Chapter 4 Practice Problems

Directions: Place all work and answers on another piece of paper except for the graphs.
Be sure to write neatly and circle you answers.

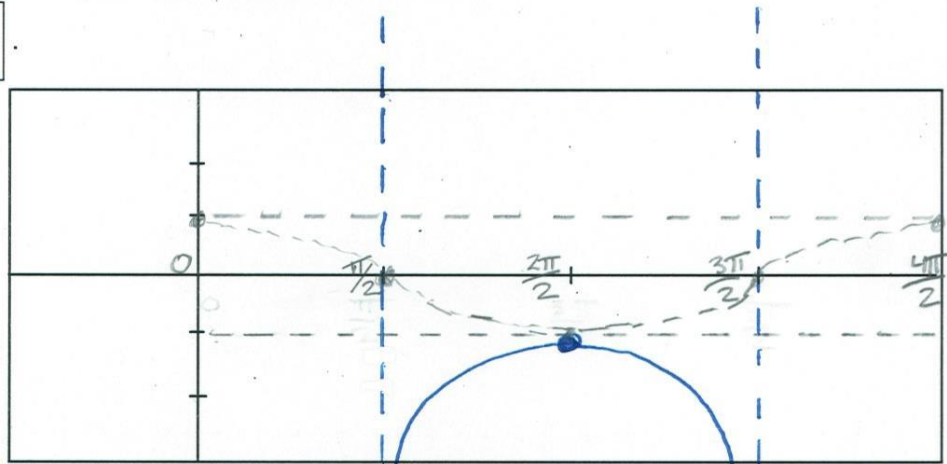**DIRECTIONS**: Graph each function on the given interval.

1. **y = sec x,**   for $\left[\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right]$.

A) Start with
$y = \cos x$

B) Put assymptotes
where $\cos x = 0$

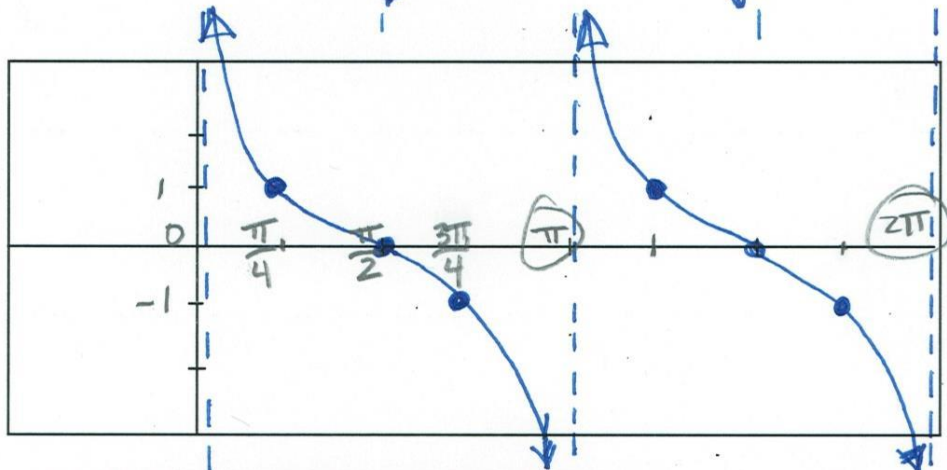C) Limit graph $\left[\dfrac{\pi}{2}, \dfrac{3\pi}{2}\right]$
to

D) Sketch _reciprocal_.

2. **y = cot x,** for [0, 2π].

