Math 110 Common Exam #2

October 23, 2019

Time: 1 hour and 25 minutes

Instructions: Show all work for full credit.
No outside materials or calculators allowed.

Extra Space: Use the backs of each sheet
for extra space. Clearly label when doing so.

Name: ______________________________

ID #: ______________________________

Instructor/Section: ____________________

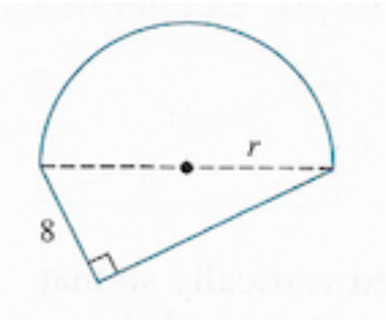
"I pledge by my honor that I have abided by the NJIT Academic Integrity Code."

________________________ (Signature)

Problem		**Score**

1. The wheels of a car turn at a rate of $\frac{100}{\pi}$ rev/sec when the car is traveling at 80 ft/sec. What is the diameter of the wheel? (5 pts)

2. The accompanying figure consists of a semi-circle and a right triangle. Find the area of the figure when r = 5 (Figure Not Drawn to Scale). (8 pts)



3. Sketch the graphs of the following functions over at least 2 periods. Be sure to label at least 2 points on your graph. (6 pts each)

   a. $y = 1 - 3\sin(2x)$

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

   c. $y = \tan(-x)$

4. Verify the following identities: (6 pts each)

   a. $\frac{cosx}{1+sinx}+\frac{cosx}{1-sinx}=2secx$

   b. $\frac{cotA\ cosA}{csc^2(A)-1}=sinA$

5. Evaluate the following (4 pts each)

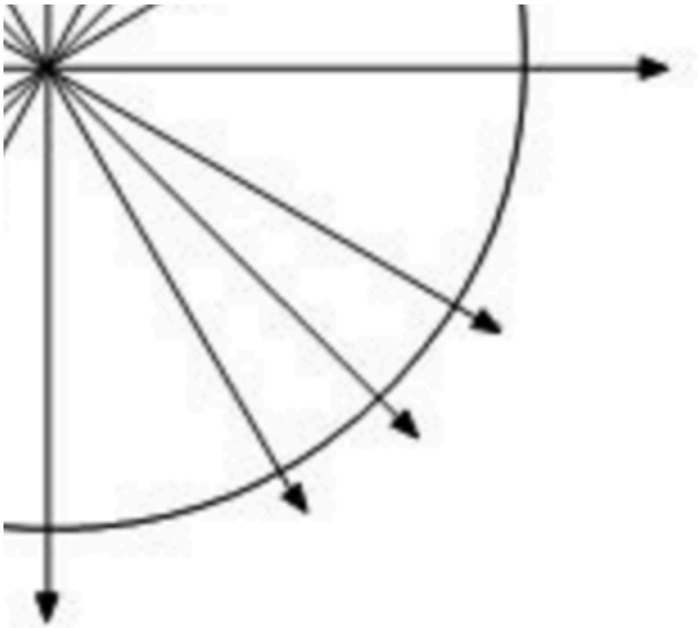
   a. $cos^{-1}\left(cos\frac{5\pi}{3}\right)$

   b. $\arcsin(1)$

   c. $\cos\left(sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)\right)$

6. Given $\theta = sin^{-1}\left(\frac{2}{3}\right)$, find $\cos(\theta)$ exactly. (5 pts)

7. Below is the fourth quadrant of the unit circle. For all angles shown (as well as the ***x-axis*** and the ***y-axis***, label the following:
    a. The angle measurements in degrees (5 pts)
    b. The angle measurements in radians (5 pts)
    c. The coordinates of the points on the circle. (5pts)



8. Find the exact value of the following: (5 pts each)

   a. $\tan\left(\frac{5\pi}{12}\right)$

   b. $\cos\left(\frac{4\pi}{5}\right)\cos\left(\frac{3\pi}{10}\right)+\sin\left(\frac{3\pi}{10}\right)\sin\left(\frac{4\pi}{5}\right)$

   c. $sin(165°)$

9. If $\sec(t) = -\frac{5}{4}$ with $\sin(t) > 0$ and $\cos(r) = \frac{4}{7}$ with $\tan(r) < 0$, find the following: (5 pts each)

   a. $\sin\,(r+t)$

   b. $cos(r-t)$