Name:_____

Math 251
1.1 – 1.3W
Due 4/6

**Function and Trigonometry Review**

- Use the style sheet on your class syllabus, but you may write directly on these sheets for #1 - 13. Notice the proper headers have been included for you for this first assignment.

**Linear Review**

Slope-intercept form: $y = mx + b$, $m =$ slope $b = y$-intercept

A line parallel to $y = mx + b$ has slope $m$

A line perpendicular to $y = mx + b$ has slope $-\frac{1}{m}$

Slope of line through $(x_1, y_1)$ and $(x_2, y_2) = \frac{y_2 - y_1}{x_2 - x_1}$

1. Determine the equations of lines that are:

   a. Perpendicular to the line $y - 3x = 5$ and has $y$-intercept -5
   Hint: First put $y - 3x = 5$ into slope-intercept form.

   b. Parallel to the line $3y - 6x + 7 = 0$ and passes through the point (2,1)
   Hint: First put $3y - 6x + 7 = 0$ into slope-intercept form.

2. Find a point $(1, a)$ so that the line through $(1, a)$ and (-2, 7) is perpendicular to the line through (-2, 7) and (4, 9).
   Hint: Find the slope for the line through (-2, 7) and (4, 9), determine what the perpendicular slops is, then set up an equation with $(1, a)$.

3. Solve the following equation: $x^2 + 7x = 98$

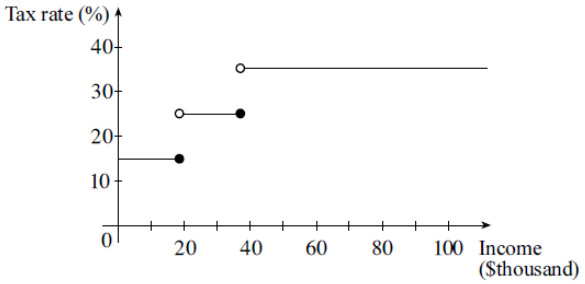
4. Factor the polynomial (of degree 3) $p(x) = x^3 + 3x^2 + 7x + 10$ as a product of polynomials with real coefficients.
   Hint: $p(x) = x^3 + 3x^2 + 7x + 10$ has a root at -2.

5. Find the domain and range of:

   a. $F(x) = \sqrt{9} - x^2$

   b. $g(x) = \sqrt{x^2 + x - 6}$

6. Determine the piecewise defined function rule for the following graph.
   Hint: Closed circles correspond to ≤ or ≥ and open circles correspond to < or >.




7. Let $f(x) = 2x$ and $g(x) = x^3$. Calculate:

   a. $(f+g)(2) =$ _____

   b. $(f-g)(2) =$ _____

   c. $(f \cdot g)(2) =$ _____

   d. $\left(\frac{f}{g}\right)(2) =$ _____

   e. $g \circ f =$ _____

   f. $g \circ g =$ _____

   g. $f \circ f =$ _____

   h. $f \circ g =$ _____

8. Write $r(x) = (2x+7)^3$ as the composition of two functions; there is more than one correct way to do this—find at least one.

9. Mark the quadrant number and whether each trig function is positive (> 0) or negative (< 0) in that quadrant.

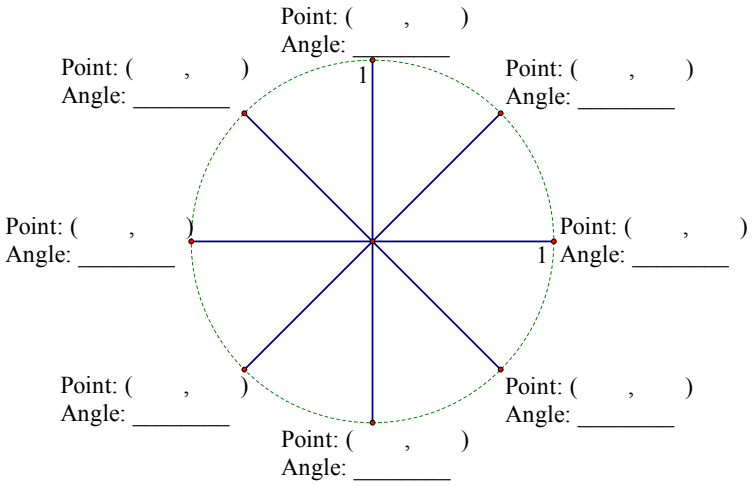
| Q___ | | Q___ | |
|---|---|---|---|
| *sin θ*____0 | *cos θ*____0 | *sin θ*____0 | *cos θ*____0 |
| *csc θ*____0 | *sec θ*____0 | *csc θ*____0 | *sec θ*____0 |
| *tan θ*____0 | *cot θ*____0 | *tan θ*____0 | *cot θ*____0 |

