QF 1a Quadratic Formula – Guided Notes Name: Key

Objective...

to understand the quadratic formula and how/when to use it.

Quadratic Formula

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

Ex: $y = x^2 + 8x + 12$

1. Determine the values of a, b, and c — 1. a = 1, b = 8, c = 12
2. Plug the values into the formula — 2. $x = \frac{-8 \pm \sqrt{8^2 - 4(1)(12)}}{2(1)}$
3. Simplify what's under the radical ($\sqrt{\ }$) — 3. $x = \frac{-8 \pm \sqrt{64 - 48}}{2(1)} \rightarrow x = \frac{-8 \pm \sqrt{16}}{2(1)}$
4. Simplify what's in the radical — 4. $x = \frac{-8 \pm 4}{2(1)}$
5. Simplify the denominator — 5. $x = \frac{-8 \pm 4}{2}$
6. Write the two separate equations — 6. $x = \frac{-8+4}{2}$ *and* $x = \frac{-8-4}{2}$
7. Simplify each equation — 7. $x = \frac{-4}{2} = \boxed{-2}$ *and* $x = \frac{-12}{2} = \boxed{-6}$

You Try:

a) $y = x^2 + 7x + 12$

$x = \frac{-7 \pm \sqrt{7^2 - 4(1)(12)}}{2(1)}$

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

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

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

P.S. Could have factored!

b) $y = x^2 + 8x + 11$

$x = \frac{-8 \pm \sqrt{8^2 - 4(1)(11)}}{2(1)}$

$x = \frac{-8 \pm \sqrt{20}}{2} = \frac{-8 \pm 2\sqrt{5}}{2}$

$\boxed{x = -4 \pm \sqrt{5}}$ Exact

$\boxed{x \approx -1.76 \\ x \approx -6.24}$ Approximate

1. $y = 4x^2 + 8x + 3$

$a=4 \quad b=8 \quad c=3$

$$x = \frac{-8 \pm \sqrt{8^2-4(4)(3)}}{2(4)}$$

$$x = \frac{-8 \pm \sqrt{16}}{8}$$

$$x = \frac{-8 \pm 4}{8}$$

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

$$x = \frac{-8-4}{8} = \boxed{\frac{-3}{2}}$$

2. $y = x^2 - 3x - 3$

$a=1 \quad b=-3 \quad c=-3$

$$x = \frac{3 \pm \sqrt{(-3)^2-4(1)(-3)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{21}}{2}$$

$\boxed{x \approx 3.79 \quad x \approx -.79}$

3. $y = 2x^2 - 7x - 3$

$a=2 \quad b=-7 \quad c=-3$

$$x = \frac{7 \pm \sqrt{(-7)^2-4(2)(-3)}}{2(2)}$$

$$x = \frac{7 \pm \sqrt{73}}{4}$$

$\boxed{x \approx 3.89 \quad x \approx -.39}$

4. $y = 9x^2 - 7x - 4$

$a=9 \quad b=-7 \quad c=-4$

$$x = \frac{7 \pm \sqrt{(-7)^2-4(9)(-4)}}{2(9)}$$

$$x = \frac{7 \pm \sqrt{193}}{18}$$

$\boxed{x \approx 1.16 \quad x \approx -.38}$