A) Start with _one_
cycle of $y = \cot x$
on $[0, \pi]$

B) Per of cot is π
so $[\pi, 2\pi]$
will be another
cycle

DIRECTIONS: Show your work to find the amplitude, period and phase and vertical shifts.
Label the axis so the amplitude, period, phase, vertical shifts and tick marks are easy to read.
Show calculations, formulas and graph data on the left side scratch space.
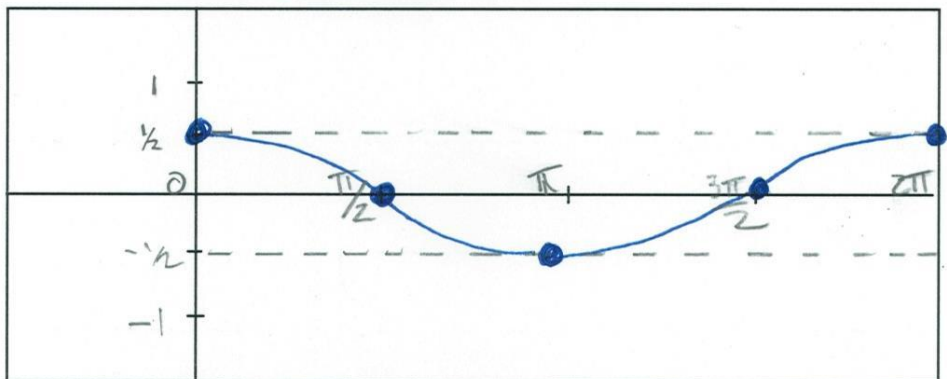
3. **y =** $\dfrac{1}{2}\cos x$ Graph only one cycle.

$A = \frac{1}{2} \rightarrow$ Amp = ½

$B = 1 \rightarrow$ Per = 2π

$C = 0 \Rightarrow$ H.S. = 0

$D = 0 \rightarrow$ V.S = 0

4. $y = -\sin(2x)$

$A = -1 \rightarrow$ Reflect

$B = 2 \rightarrow$ Per $= \dfrac{2\pi}{B}$

$\quad = \dfrac{2\pi}{2} = \boxed{\pi}$

Tick $= \dfrac{Per}{4} = \dfrac{\pi}{4}$
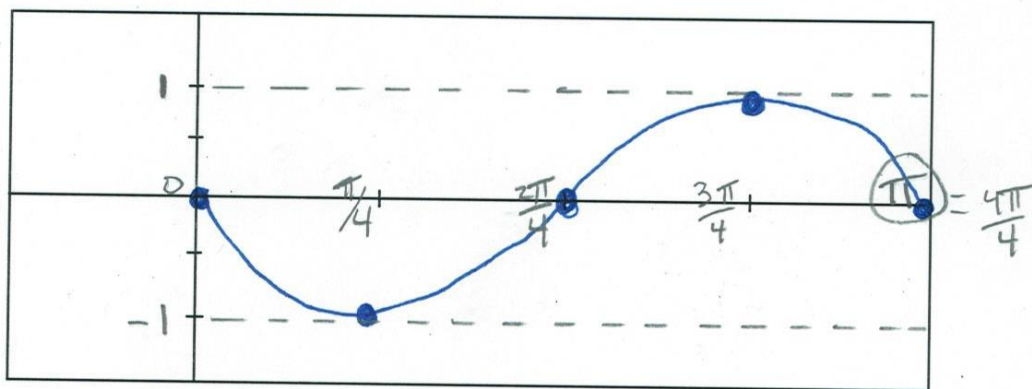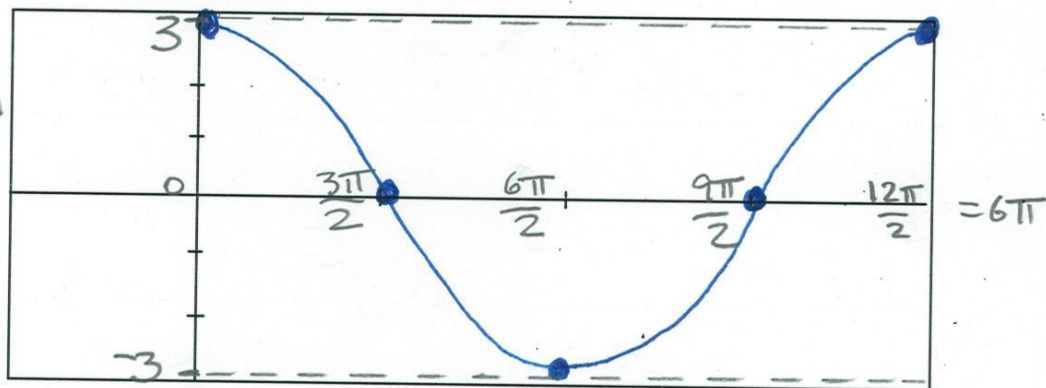

