10.6: The Quadratic Formula

Try factoring $y = x^2 + 4x + 1$.

can't factor!

Graph it (on your calculator)! How many solutions does the function have?

How can we find them by hand??

The Quadratic Formula!

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

$y = ax^2 + bx + c$

* Quadratics must be in standard form! before you can use the quad. formula!

Use the quadratic formula to solve.
Round solutions to the nearest hundredth.

① $-x^2 + x + 12 = 0$

② $4x^2 - x - 20 = 0$

① $-x^2+x+12=0$

$a=-1 \quad b=1 \quad c=12$

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

$$x=\frac{-1\pm\sqrt{(1)^2-4(-1)(12)}}{2(-1)}$$

$$x=\frac{-1\pm\sqrt{1+48}}{-2}$$

$$x=\frac{-1\pm\sqrt{49}}{-2}$$

$$x=\frac{-1\pm 7}{-2}$$

$x=\frac{-1+7}{-2}=\frac{6}{-2}=-3$

$x=\frac{-1-7}{-2}=\frac{-8}{-2}=+4$

② $4x^2-x-20=0$

$a=4 \quad b=-1 \quad c=-20$

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

$$x=\frac{1\pm\sqrt{(-1)^2-4(4)(-20)}}{2(4)}$$

$$x=\frac{1\pm\sqrt{321}}{8}$$

$x=-2.11$ & $x=2.36$

③ $x^2+6x=14$

$-14 \quad -14$

$x^2+6x-14=0$

$a=1 \quad b=6 \quad c=-14$

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

$$x=\frac{-6\pm\sqrt{6^2-4(1)(-14)}}{}$$

④ $-5x^2+x=13$

$-13 \quad -13$

$-5x^2+x-13=0$

$a=-5 \quad b=1 \quad c=-13$

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

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(-14)}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{92}}{2}$$

$$x = -7.80, \; x = 1.80$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(-5)(-13)}}{2(-5)}$$

$$x = \frac{-1 \pm \sqrt{-259}}{-10}$$

← can't do $\sqrt{}$ of a neg. #!

No Real Solution