MAT 122 Test 1 – Spring, 2014 Name_____
100 Points Covers Chapter 1 NO GRAPHING CALCULATORS!!!

1. (10 pts) Find two angles, between -2π and 2π (i.e., 0^0 and 360^0) that are coterminal with $\frac{43\pi}{4}$. Give exact answers in degrees and radians.

2. (5 pts) Find the arc length on a circle of radius $r = 7$ that is intercepted by an angle of 1935^0.

3. Suppose you know that $\cos(\theta) = \frac{5}{7}$.

   a. (5 pts) Assume the terminal side of the angle θ lies in the 1st quadrant. Find the other five trigonometric functions of θ.

   b. (5 pts) Suppose θ is any angle between 0 and 2π. Draw *two* pictures that satisfy the condition $\cos(\theta) = \frac{5}{7}$. Give two solutions, in degrees, to the equation $\cos(\theta) = \frac{5}{7}$..

   c. (5 pts) Give *all* solutions to the equation $\cos(\theta) = \frac{5}{7}$, in degrees, rounded to four decimal places.

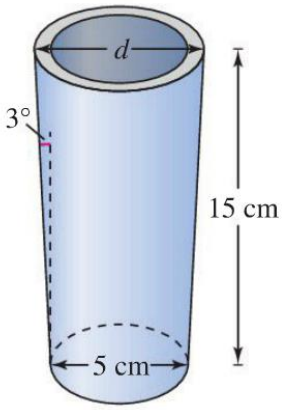
4. (10 pts) Sketch one period of the graphs of …
   a. … $y = \sin(x)$ and $y = \csc(x)$ on the same set of coordinate axes.
   b. … $y = \cos(x)$ and $y = \sec(x)$ on the same set of coordinate axes.

5. (10 pts) Sketch the graph of one period of …
   a. … $y = \tan(x)$
   b. … $y = \cot(x)$

6. (10 pts) Sketch the graph of $f(x)=10\sin\left(\frac{\pi}{8}x-\frac{\pi}{4}\right)+15$

7. (10 pts) Build a cosine function that achieves its maximum height of y = 28 meters at time x = 5 seconds and its minimum height of $y=-4$ meters at x = 25 seconds.

8. (10 pts) A tapered shaft has a diameter of 5 centimeters at the small end and is 15 centimeters long (See figure.). The taper is 3^0. Find the diameter *d* of the large end of the shaft.



9. (10 pts) Find the exact value of $\csc\left(\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)$.

10. (10 pts) Write an algebraic expression that is equivalent to $\sec(\arctan(3x))$

11. (10 pts) Bonus: Answer *one* of the following, for 10 points:
    a. Build a tangent function with vertical asymptotes at $x=3$ and $x=7$ that passes through the points $(4,59),(5,27)$, and $(6,-5)$.
    b. Sketch the graphs of $\sin(x)$ and $\sin^{-1}(x)$ on the same axes.
    c. Sketch the graphs of $\cos(x)$ and $\arccos(x)$ on the same axes.
    d. Sketch the graph of $7.3\sin(2.1x+9.9)+2.6$. Any and all calculations, just round to 1 decimal place.