \left[-1, \frac{\sqrt{2}}{2}\right) \quad b) \frac{\sqrt{2}}{2} \quad c) \left(\frac{\sqrt{2}}{2}, 1\right]$$

$$24) a) 32.9^\circ \quad b) 12.9 \text{ ft.}$$

$$25) a) \theta = 26^\circ \quad b) 24.39 \text{ ft.}$$

$$26) A = \tan^{-1}\left(\frac{h-5}{150}\right)$$

$$27) a) \frac{\pi}{6} \quad b) -\frac{\pi}{4} \quad c) \frac{\pi}{3} \quad d) \frac{2\pi}{3}$$

$$28) \cos^{-1}, \cot^{-1}, \sec^{-1}$$

$$29) \sin^{-1}, \tan^{-1}, \csc^{-1}$$

$$30) a) \frac{5}{13} \quad b) \sqrt{10} \quad c) \frac{3\sqrt{5}}{7}$$

$$31) a) 1.015 \quad b) 1.150 \quad c) 143.13^\circ \quad d) 165.964^\circ$$
$$e) 57.14^\circ \quad f) 1.148 \quad g) 62.241^\circ \quad h) 4.989^\circ$$

$$32) a) \theta = \frac{\pi}{3} + 2\pi n \quad b) \theta = \frac{2\pi}{3} + \pi n \quad c) \theta = \frac{7\pi}{6} + 2\pi n$$
$$\text{or } \frac{2\pi}{3} + 2\pi n \quad \text{or } \frac{11\pi}{6} + 2\pi n$$
$$d) \emptyset$$

$$33) a) \frac{1}{x} \quad b) \frac{1}{\sqrt{2x-x^2}} \quad c) \frac{\sqrt{25-x^2}}{x} \quad d) x$$

$$e) \frac{\sqrt{r^2 - (h-x)^2}}{r}$$