

# Warm-up

1. Solve by factoring:  $3x^2 - 16x - 7 = 5$

$3x^2 - 16x - 12 = 0$

2. Solve by factoring:  $2x^2 = 32$

$2x^2 - 32$

$2(x^2 - 16)$

$(x-4)(x+4)$

$(x=4)(x=-4)$

# Graphing Quadratic Equations

A decorative graphic consisting of a solid teal horizontal bar that spans the width of the slide. Below this bar, on the right side, are several horizontal lines of varying lengths and colors, including teal and white, creating a layered, modern look.

# Graphing a Quadratic Equation Review

- The anatomy of a parabola:

**Zeros, Roots, Solution,  
x-intercepts**

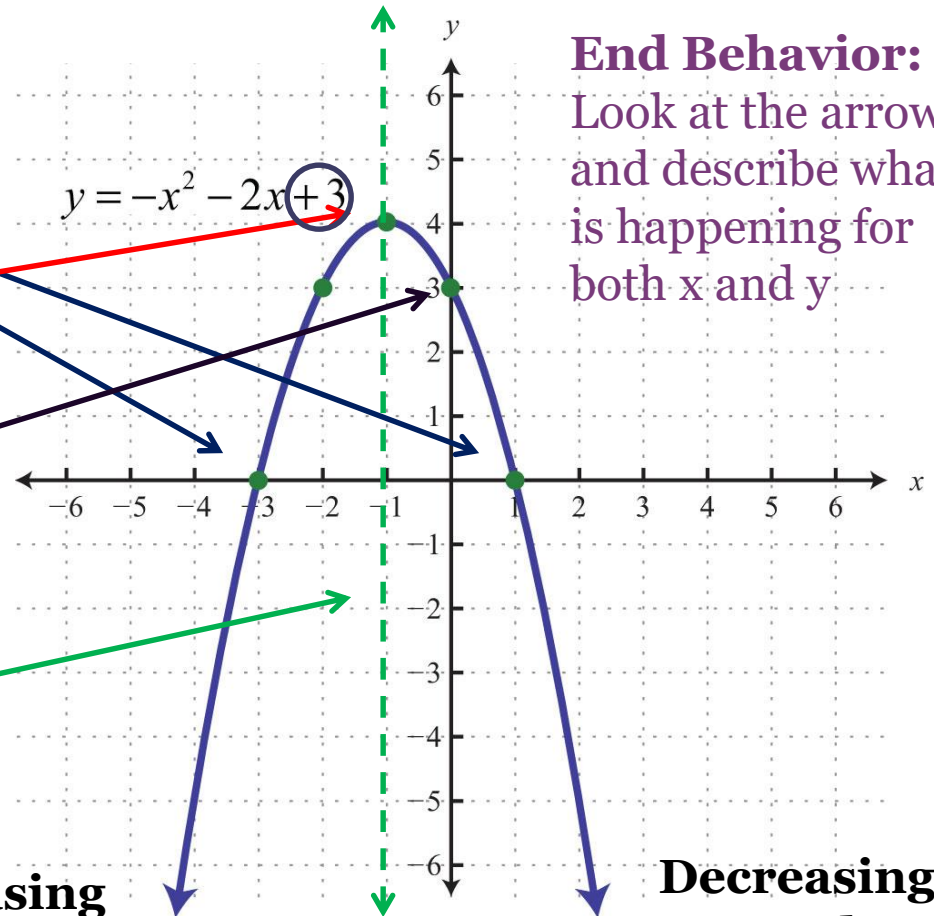
**Vertex**

**y-intercept**

**Axis of  
Symmetry**

**Increasing  
Interval**

**Decreasing  
Interval**



# Graphing Quadratics

$$y = ax^2 + bx + c$$

- Step 1: Find the axis of symmetry  $x = -\frac{b}{2a}$
- Step 2: **Substitute** the a.o.s. in for x to find y
- Step 3: **Plot** the vertex (a.o.s., y found)
- Step 4: Plot the y-intercept **(0, c)**
- Step 5: **Reflect** this point over the a.o.s
- Step 6: **Draw** a curve through your three points!

