

Math 101 — Quiz 3
TUTOR HELP NOT OKAY!!

Name: Ken

Directions: **Due Wednesday, Feb. 18th**

- You are not to work on this together or get help from mentors/tutors!!
- Show all work.
- Write your solutions on printer paper.
- Only use a calculator if the question specifically says to use one!
- Box off your solutions.
- No credit will be given for sloppy or illegible work.
- Do not write your solutions on this piece of paper.
- Staple your worked out solutions to this piece of paper and use this piece of paper as your top (or cover) sheet.

Exercises

1. Section 2.6

Do problems 4, 6, 19, 20 and 27 on page 170 in the textbook.

4

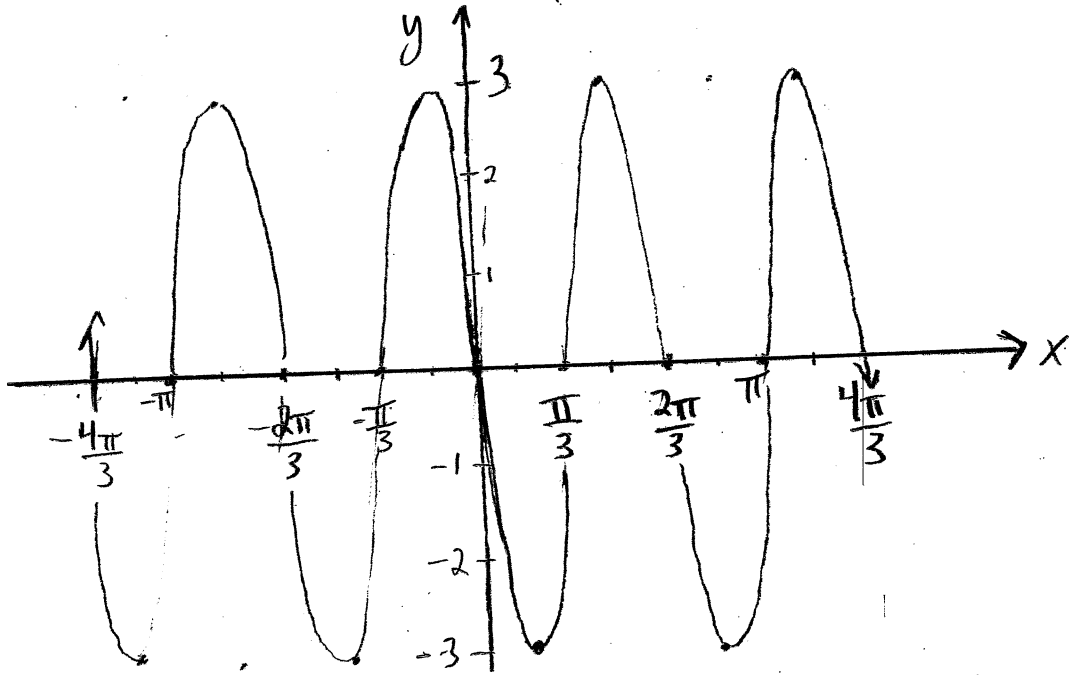
$$y = 3 \sin(3x - \pi)$$

$A = 3$, $Pd = \frac{2\pi}{3}$, Phase Shift: solve $3x - \pi = 0$ for x

$$3x = \pi$$

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

$$x = \frac{\pi}{3} \Rightarrow \text{horizontal shift } \frac{\pi}{3} \text{ units right}$$



