Quadratics with no x-intercepts:

When a parabola has no x-intercepts, we tend to talk about these intercepts as being **imaginary**.
In mathematics, imaginary numbers are an actual thing!

Imaginary Numbers: a # that when squared has a negative result

$i = \sqrt{-1}$

When we come across the square root of a negative number, we know this is impossible to evaluate, so we kick out the negative and turn it into an i.

Solve: $y = x^2 - 4x + 5$ $\quad a=1 \quad b=-4 \quad c=5$

$$0 = x^2 - 4x + 5$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(5)}}{2(1)}$$

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

$$x = \frac{4 \pm i\sqrt{4}}{2}$$

$$x = \frac{\cancel{4}^{2} + \cancel{2}^{1} i}{\cancel{2}_{1}} = 2 + i$$

$$x = \frac{\cancel{4}^{2} - \cancel{2}^{1} i}{\cancel{2}_{1}} = 2 - i$$

Solve: $y = 5(x - 1)^2 + 25$

$$0 = 5(x-1)^2 + \cancel{25}$$
$$-25 \qquad\qquad \cancel{-25}$$

$$\frac{-25}{5} = \frac{\cancel{5}(x-1)^2}{\cancel{5}}$$

$$\pm\sqrt{-5} = \pm\sqrt{(x-1)^2}$$

$$x - 1 = \pm\sqrt{5}i$$

$$x - 1 = \sqrt{5}i$$
$$+1 \qquad +1$$

$$(\sqrt{5}i + 1, 0)$$

$$x - 1 = -\sqrt{5}i$$
$$+1 \qquad +1$$

$$(-\sqrt{5}i + 1, 0)$$

Solve: $x^2 + 6x + 4 = -x^2 + 7$

$$\left(\frac{-3+\sqrt{15}}{2}, 0\right)$$

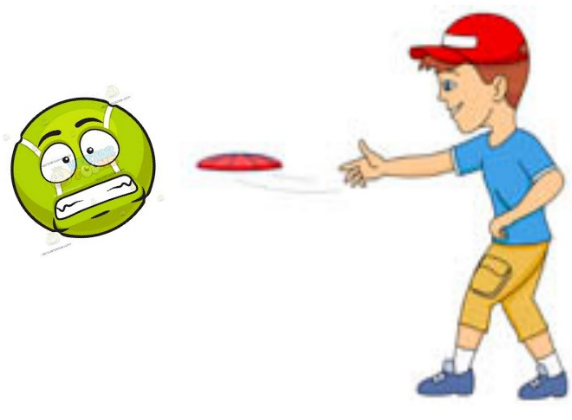
$$2x^2 + 6x - 3 = 0$$

$$\left(\frac{-3-\sqrt{15}}{2}, 0\right)$$

$A = 2 \quad B = 6x \quad C = -3$

$$\frac{-b \pm \sqrt{6 + 4(2)(-3)}}{2(2)}$$

A tennis ball is tossed in the air. Its trajectory can be modeled by $y = -x^2 - 3x + 2$. A freesbie is thrown at the same time. Its trajectory can be modeled by $y = x - 2$. At what time would the tennis ball collide with the freesbie?



Desmos Review Activity

1. Grab a partner

2. Grab a laptop

3. Go to www.student.desmos.com

4. Type the Class Code: **VFUPP** **all caps**