# Graphing a parabola

Finding the zeros, roots, solutions, and x-intercepts:

Solve the equation by factoring.

$$y = x^2 - 6x + 8$$

$$(x-4)(x-2)$$

$$x=4 \quad x=2 \quad \text{zeros}$$

**Solutions:**

$$x = 4, x = 2$$

**x-intercepts:**

$$(4, 0), (2, 0)$$

# Graphing a parabola

- Find the y-intercept of the quadratic.

$$y = x^2 - 6x + 8 \quad \text{y-int } \underline{x=0}$$

$$y = 0^2 - 6(0) + 8$$

$$\underline{y = 8}$$

$$(0, 8)$$

**y-intercept:**  
**(0, 8)**

# Graphing a parabola

- Find the axis of symmetry of the quadratic.

$$y = x^2 - 6x + 8$$

- Hint: use  $x = \frac{-b}{2a}$   $x = \frac{6}{2(1)}$   $x = 3$

$$x = 3$$

# Graphing a parabola

- Solving for the vertex.

$$y = x^2 - 6x + 8$$

Use  $x = -\frac{b}{2a}$  first

$$x = \frac{6}{2(1)} = 3$$

**Vertex is (3, -1)**



# Graphing a parabola

- Determine if the parabola has a maximum or a minimum and the value.