$$\text{dom} = \mathbb{R}$$

$$\text{rng} = [-3, 3]$$

$$(6) \quad y = 3 \cos(2x + \pi)$$

$$A = 3, \quad \text{pd} = \frac{2\pi}{2} = \pi$$

$$\text{QP} = \frac{\pi}{4}$$

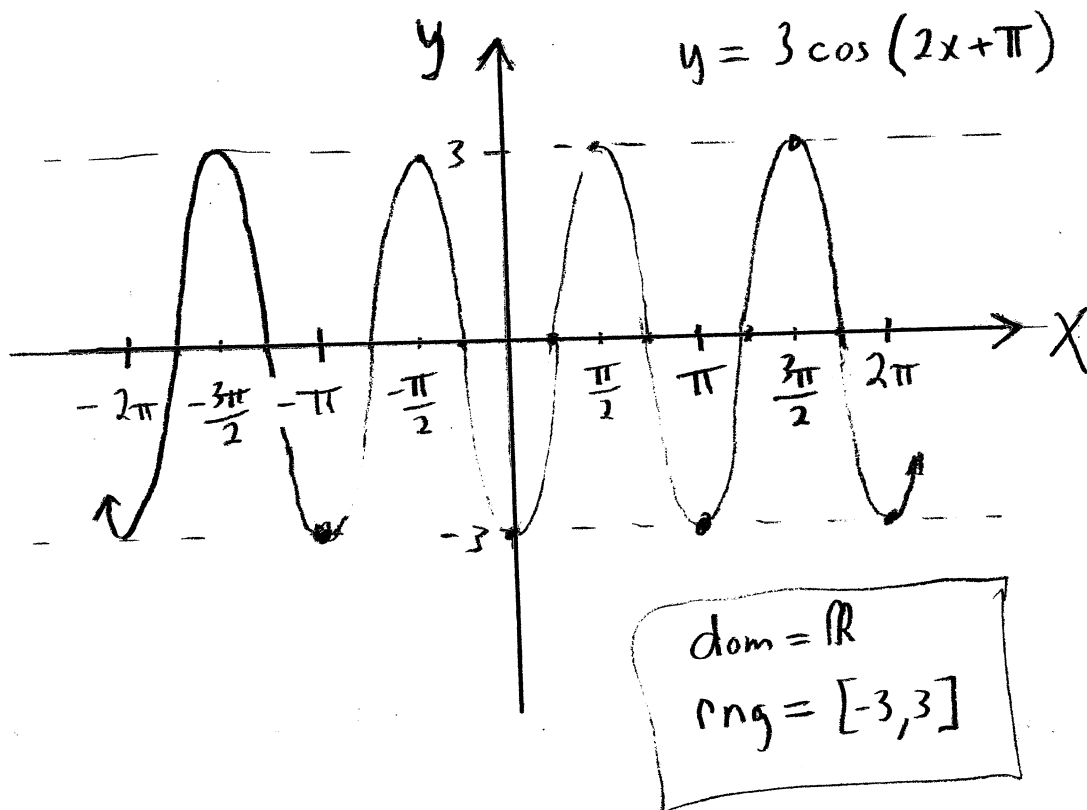
Phase shift

$$2x + \pi = 0$$

$$2x = -\pi$$

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

$\Rightarrow$ horizontal shift is $\frac{\pi}{2}$ units left
(2 quarter points)



$$(19) \quad y = 2 \tan(4x - \pi)$$

$$A = 2, \quad p.d = \frac{\pi}{4}$$

domain, range & vertical asymptotes $\text{range} = (-\infty, \infty)$

$$4x - \pi = \frac{\pi}{2} + k\pi$$

$$4x = \pi + \frac{\pi}{2} + k\pi$$

$$4x = \pi \cdot \frac{3}{2} + \frac{\pi}{2} + k\pi$$

$$4x = \frac{3\pi}{2} + k\pi$$

$$\frac{1}{4} \cdot 4x = \frac{1}{4} \left(\frac{3\pi}{2} + k\pi \right)$$

$$x = \frac{3\pi}{8} + \frac{k\pi}{4} = \frac{3\pi + 2k\pi}{8} = \frac{(3 + 2k)\pi}{8}$$

$$\text{dom} = \left\{ x \mid x \neq \frac{(3 + 2k)\pi}{8} \right\}$$

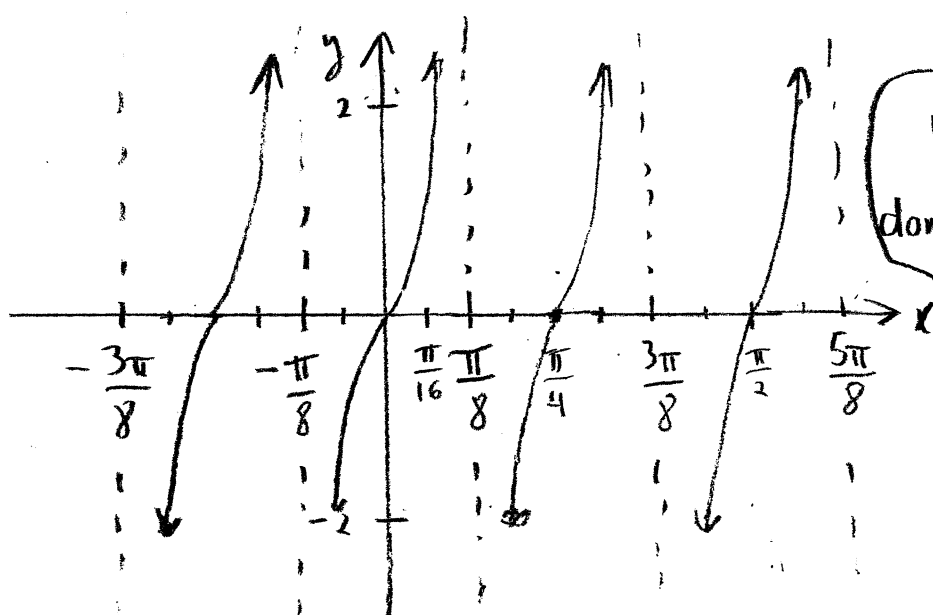
$$\text{VA's} = \left\{ x \mid x = \frac{(3 + 2k)\pi}{8} \right\}$$

