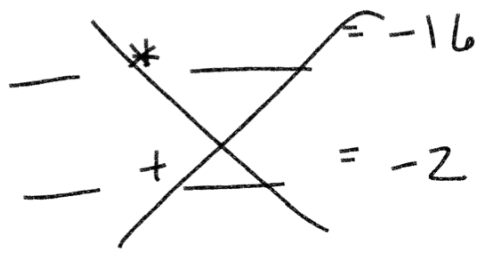


$\frac{16}{4*4}$
 $\frac{2*8}{2*8}$
 $\frac{1*16}{1*16}$

$x^2 - 2x - 16 = 0$ ↖ y-int

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



Quadratic Formula

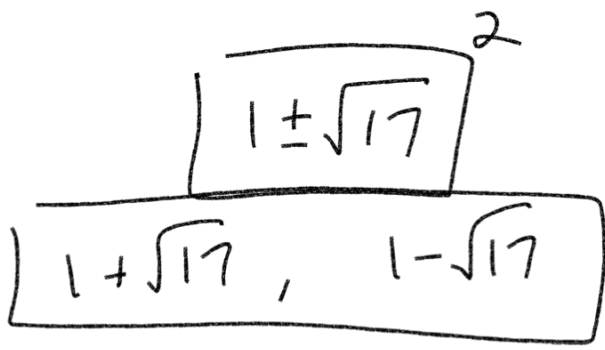
$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



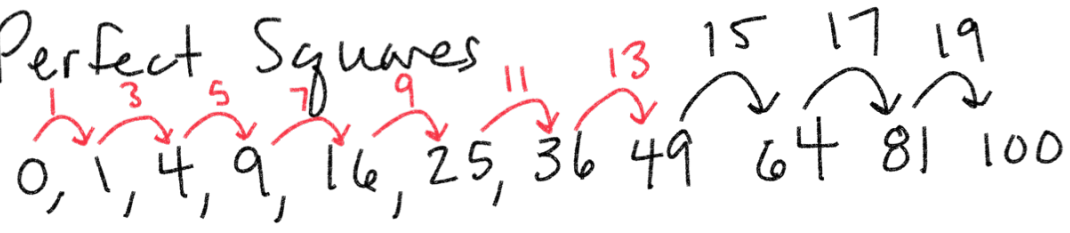
$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-16)}}{2(1)}$$

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

$$\frac{1}{2} \pm \frac{1}{2} \sqrt{17}$$



Perfect Squares



$$x^2 - 2x - 16 = 0 \quad \text{vertex } (1, -17)$$

$$x = 1$$

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

$$1 - 2 - 16$$

$$-1 - 16 = -17$$

② up to 2 solutions

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

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

$$h = \frac{-b}{2a}$$

$$\frac{-(-2)}{2(1)} = \frac{2}{2} = 1$$

Quadratic Formula

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

discriminant

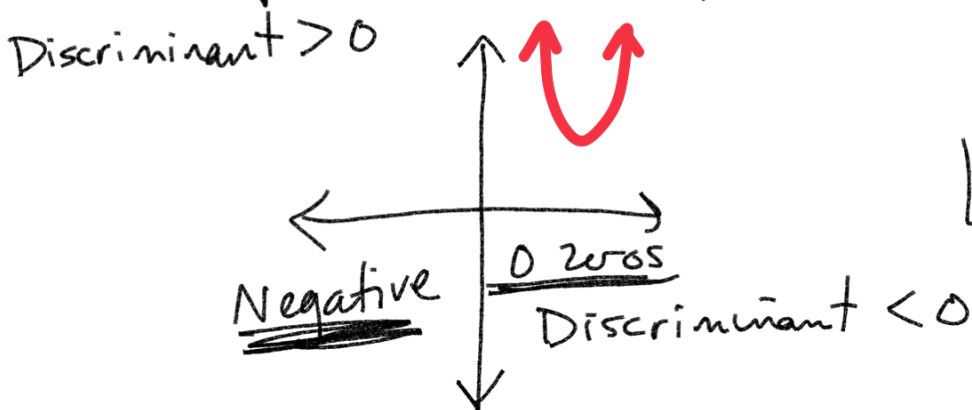
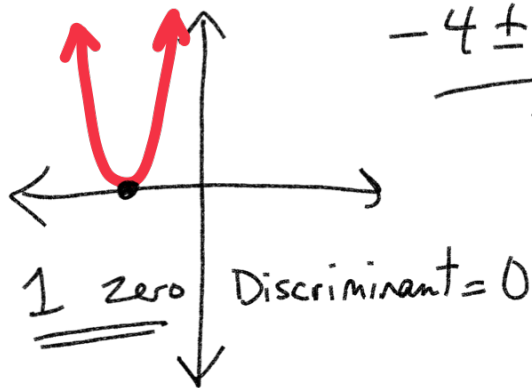
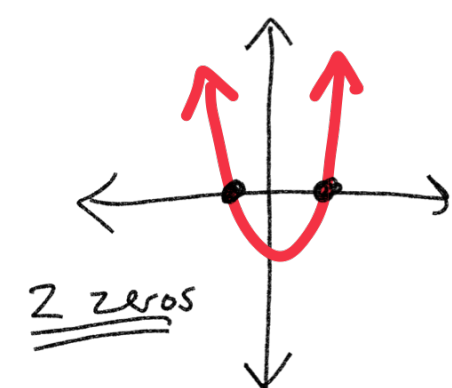
$$\frac{-4 \pm \sqrt{(4)^2 - 4(1)(-18)}}{2(1)} = \frac{-4 \pm \sqrt{16 + 72}}{2}$$

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

$\sqrt{88}$
 $\sqrt{4} \sqrt{22}$
 \downarrow
 $2\sqrt{22}$

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

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



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

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

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

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

$$\frac{-4 \pm \sqrt{16 - 48}}{2}$$

$$\text{Discriminant} = -32$$

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

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

\emptyset zeros

$$\begin{aligned} &\sqrt{32} \\ &\wedge \\ &\sqrt{16} \cdot \sqrt{2} \\ &4\sqrt{2} \end{aligned}$$

$$\sqrt{-1} = i$$

$$\begin{aligned} \frac{-4 \pm \sqrt{-32}}{2} &= \frac{-4 \pm i\sqrt{32}}{2} \\ &= \frac{-4 \pm 4i\sqrt{2}}{2 \div 2} \end{aligned}$$

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

Quadratic
Formula

h of
vertex

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

Discriminant
How many
zeros

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

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

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

$$\text{Discriminant} = -92$$

∅ zeros

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

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

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

$$\frac{-2 \pm 2i\sqrt{23}}{6}$$

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

$$\sqrt{-92}$$

$$\sqrt{-92} = \sqrt{92} \cdot \sqrt{-1}$$

$$\sqrt{92} \cdot i$$

$$\sqrt{4} \sqrt{23} \cdot i$$

$$2i\sqrt{23}$$