$$y = x^2 - 6x + 8$$

**Minimum, -1**

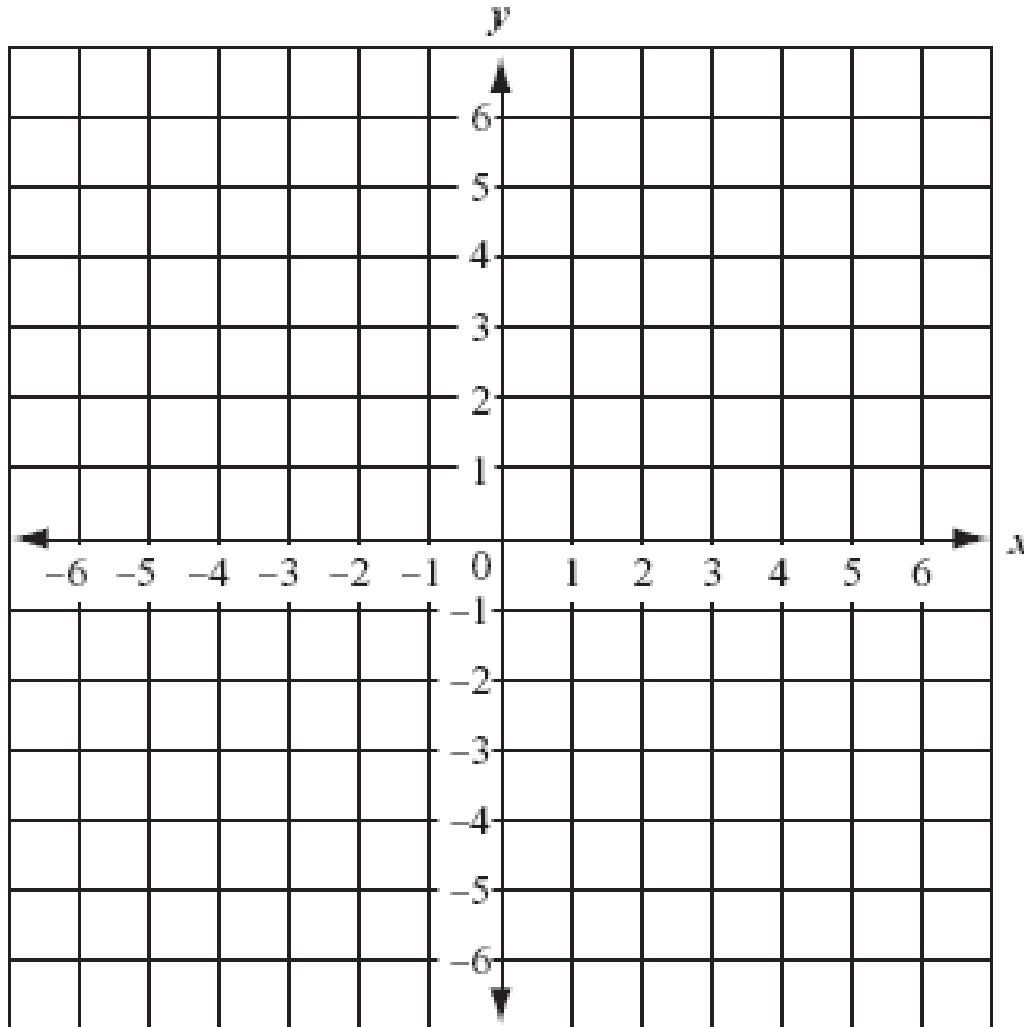
# Graphing a parabola

- Determine the end behavior of the graph

$$y = x^2 - 6x + 8$$

*As  $x \rightarrow \infty$ ,  $y \rightarrow \infty$ .*  
*As  $x \rightarrow -\infty$ ,  $y \rightarrow \infty$ .*

# Put it all together to graph



$$y = x^2 - 6x + 8$$

**Vertex:**

**Domain:**

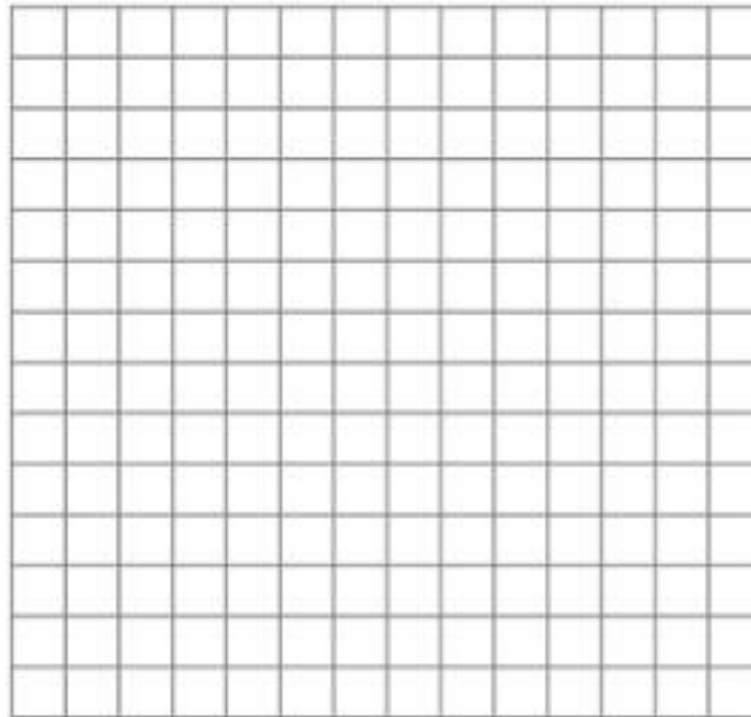
**Range:**

**Increasing Interval:**

**Decreasing Interval:**

**End Behavior:**

- For the equation  $y = x^2 - 4x + 3$  find the:
- 1. solution      2. x-intercepts      3. y-intercept
- 4. AOS      5. vertex      6. max/min
- 7. Graph:



