6-4 Quadratic Formula

The quadratic formula is a quick easy way to solve a quadratic equation.

A quadratic equation in standard form is $\mathbf{a}x^2 + \mathbf{b}x + \mathbf{c} = 0$

The coefficients a, b, and c are put in this formula. $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

The plus and minus after the b gives two separate answers, one using the plus and the other using the minus.

Example: $8x^2 + 14x - 30 = 0$
a is 8, b is 14 and c is -30

$$\frac{-(14) \pm \sqrt{(14)^2 - 4(8)(-30)}}{2(8)} = \frac{-14 \pm \sqrt{196 + 960}}{16} = \frac{-14 \pm \sqrt{1156}}{16} = \frac{-14 \pm 34}{16}$$

Now use the plus and minus sign to make two answers.

$\dfrac{-14 + 34}{16}$ or $\dfrac{-14 - 34}{16}$

$\dfrac{20}{16}$ or $\dfrac{-48}{16}$ for an answer of 5/ 4 or -3

Practice: Use the quadratic formula to solve the following quadratic equations.

a) $3x^2-x-10=0$ $\quad$ $0=6x^2-8x-30$ $\quad$ $x^2-x-42=0$
Hint: a is 3, b is -1, c is -10

b) $x^2+11x+30=0$ $\quad$ $0=x^2-2x-24$ $\quad$ $0=x^2+x-6$

c) $0=2x^2-13x+6$ $\quad$ $0=5x^2+9x-2$ $\quad$ $0=6x^2-35x+49$

d) $-3x^2+22x-35=0$ $\quad$ $0=10x^2-x-24$ $\quad$ $0=x^2-8x-48$

e) $0=9x^2-25$ $\quad$ $0=25x^2-1$ $\quad$ $0=x^2-16$
Hint: b is 0
Is there an easier way to do this one?

f) $x^2+5x-14=0$ $\quad$ $0=2x^2-19x+24$ $\quad$ $0=7x^2+37x-30$

g) $0=4x^2-28x+49$ $\quad$ $0=x^2+10x+25$ $\quad$ $0=9x^2+6x+1$