5. $y = 3\cos\left(\dfrac{1}{3}x\right)$

$A = 3 \rightarrow$ Amp $= 3$

$B = \frac{1}{3} \rightarrow$ Per $= \dfrac{2\pi}{\frac{1}{3}} = \boxed{6\pi}$

Tick $= \dfrac{Per}{4} = \dfrac{6\pi}{4} = \dfrac{3\pi}{2}$

$C = 0$

$D = 0$
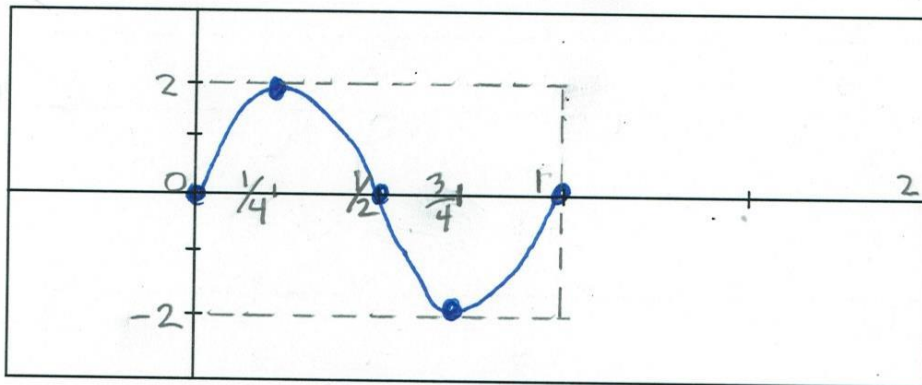

6. $y = 2\sin(2\pi x)$

$A = 2 \rightarrow$ Amp $= 2$

$B = 2\pi \rightarrow$ Per $= \dfrac{2\pi}{B} = \dfrac{2\pi}{2\pi}$

$\boxed{Per = 1}$

Tick $= \dfrac{Per}{4} = \dfrac{1}{4}$

$C = 0$

$D = 0$

7. $y = 4\cos\left(x + \dfrac{\pi}{2}\right)$

$A = 4 \rightarrow$ Amp $= 4$

$B = 1 \rightarrow$ Per $= 2\pi$
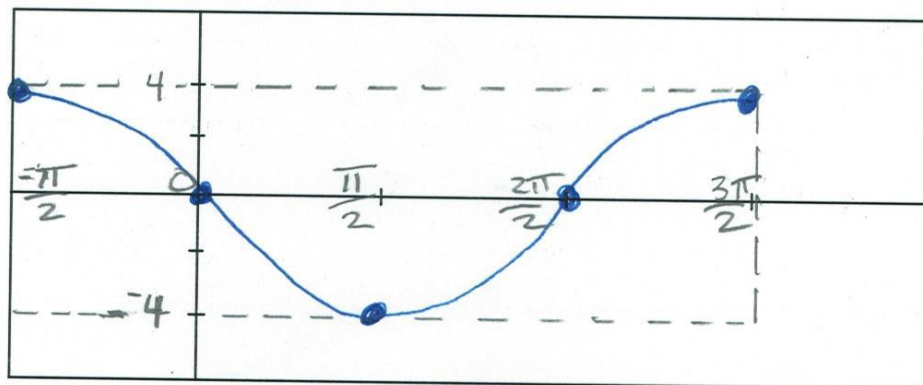
Tick $= \dfrac{Per}{4} = \dfrac{2\pi}{4} = \pi/2$