**Domain:**

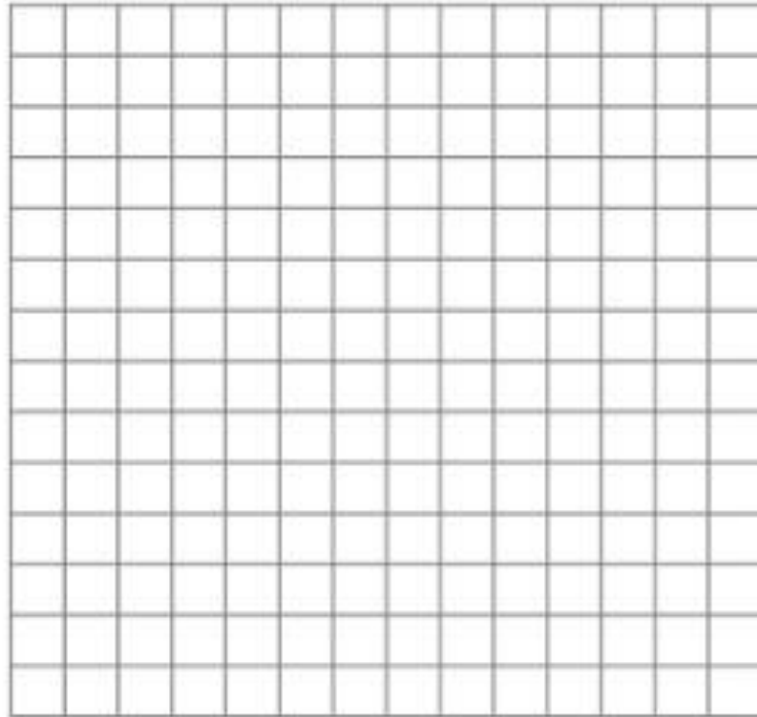
**Range:**

**Increasing Interval:**

**Decreasing Interval:**

**End Behavior:**

- For the equation  $y = -2x^2 + 2x + 12$  find the:
- 1. solution      2. x-intercepts      3. y-intercept
- 4. AOS      5. vertex      6. max/min
- 7. Graph:



**Domain:**

**Range:**

**Increasing Interval:**

**Decreasing Interval:**

**End Behavior:**

- For the equation  $y = 15x^2 + x$  find the:
- 1. solution      2. x-intercepts      3. y-intercept
- 4. AOS      5. vertex      6. max/min

- 7. Graph:



**Domain:**

**Range:**

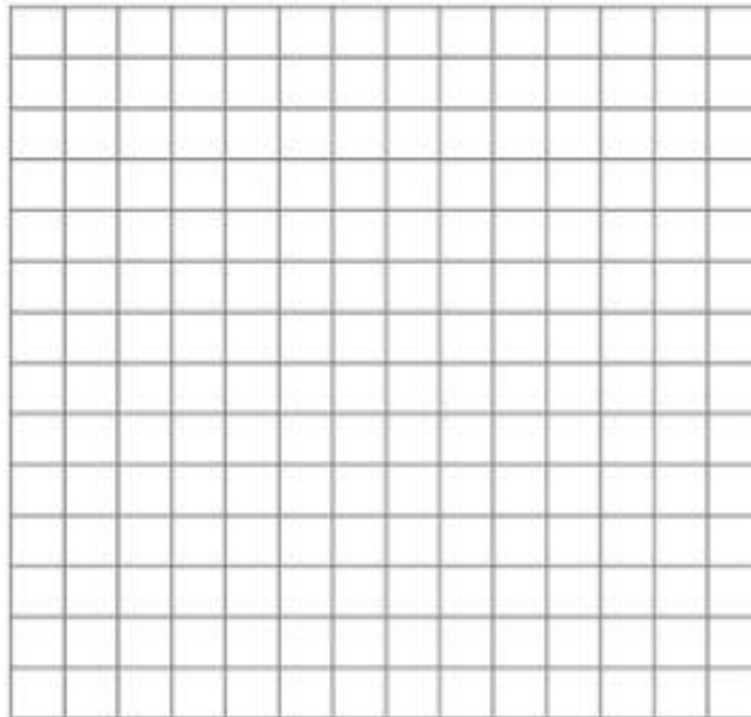
**Increasing Interval:**

**Decreasing Interval:**

**End Behavior:**

- For the equation  $y = 4x^2 - 9$  find the:
- 1. solution      2. x-intercepts      3. y-intercept
- 4. AOS      5. vertex      6. max/min

- 7. Graph:



