W-A2 Algebra 2 Week 26 4/3

$x^2 - 2x - 16 = 0$

$-4 * 4$
$-8 * 2$
$-16 * 1$

$\_ * \_ = -16$
$\_ + \_ = -2$

Quadratic Formula

$a = 1 \quad b = -2 \quad c = -16$

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

$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-16)}}{2(1)}$$

$$\frac{2 \pm \sqrt{4 + 64}}{2} = \frac{2 \pm \sqrt{68}}{2}$$

$\sqrt{68} = 2\sqrt{17}$

$\sqrt{4} \quad \sqrt{17}$

$2\sqrt{17}$

$$\frac{2 \pm 2\sqrt{17}}{2} \quad \div 2 \quad \div 2$$

$$1 \pm \sqrt{17}$$

$1 + \sqrt{17}, \quad 1 - \sqrt{17}$

Perfect Square

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, (121)

+3 +5 +7 +9 +11 +13 +15 +17 +19 +21

$x^2 - 2x - 16 = 0$

Find the vertex

$a = 1 \quad b = -2 \quad c = -16$

$h = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = \frac{2}{2} = 1$

vertex $(1, -17)$

$k = (1)^2 - 2(1) - 16$

$1 - 2 - 16$

$-1 - 16 = -17$

or.... take the average of the zeros

$\frac{1 + \sqrt{17} + 1 - \sqrt{17}}{2} = \frac{2}{2} = 1$

Quadratic Formula

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

h

discriminant

# of possible

$y = ax^2 + bx + c$

If....

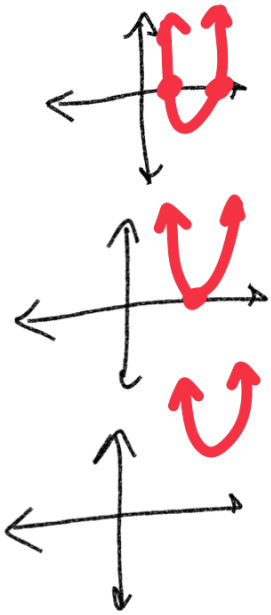
$b^2 - 4ac > 0 \rightarrow 2$

$\oplus$

$b^2 - 4ac = 0 \rightarrow 1$

$b^2 - 4ac < 0 \rightarrow 0$

$\ominus$



$x^2 + 4x - 18 = 0$

$a = 1 \quad b = 4 \quad c = -18$

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

$$\frac{-4 \pm \sqrt{(4)^2 - 4(1)(-18)}}{2(1)}$$

$$\frac{-4 \pm \sqrt{16 + 72}}{2} = \frac{-4 \pm \sqrt{88}}{2} = \frac{-4 \pm 2\sqrt{22}}{2} \quad \begin{matrix} \div 2 \\ \div 2 \end{matrix}$$

$$\frac{-2 \pm \sqrt{22}}{}$$

$\sqrt{88}$: $\sqrt{4} \cdot \sqrt{22} = 2\sqrt{22}$

$-2 + \sqrt{22}, \; -2 - \sqrt{22}$

Find zeros

Use the discriminant to confirm # of zeros

Discriminant: $b^2 - 4ac$

$88 \rightarrow$ 2 real solutions

$x^2 + 4x + 12 = 0$

$a = 1 \quad b = 4 \quad c = 12$

Find the zeros/solve.

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

h — disc.

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

$$\frac{-4 \pm \sqrt{16 - 48}}{2} = \frac{-4 \pm \sqrt{-32}}{2} \quad \begin{matrix} \div 2 \\ \div 2 \end{matrix}$$

$$\frac{-4 \pm 4i\sqrt{2}}{2 \div 2}$$

$$-2 \pm 2i\sqrt{2}$$

$\sqrt{-32}$: $\sqrt{-1} \cdot \sqrt{16} \cdot \sqrt{2}$

$i \cdot 4\sqrt{2} = 4i\sqrt{2}$

$3x^2 + 2x + 8 = 0$

$a = 3 \quad b = 2 \quad c = 8$

Discriminant

$-92 \rightarrow$ 0 real solution

$\sqrt{-92}$

$\sqrt{-1} \cdot \sqrt{4} \cdot \sqrt{23}$

$2i\sqrt{23}$

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

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

$$\frac{-2 \pm \sqrt{4 - 96}}{6} = \frac{-2 \pm \sqrt{-92}}{6}$$

$$\frac{-2 \pm 2i\sqrt{23}}{6} \quad \begin{matrix} \div 2 \\ \div 2 \end{matrix}$$

$$\boxed{\frac{-1 \pm i\sqrt{23}}{3}}$$