Quadratic Formula Example
Solving a quadratic equation

Here is my solution to the quadratic equation $m^2 - 6m - 7 = 0$.

We will use the quadratic formula which is used to solve quadratic equations in the generic form $ax^2 + bx + c = 0$. Some old guy, long ago, solved this generic equation for *x* and got $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. This is what we call the quadratic formula.

So what we need to do to solve $m^2 - 6m - 7 = 0$, is to determine what the coefficients are, or what stands in place for *a*, *b*, and *c* as seen in the generic form $ax^2 + bx + c = 0$. Notice we could think of our equation as $\underline{1}m^2 + \underline{-6}m + \underline{-7} = 0$. I've written it with "plus" signs because the generic form has no minus signs and I have underlined each term to bring them out. So we see that *a* is 1, *b* is -6, and *c* is -7.

We will stick these values into the quadratic formula and out will come the solutions to our equation, or the values of *x* that make the equation true. How lovely is that!? I do it below. Notice how carefully we have to watch the order of operations.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Put in 1 for *a*, -6 for *b*, and -7 for *c*.

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-7)}}{2(1)}$$

Watch the order of operations! The negative of -6 is 6. Inside the radical, $(-6)^2$ is positive 36. Leave the minus sign in place, and find that 4(1)(-7) is -28

$$x = \frac{6 \pm \sqrt{36 - -28}}{2}$$

$$x = \frac{6 \pm \sqrt{36 + 28}}{2}$$

Again, watch the order of operations and simplify as far as you can.

$$x = \frac{6 \pm \sqrt{64}}{2}$$

$$x = \frac{6 \pm 8}{2}$$

So this means that *x* could be two different values. It could be "6 plus 8" divided by 2, and it could be "6 minus 8" divided by 2. So that gives us $^{14}/_{2}$ or 7 as our first answer and $^{-2}/_{2}$ as our second answer. Notice both values, when substituted into the original equation for *x*, would make the equation true. Try it out to convince yourself that we truly did solve the equation.