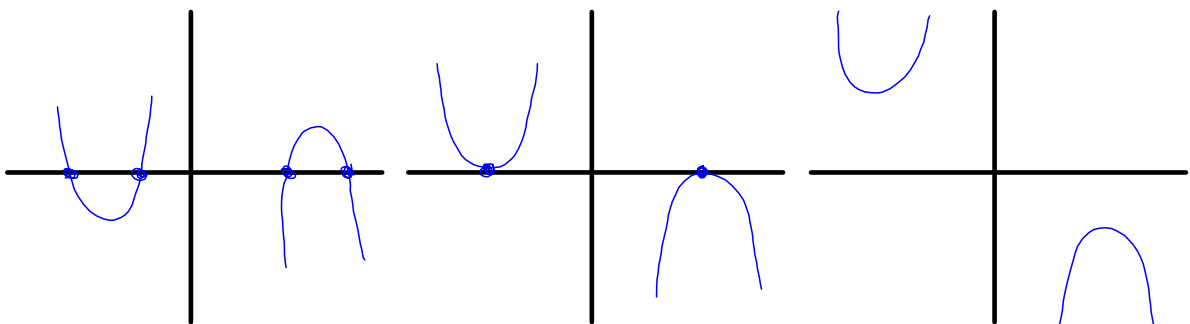


Are you ready for the Quiz?

## X-INTERCEPTS OF A QUADRATIC RELATION

Learning goals  
- Finding zeros using equations

Parabolas can be on a graph 6 different ways.



y-coordinate is zero.

Another name for x-intercepts is zeros

## How do we find zeros?

What form of the parabola do we need?

Factored form

Find the zeros by factoring

$$y = x^2 + 5x + 6$$

Steps:

$$0 = x^2 + 5x + 6$$

1. Set  $y=0$

$$0 = (x + 3)(x + 2)$$

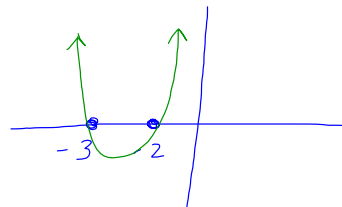
2. Factor

$$x + 3 = 0 \quad x + 2 = 0$$

3. Set each bracket to zero

$$x = -3 \quad x = -2$$

4. Solve for  $x$ .



Find the zeros...

sketch the parabola

verify using TI-Nspire.

$$y = x^2 + x - 12$$

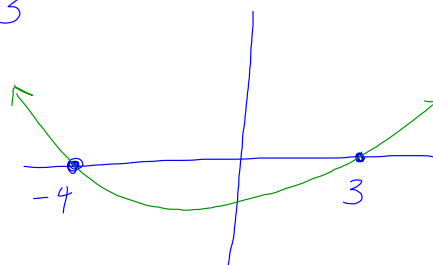
$$0 = x^2 + x - 12$$

$$0 = (x + 4)(x - 3)$$

$$\begin{array}{r} 4 \times -3 = -12 \\ 4 + -3 = 1 \end{array}$$

$$x + 4 = 0 \\ x = -4$$

$$x - 3 = 0 \\ x = 3$$



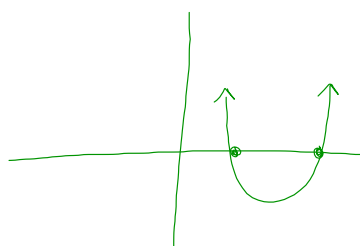
**On the Boards...**

Find the zeros.

$$y = x^2 - 9x + 18$$

$$0 = (x-3)(x-6)$$

$$\begin{array}{cc} \downarrow & \downarrow \\ x=3 & x=6 \end{array}$$



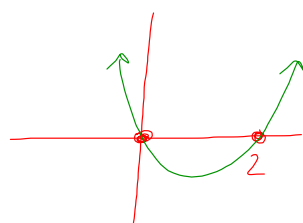
$$y = 3x^2 - 6x$$

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

$$0 = 3(x)(1x-2)$$

$$\begin{array}{c} \downarrow \\ x-2=0 \\ x=2 \end{array}$$

$$\begin{array}{c} (x-0) \\ \downarrow \\ x-0=0 \\ x=0 \end{array}$$



**Finding Factored Form**  $\rightarrow y = a(x-t)(x-s)$

The parabola has the equation  $y = 2x^2 - 4x - 6$

a. write the equation in factored form

$$y = 2(x^2 - 2x - 3)$$

$$y = 2(x-3)(x+1)$$

b. determine the zeros

$$0 = 2(x-3)(x+1)$$

$$\begin{array}{c} \downarrow \\ x-3=0 \\ x=3 \end{array}$$

$$\begin{array}{c} \downarrow \\ x+1=0 \\ x=-1 \end{array}$$

c. determine the axis of symmetry

$$\frac{3 + (-1)}{2} = \frac{2}{2} = 1$$

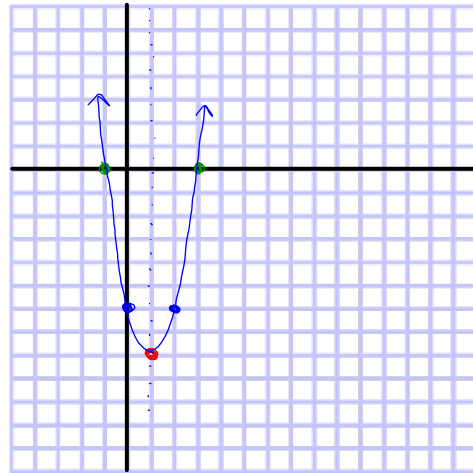
d. determine the vertex

$$\begin{aligned} x &= 1 \\ y &= 2(1)^2 - 4(1) - 6 \\ &= 2(1) - 4(1) - 6 \\ &= 2 - 4 - 6 \\ &= -8 \end{aligned} \quad \therefore (1, -8)$$

e. determine the step pattern

$$a = 2 \quad 2, 6, 10$$

f. graph the parabola



g. write the equation in vertex form

$$\begin{aligned} y &= a(x - h)^2 + k \\ y &= 2(x - 1)^2 - 8 \end{aligned}$$

## On the Boards...

Find the zeros of each quadratic relation.

- a)  $y = (x - 5)(x + 3)$  5, -3      b)  $y = (x - 4)(x - 1)$  4, 1  
 c)  $y = 5(x - 9)(x - 9)$  9      d)  $y = 3(x - 7)(x + 6)$  7, -6  
 e)  $y = -2(x + 8)(x + 2)$  -8, -2      f)  $y = -3x(x + 5)$  0, -5

# Homework

Pg. 271 # 1, 3, 4ace, 7ab