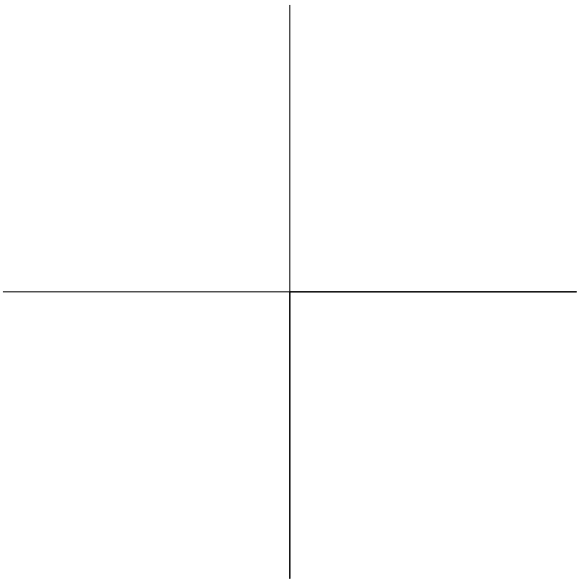
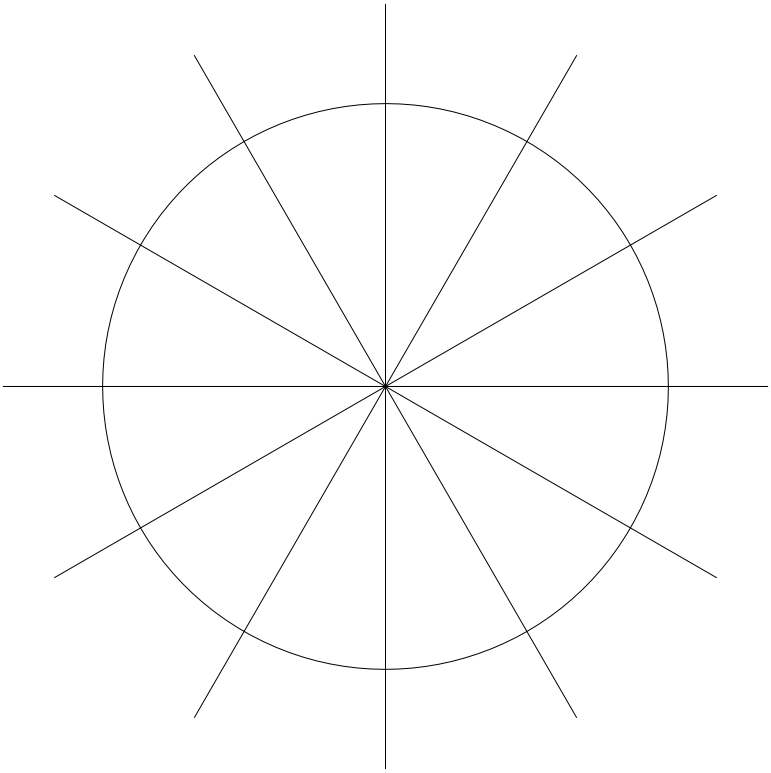
**Precalculus review questions–Wednesday Evening, January 20, 2016**

1. Find the equation of the line with slope $m = \frac{2}{3}$ and passing through $(1, 3)$. Then, find the intercepts of this line. Draw the line below. (Be sure to label your axes accurately. Don't make 1 too small.)



2. Completely, fill in the unit circle below.



3. Use the unit circle and trigonometric identities to find $\sin(\frac{\pi}{12})$.

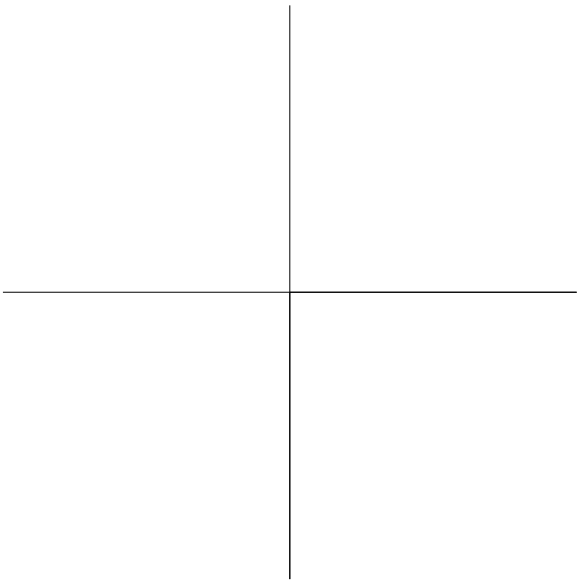
4. Solve the equation $3x^2 + 4x + 1 = 0$ in two ways: Using the quadratic formula and factoring. (Be sure you get the same answer.)

5. Solve the equation $2x^2 + 8x + 1$ by completing the square.

6. Write the equation of a circle with center $(1, 1)$ and radius $r = 3$.

7. Find the equation of the parabola passing through the three points: $(1, 0)$, and $(2, 5)$, and $(-1, 8)$.

8. Find the point where the two equations cross: $2x + 3y = 5$ and $3x - 2y = 14$. Draw the equations on the axes provided to show that your solution is correct.



9. Factor the following polynomials completely:

   (a) $8x^3 - 27$

   (b) $4x^2 - 9$

   (c) $3x^4 - 6x^3 - 9x^2$

   (d) $x^4 - 64$

   (e) $3x^3 - 3x^2 + 4x - 4$

10. Solve or simplify (state the difference before beginning any of these).

   (a) $\dfrac{x-2}{x+4} = 3$

   (b) $\dfrac{\frac{2}{x+h} - \frac{2}{x}}{h}$

11. Rationalize the denominator or numerator (whichever begins with radicals)

(a) $\dfrac{3}{\sqrt{2}}$

(b) $\dfrac{x}{\sqrt{2x+1}-\sqrt{x}}$

(c) $\sqrt{x+1}-\sqrt{2x-1}$