**Domain:**

**Range:**

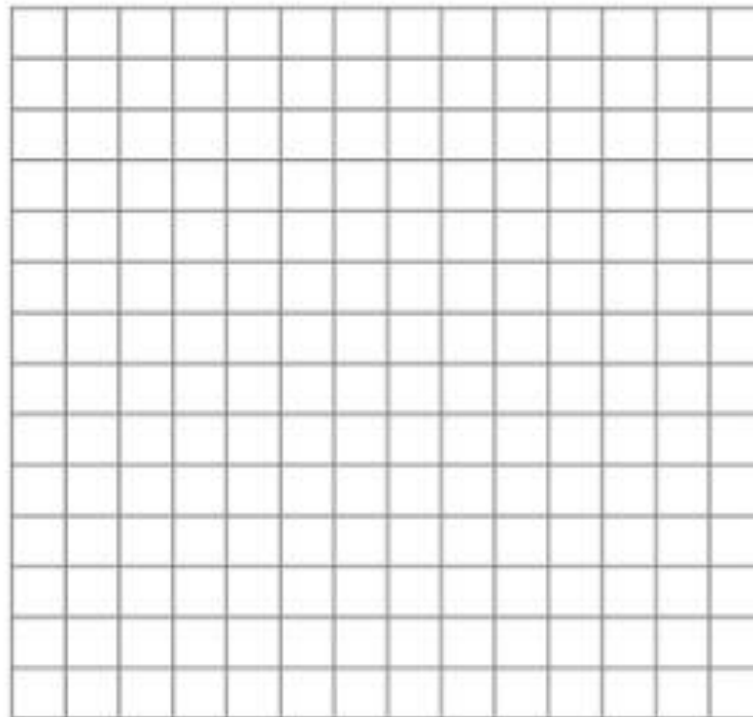
**Increasing Interval:**

**Decreasing Interval:**

**End Behavior:**

- For the equation  $y = 2x^2 + 3x + 1$  find the:
- 1. solution      2. x-intercepts      3. y-intercept
- 4. AOS      5. vertex      6. max/min

- 7. Graph:



