

## Quiz 3 on PreCalculus II (Math 1151)

Mark your Recitation Session Number: 015 023 025

Name: \_\_\_\_\_ Student ID: \_\_\_\_\_ Score: \_\_\_\_\_

You must show all your work. Correct answer without any step earns zero point.  
You **cannot** use calculators in this quiz.

1. (4 points.) Graph the following function over 2 periods, indicate zeroes and asymptotes:

$$y = -2 \tan\left(x + \frac{\pi}{4}\right).$$

The graph is omitted.

However, notice that the zeroes are  $-\frac{\pi}{4}, \frac{3\pi}{4}$  etc.; (In fact:  $\{-\frac{\pi}{4} + k\pi, \text{ for any integer } k\}$ .)

While the asymptotes are  $x = -\frac{3\pi}{4}, x = \frac{\pi}{4}, x = \frac{5\pi}{4}$  etc. (In fact:  $\{x = \frac{\pi}{4} + k\pi, \text{ for any integer } k\}$ .)

2. (a) (3 points.) Find the amplitude, period and phase shift of  $y = 4 \cos(\pi x + 2)$ .

**Solution:** first we write the function in the standard form:

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

So we can identify:

$$\text{Amplitude: } |A| = 4; \text{ Period: } T = \frac{2\pi}{\omega} = \frac{2\pi}{\pi} = 2; \text{ Phase shift: } \frac{\phi}{\omega} = -\frac{2}{\pi}.$$

- (b) (3 points.) Write the equation of a sine function that has the given characteristics:

Amplitude: 2; Periods:  $\pi$ ; Phase shift: 2.

**Solution:** we can first determine that  $A = 2$ , and from  $T = \frac{2\pi}{\omega} = \pi$ , we get  $\omega = 2$ . Now consider  $\frac{\phi}{\omega} = 2$ , we find out that  $\phi = 4$ . Thus, by plugging the values of  $A$ ,  $\omega$ , and  $\phi$  into the standard formula, we can write an equation of such a sine function as:

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