Practice Problems

Try the quizzes that I gave to my College Algebra class last term, available online at `http://tobybartels.name/MATH-1150/2011w/quizzes/`. (Each quiz has 4 associated files, but these are basically all the same. As long as you look at each of the 14 quizzes, you're OK.) If you start going through these in order and want to skip ahead, then skip to Quiz 10 and continue from there.

Due Problems

These problems were due April 7 Thursday.

1 *Factor*

$$6x^2 - x - 2.$$

(Show at least one intermediate step; if you do it by trial and error, then at least show what you check and don't erase the failed attempts.)

Since $6 \cdot (-2) = -12$, I look for two numbers that multiply to -12 and add to -1.

- $-12/1 = -12$, but $-12 + 1 = -11 \neq -1$, so that doesn't work;
- $-12/2 = -6$, but $-6 + 2 = -4 \neq 1$, so that doesn't work;
- $-12/3 = -4$, and $-4 + 3 = -1$, so -4 and 3 work;
- there's no need to check any more.

Now I can split up the middle term and factor by grouping:

$$\begin{gathered} 6x^2 - x - 2, \\ 6x^2 - 4x + 3x - 2, \\ 2x(3x - 2) + 1(3x - 2), \\ (2x + 1)(3x - 2). \end{gathered}$$

This is now completely factored.

2 *Find the intercepts of the equation*

$$2x^2 + 3y = 5.$$

(Show at least one intermediate step for each.)

First, I change y to 0 and solve for x:

$$\begin{aligned} 2x^2 + 0 &= 5; \\ x^2 &= \frac{5}{2}; \\ x &= \pm\sqrt{\frac{5}{2}} = \pm\frac{\sqrt{10}}{2}. \end{aligned}$$

Next, I change x to 0 and solve for y:

$$\begin{aligned} 0 + 3y &= 5; \\ y &= \frac{5}{3}. \end{aligned}$$

Therefore, the intercepts are $\left(\sqrt{10}/2, 0\right)$, $\left(-\sqrt{10}/2, 0\right)$, and $(0, 5/3)$.

3 *A 10-foot ladder is leaning diagonally against the side of a building. Let x be the distance along the ground from the base of the ladder to the building, and let y be the height at which the ladder reaches the building, both in feet. Write down an equation in x and y to describe this situation.*

The ladder is the hypotenuse of a right triangle whose legs are the distances given by x and y. Since everything is measured in feet,

$$x^2 + y^2 = (10)^2,$$

or

$$x^2 + y^2 = 100.$$