**Domain:**

**Range:**

**Increasing Interval:**

**Decreasing Interval:**

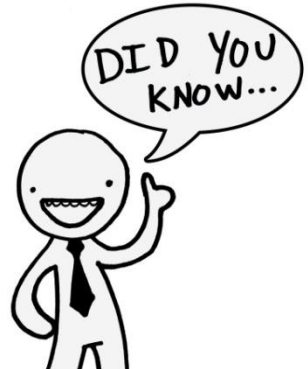
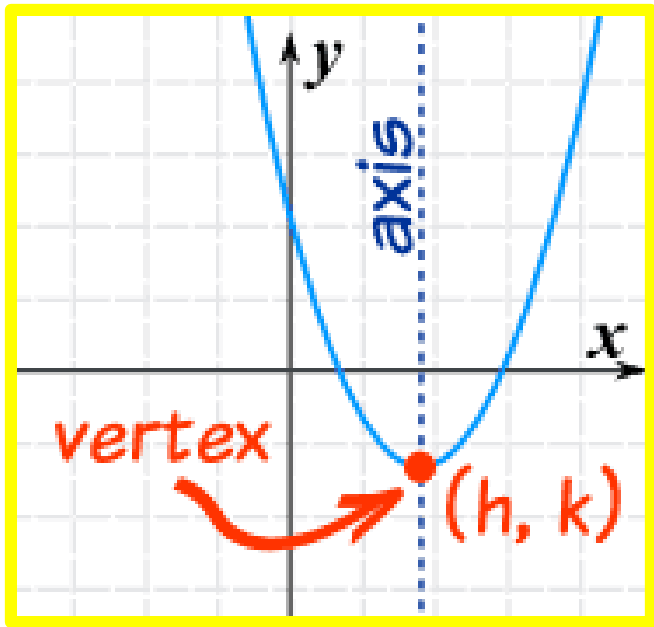
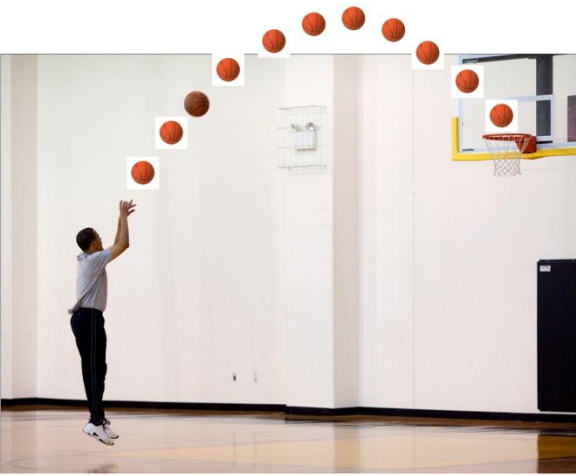
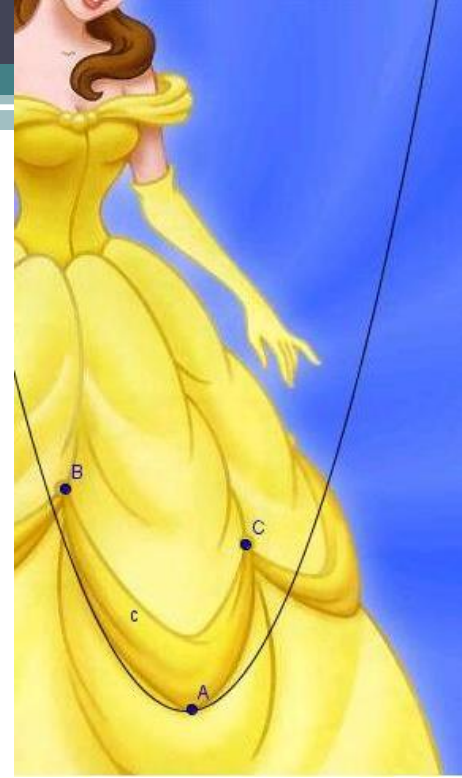
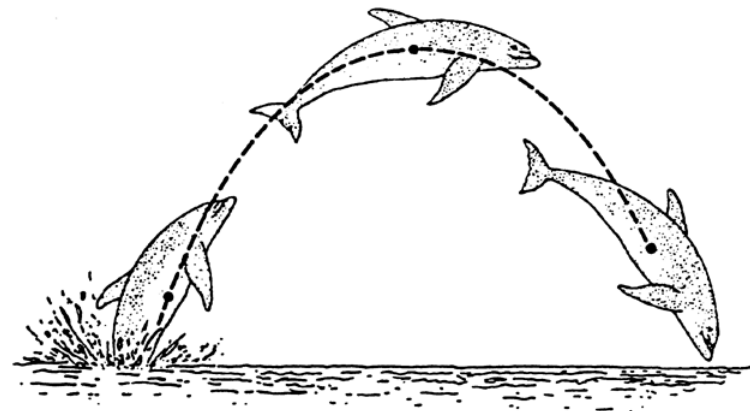
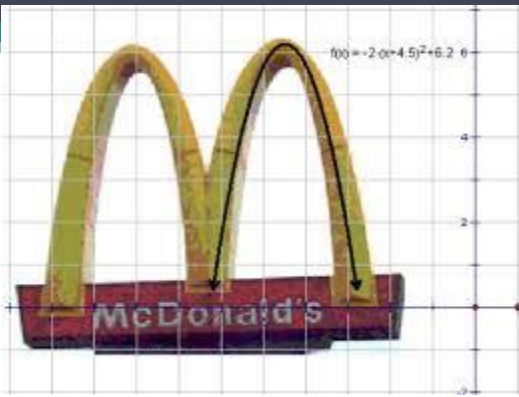
**End Behavior:**

Teacher  
Note:  
Use if  
needed



# Let's see where quadratics come into play in the real world...

- <https://www.youtube.com/watch?v=lbMir1UAO4I>
- <https://www.youtube.com/watch?v=ReHwNtoRMrY>



# Homework

**HOMEWORK 4-1**

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**TUTORIALS**

**ALL HUSKY HELP TIMES**

**TUESDAY AND WEDNESDAY  
AFTERNOON**

**2:20-3:20**