M-A2 Algebra 2 Week 26 4/15

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

$\_ * \_ = -16$

$\_ + \_ = -2$

Quadratic formula

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

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

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

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

$$\frac{2 \pm \sqrt{68}}{2}$$

$\sqrt{68}$

$\sqrt{4} \cdot \sqrt{17}$

$2\sqrt{17}$

$$\frac{2 \pm 2\sqrt{17}}{2} \quad \begin{matrix} \div 2 \\ \div 2 \end{matrix}$$

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

$1 + \sqrt{17}$ and $1 - \sqrt{17}$

Perfect Squares

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

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

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

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

or... Discriminant

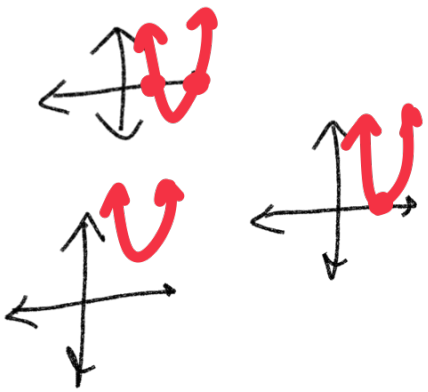
$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-16)}}{2(1)}$

h

$\frac{2}{2} = 1$

$ax^2 + bx + c$ ← # of possible zeros

If....



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

⊕

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

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

⊖

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

Find zeros

Use the discriminant to confirm # of zeros

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

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

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

$$\frac{-4 \pm \sqrt{16 + 72}}{2} =$$

$$\frac{-4 \pm \sqrt{88}}{2}$$

$\sqrt{88}$

$\sqrt{4} \cdot \sqrt{22}$

$2\sqrt{22}$

$$\frac{-4 \pm 2\sqrt{22}}{2}$$ ($\div 2$, $\div 2$)

$$\frac{-4 \pm 2\sqrt{22}}{2 \div 2}$$

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

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

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

Find the zeros/solve

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

h

discr.

$$\frac{-4 \pm \sqrt{(4)^2-4(1)(12)}}{2(1)} = \frac{-4 \pm \sqrt{16-48}}{2}$$

$$\frac{-4 \pm \sqrt{-32}}{2}$$

$\sqrt{-32}$

$\sqrt{-1} \cdot \sqrt{32}$

i $\quad \sqrt{16}\ \sqrt{2}$

$4i\sqrt{2}$

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

$$\frac{-2 \pm 2i\sqrt{2}}{1}$$

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

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

Find the zeros

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

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

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

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

$\sqrt{\ominus} \rightarrow i$

$-3 * -3 = \ominus$

~~$-3 * 3$~~

$\sqrt{-92}$

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

$i \cdot 2\sqrt{23} \rightarrow 2i\sqrt{23}$

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

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