*y*

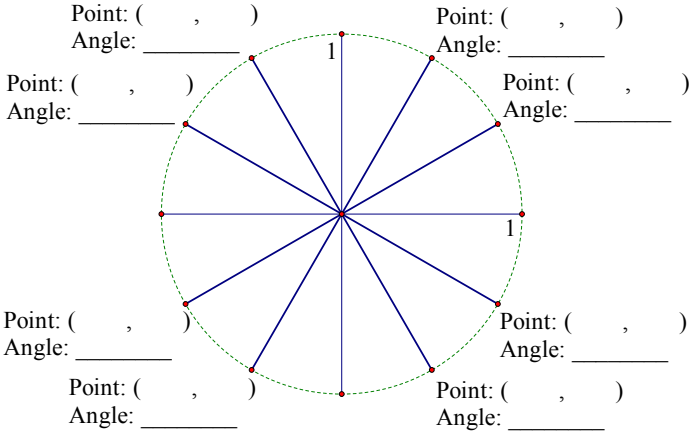
*x*

| Q___ | | Q___ | |
|---|---|---|---|
| *sin θ*____0 | *cos θ*____0 | *sin θ*____0 | *cos θ*____0 |
| *csc θ*____0 | *sec θ*____0 | *csc θ*____0 | *sec θ*____0 |
| *tan θ*____0 | *cot θ*____0 | *tan θ*____0 | *cot θ*____0 |

10. Fill in the unit circle with the correct angles (use radians) and coordinate pairs.




11. Fill in the unit circle with the correct angles (use radians) and coordinate pairs.



12. Determine the exact values of the following without using a calculator:

a. $\sin(0) =$ _____ b. $\cos(\pi) =$ _____ c. $\tan\left(\frac{\pi}{2}\right) =$ _____

d. $\sec\left(\frac{\pi}{2}\right) =$ _____ e. $\csc\left(\frac{3\pi}{2}\right) =$ _____ f. $\sec\left(\frac{3\pi}{4}\right) =$ _____

g. $\cos\left(\frac{\pi}{4}\right) =$ _____ h. $\sin\left(\frac{-3\pi}{4}\right) =$ _____ i. $\cot\left(\frac{5\pi}{4}\right) =$ _____

j. $\sin\left(\frac{2\pi}{3}\right) =$ _____ k. $\csc\left(\frac{4\pi}{3}\right) =$ _____ l. $\cos\left(\frac{\pi}{3}\right) =$ _____

m. $\tan\left(-\frac{\pi}{3}\right) =$ _____ n. $\sin\left(\frac{7\pi}{6}\right) =$ _____ o. $\cos\left(\frac{5\pi}{6}\right) =$ _____

p. $\sec\left(-\frac{\pi}{6}\right) =$ _____ q. $\csc\left(\frac{\pi}{6}\right) =$ _____ r. $\tan\left(-\frac{5\pi}{6}\right) =$ _____

13. Suppose $0 < \theta < \frac{\pi}{2}$ and $\sin(\theta) = \frac{1}{3}$, determine the following. Show your work by including a sketch of a triangle with $\theta$ and the side lengths marked.

a. $\cos(\theta) =$ _____ b. $\tan(\theta) =$ _____

c. $\sec(\theta) =$ _____ d. $\csc(\theta) =$ _____

e. $\cot(\theta) =$ _____

14. Graph $y = \sin(x)$ over the interval $-2\pi \le x \le 2\pi$. Label all key points (intercepts, max and min values). Use graph paper.

15. Graph $y = \cos(2x + \pi)$ over the interval $-2\pi \le x \le 2\pi$. Label all key points (intercepts, max and min values). Use graph paper.