NAME:_____

MATH 128 TEST 3 SAMPLE

PLEASE SHOW ALL WORK!

1.) (6 pts) A circle has a radius of 190.99 miles. What is the arc length of a sector with a central angle of 15 degrees? What is the area of the sector? Please round your answers to the nearest whole number.

arc length:_____

area:_____

2.) (6 pts) A Ferris wheel has a radius of 25 feet and it rotates at 4 revolutions for every 2 minutes. Find the angular speed, in radians per minute of the Ferris wheel. Also find the linear speed, in ft per minute, of a seat on this Ferris wheel. You may write your answers in terms of π.

Angular:_____

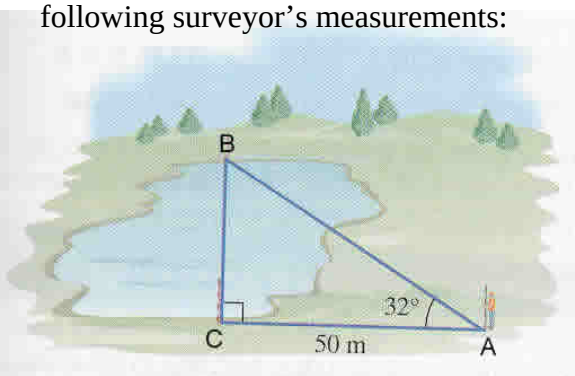
Linear:_____

3.) The Burj Dubai is currently the tallest freestanding structure. From a point at the top of the building to a point on level ground 619 feet from the base of the building the angle of depression is 77.013°. Approximate the height of the Burj Dubai to the nearest foot.

3._____

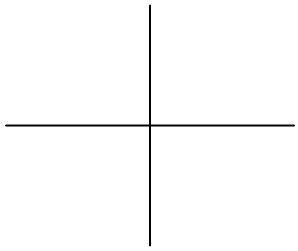
4.) Find the distance from A to B using the following surveyor's measurements:

4._____



5.) (6 pts) Find the <u>exact</u> value of $\cos\left(\frac{11\pi}{6}\right)$ using reference angles. Indicate the ref. angle and draw in standard position.

Value:_____



Ref. angle:_____

6.) (6 pts) Find the exact value and reference angle for $\tan(-585^\circ)$.

Value:_____

Ref. Angle:_____

7.) (20 points) Find the following exact values if you are given: $\sec\theta = \frac{5}{4}$ and $270^\circ \le \theta \le 360^\circ$.

$\sin\theta$:_____ $\csc\theta$:_____

$\tan\theta$:_____ $\cot\theta$:_____

$\cos\theta$:_____ $\sin 2\theta$:_____

$\tan 2\theta$:_____ $\cos 2\theta$:_____

$\cos\frac{\theta}{2}$:_____ $\tan\frac{\theta}{2}$:_____

8.) (10 points) Use the following equation to answer the questions: $y = -3\sin\left(\frac{\pi}{8}x + \frac{\pi}{2}\right)$

a.) Find the period. 8a._____

b.) Find the amplitude. 8b._____

c.) Find the phase shift. 8c._____

d.) Graph the function over one period.

9.) (6 pts) Graph over two full periods: $y = -\cot\left(x + \frac{5\pi}{6}\right)$

10.) Does $\cos^{-1}\left(\cos\left(\sqrt{10}\right)\right) = \sqrt{10}$? 10._____

(Assume $\sqrt{10}$ is in radians.)

11.) (8 points) Establish the identity: $\frac{\cos x - 1}{\sin x} + \frac{\sin x}{1 + \cos x} = 0$

12.) (7 pts) Establish the identity: $\sec\theta(\cos\theta + \sin\theta\tan\theta) = \sec^2\theta$

13.) Prove the identity by using sum or difference formulas:
$\sin(180^\circ - x) - \cos(x - 90^\circ) = 0$

14.) Find the exact value of $\sin 15^\circ$ by letting $15^\circ = 45^\circ - 30^\circ$ and using a difference formula. 14._____