$C = \pi/2 \rightarrow$ H.S $= \dfrac{-C}{B}$

$\quad = \dfrac{-\pi/2}{1}$

So H.S. $= -\pi/2$

$D = 0$

argument $\rightarrow$ $0 \le x + \pi/2 \le 2\pi$

$\quad -\pi/2 \quad -\pi/2 \quad -\pi/2$

start $[-\pi/2 \le x \le 3\pi/2]$ end

Graph one cycle

argument → $0 \leq 2x - \pi/4 \leq 2\pi$

$$\begin{array}{c} +\pi/4 \qquad +\pi/4 \qquad +\pi/4 \\ \hline \dfrac{\pi/4}{2} \leq \dfrac{2x}{2} \leq \dfrac{9\pi/4}{2} \end{array} \Bigg\} \quad \dfrac{\pi}{8} \leq x \leq \dfrac{9\pi}{8}$$

$\underset{\text{start}}{\underbrace{\quad}} \qquad \underset{\text{end.}}{\underbrace{\quad}}$

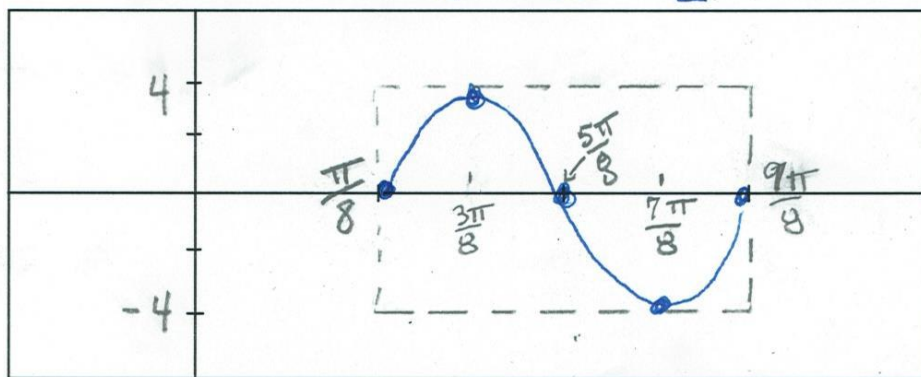8. $y = 4\sin\left(2x - \dfrac{\pi}{4}\right)$

$A = 4 \rightarrow$ Amp $= 4$

$B = 2 \rightarrow$ Per $= \dfrac{2\pi}{B} = \dfrac{2\pi}{2}$

$\boxed{\text{Per} = \pi}$

Tick $= \dfrac{\text{Per}}{4} = \dfrac{\pi}{4} = \boxed{\dfrac{2\pi}{8}}$

$C = -\pi/4 \rightarrow$ H.S. $= -\dfrac{C}{B}$

$= \dfrac{-(-\pi/4)}{2} = \dfrac{\pi}{8}$

9. ~~Sketch the graph of **y = 2 + sin x**, for **x** between 0 and 2π~~   (from 4.6 was skipped)

10. ~~Sketch the graph of **y = 2x + 2sin x**, for **x** between 0 and 4π~~   (from 4.6 was skipped)

11. Graph **y = cos⁻¹x**.   (Give it a try but it is not the test.)

Evaluate each expression without using a calculator and write your answer in radians.

12. arcsin (1)

13. $\arccos\left(-\dfrac{1}{2}\right)$

Use a calculator to evaluate each expression to the nearest tenth of a degree

14. arctan (−0.7532)

15. arccos (−0.5329)

Evaluate without using a calculator.

16. $\sin\left(\cos^{-1}\dfrac{4}{5}\right)$

17. $\sec\left(\tan^{-1}\dfrac{1}{2}\right)$

18. Write an equivalent expression that involves χ only. (Assume χ is positive.)
    cos (sin⁻¹(x + 1))

Solutions for Chapter 4

1. graph	8. graph	15. 122.2°
2. graph	9. graph	16. 3/5
3. graph	10. graph	
4. graph	11. graph	17. $\sqrt{5/2}$
5. graph	12. π/2	
6. graph	13. 2π/3	18. $\sqrt{-x^2 - 2x}$
7. graph	14. -37°	