

$$y = x^2 + 4x + 3$$

2.) discriminant

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

$$a = 1$$

$$b^2 - 4ac$$

$$b = 4$$

$$(4)^2 - 4(1)(3)$$

$$c = 3$$

$$4$$

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

positive discriminant

↓  
means

nature of roots: 2 rational roots

$$x = \frac{-4 \pm 2}{2} = \begin{cases} \frac{-4+2}{2} = -1 \\ \frac{-4-2}{2} = -3 \end{cases}$$

$$\text{roots} = \{-1, -3\}$$

quadratic formula

3.)  $y = x^2 + 4x$

$$a = 1$$

$$b^2 - 4ac$$

$$b = 4$$

$$(4)^2 - 4(1)(0)$$

$$c = 0$$

$$16$$

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

positive discriminant

↓  
means

nature of roots: 2 rational roots

$$x = \frac{-4 \pm 4}{2} = \begin{cases} \frac{-4+4}{2} = 0 \\ \frac{-4-4}{2} = -4 \end{cases}$$

$$\text{roots} = \{0, -4\}$$

$\frac{\sqrt{40}}{2\sqrt{10}}$  simplify



4.)  $y = 2x^2 - 4x - 3$

$a = 2$   
 $b = -4$   
 $c = -3$

$b^2 - 4ac$   
 $(-4)^2 - 4(2)(-3)$

$40$

positive discriminant  
means

nature of roots: 2 irrational roots

Quadratic formula  
 $x = \frac{-(-4) \pm \sqrt{40}}{2(2)}$

$x = \frac{4 \pm 2\sqrt{10}}{4}$  simplify

roots  
 $x = 1 \pm \frac{\sqrt{10}}{2}$

or  $1 \pm \frac{1}{2}\sqrt{10}$

change to decimals  
round to the nearest  
thousandths

$1 + \frac{\sqrt{10}}{2}$

$1 - \frac{\sqrt{10}}{2}$

$\approx 2.581$

$\approx -0.581$

roots as decimals



5.)  $y = x^2 + 2x - 5$

$a = 1$   
 $b = 2$   
 $c = -5$

$b^2 - 4ac$   
 $(2)^2 - 4(1)(-5)$

$24$

positive discriminant  
means

nature of roots: 2 irrational roots

$x = \frac{-2 \pm \sqrt{24}}{2(1)}$  simplify

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

roots  
 $x = -1 \pm \sqrt{6}$

$-1 + \sqrt{6}$   
 $\approx 1.450$

$-1 - \sqrt{6}$   
 $\approx -3.450$

$\frac{\sqrt{24}}{2}$   
 $\frac{\sqrt{4 \cdot 6}}{2}$   
 $2\sqrt{6}$