$$\text{when } k=0, \quad x = \frac{3\pi}{8}$$

$$\text{when } k=-1, \quad x = \frac{\pi}{8}$$

$$\text{when } k=1, \quad x = \frac{5\pi}{8}$$

19



$$y = 2 \tan(4x - \pi)$$

$$\text{dom} = \left\{ x \mid x \neq \frac{(3+2k)\pi}{8} \right\}$$

$$\text{rng} = \mathbb{R}$$

20 $y = \frac{1}{2} \cot(2x - \pi)$

$$A = \frac{1}{2}, \quad P_d = \frac{\pi}{2}, \quad 2x - \pi = k\pi$$

$$2x = \pi + k\pi$$

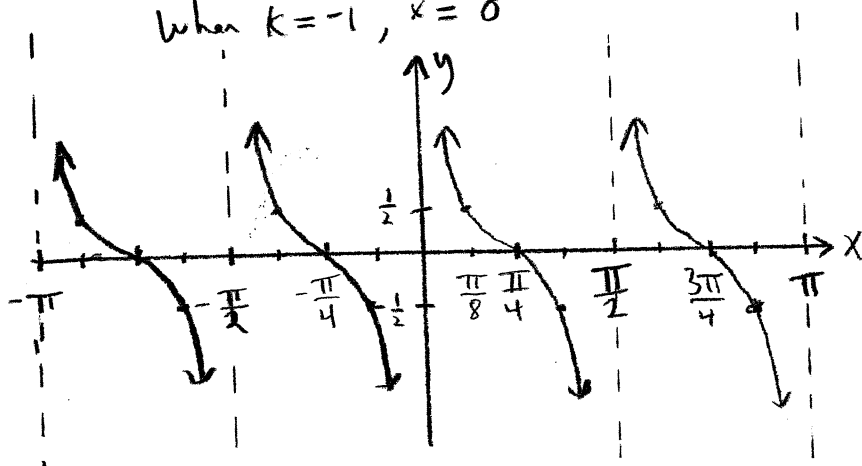
$$x = \frac{\pi}{2} + \frac{k\pi}{2} = (1+k) \frac{\pi}{2}$$

$$\text{VA's} = \left\{ x \mid x = (1+k) \frac{\pi}{2} \right\}$$

When $k=0$, $x = \frac{\pi}{2}$,

When $k=1$, $x = \pi$

When $k=-1$, $x = 0$



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

$$\text{dom} = \left\{ x \mid x \neq \frac{\pi}{2} + \frac{k\pi}{2} \right\}$$

$$\text{rng} = \mathbb{R}$$

27

$$pd = \frac{2\pi}{30\pi} = \frac{1}{15}$$

$$\text{Amp} = 120 \text{ amperes}$$

$$P_s = \frac{1}{90} \text{ sec} = \frac{1}{6} \cdot \frac{1}{15} \\ = \frac{1}{6} pd$$

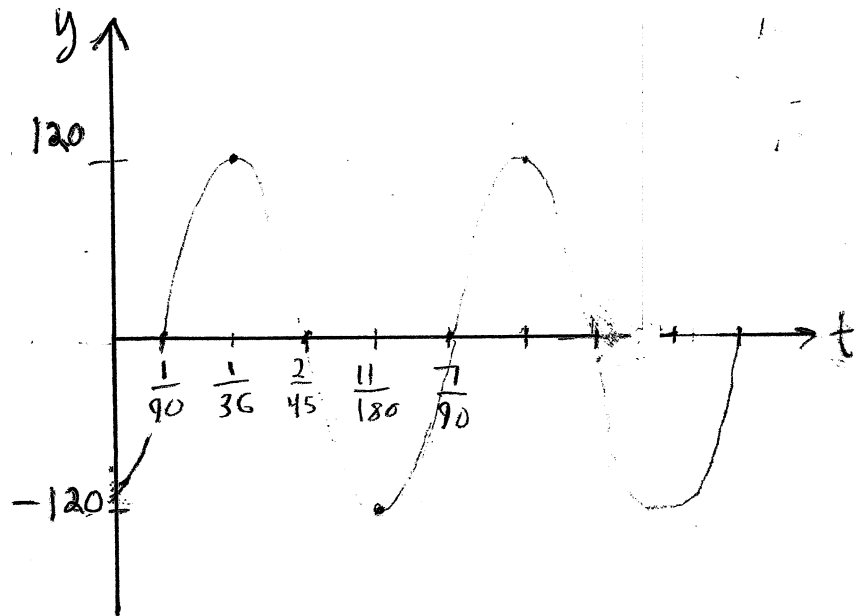
$$QP = \frac{1}{4} - \frac{1}{15} = \frac{1}{60}$$

$$30\pi t - \frac{\pi}{3} = 0$$

$$30\pi t = \frac{\pi}{3}$$

$$t = \frac{1}{30\pi} \cdot \frac{\pi}{3}$$

$$t = \frac{1}{90}$$



$$\text{dom} = [0, \infty)$$

$$\text{rng} = [-120, 120]$$