

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Per: \_\_\_\_\_

**Show all the work clearly to receive full credit. No work or incomplete work = NO CREDIT**

- 1) Find the least positive and the least negative angle coterminal with  $\frac{17\pi}{7}$ .
- 2) Find the length of the arc on a circle of radius 15 meters intercepted by a central angle  $75^\circ$ .  
**Round answer to two decimal places.**
- 3) A car wheel has a 35-inch radius. Through what angle does the wheel turn when the car rolls forward 5 ft?  
**Round answer to the nearest degree.**
- 4) A pendulum swings through an angle of  $45^\circ$  each second. If the pendulum is 49 inches long, how far does its tip move each second?
- 5) What is the **domain** of the sine function?      What is the **domain** of the cosine function?  
What is the **range** of the sine function?      What is the **range** of the cosine function?

**In problems 6 – 10, find the exact value. Do not use a calculator. Show all the work to receive full credit.**

- 6)  $\sin(\pi/4 + 15\pi)$ .      7)  $\sec 270^\circ = ?$       8)  $\cot 570^\circ = ?$       9)  $\tan(8\pi/3) = ?$       10)  $\sin(\frac{\pi}{3}) \sec(\frac{\pi}{3}) - \tan(\frac{\pi}{6})$

- 11) Find a co-function with the same value as  $\tan \frac{2\pi}{7}$ . **Show all the work to receive full credit.**
- 12) A ship sights a lighthouse 35 miles directly to the north. A second ship west of the first ship, also sights the lighthouse. The bearing from the second ship to the lighthouse is  $N 37^\circ E$ . How far is the second ship from the lighthouse?  
**Round answer to the nearest mile.**
- 13) A building 150 feet tall casts a 50 foot long shadow. If a person stands at the end of the shadow and looks up to the top of the building, what is the angle of the person's eyes to the top of the building? **(Assume the person's eyes are 5 feet above ground level.) Round answer to two decimal places.**

14) Find the **exact value** of the expression. **Show all the work needed without using a calculator or no credit will be given.**

$$\left( \tan \frac{\pi}{3} \right) \left( \cos \frac{3\pi}{2} \right) + \left( \sin \pi \right) \left( \cot \frac{3\pi}{2} \right)$$

15) Point  $(-8, -15)$  is on the terminal side of angle  $\theta$ . Find the **exact value** of  $\cos \theta$ .

Draw 15 and 16. Angle in standard position, reference angle and rotation correctly.

16) Find the **exact value** of  $\cos \theta$ , given  $\tan \theta = -\frac{7}{24}$ , and  $270^\circ < \theta < 360^\circ$

17) Graph one period of  $y = 3\cos\left(2x + \frac{\pi}{2}\right)$

18) Graph one period  $y = \frac{1}{2}\sin\left(\frac{x}{2} - \pi\right)$

19) Graph **two periods of**:  $y = 2\tan\left(x - \frac{\pi}{2}\right)$

20) Graph:  $y = \csc\left(x + \frac{\pi}{4}\right)$ . Use the entire grid.

Show the work for the new asymptotes here:

Show the work amplitude, period, and shifts here:

a=\_\_\_\_\_ b=\_\_\_\_\_ per:= \_\_\_\_\_ ps=\_\_\_\_\_ vs=\_\_\_\_\_

**Find the exact value of the following inverse functions. Show all the work needed without using a calculator or no credit will be given. Draw as necessary**

- 21)  $\cos^{-1}\left(\sin \frac{5\pi}{3}\right)$       22)  $\tan^{-1}\left(\sin \frac{\pi}{2}\right)$       23)  $\sin\left(\cos^{-1}\left(-\frac{7}{25}\right)\right)$       24)  $\tan^{-1}(\cos(-3\pi))$

25) From a boat on the lake, the angle of elevation to the top of a cliff is  $28^\circ$ . If the base of the cliff is 215 feet from the boat, how high is the cliff (to the nearest foot)?

1)	12)
2)	13)
3)	14)
4)	15)
5)	16)
6)	21)
7)	22)
8)	23)
9)	24)
10)	25)
11)	

