

## **Math Virtual Learning**

Algebra 1

April 10, 2020



#### Algebra 1 Lesson: April 10, 2020

#### Learning Target: Students will identify key parts of a quadratic function.



#### Bell Ringer:

#### 1. Solve the system of equations.

A) 12x + 18y = -12 2x + 3y = -2

Hint: Elimination method. -Multiply one of the lines to get a variable to cancel out

) 
$$y = -4x + 11$$
  
 $6x + 4y = 4$ 

Hint: Substitution method. -Substitute the y equals expression in for y in the other equation.(Use Parenthesis)

2. Explain similarities/differences between the two functions? Solve both equations

B

A)  $12x^2 - 27x = 0$  B)  $12x^2 - 27 = 0$ 

Answers are at the beginning of Practice Video



#### Learning Target:

#### Students will identify key parts of a quadratic function.

#### Let's Get Started on the Lesson:

Watch Video: Identifying key parts of a Quadratic Function

Practice Video:

You can go ahead and try to work through problems on the next slides before watching the video.

### Practice: Identify the key parts of the quadratic:



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• Up or Down

x

-3

-2

-1

0

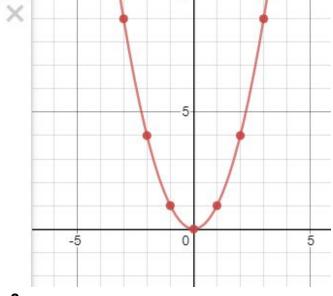
1

2

3

- y-intercept: ○ ( , )
- Axis of Symmetry:
   x = \_\_\_\_\_
- - Max or Min
- Domain:
  - o \_\_\_\_≤x≤\_\_\_\_
- Range:
- \_\_\_\_ ≤ y ≤ \_\_\_\_
   End Behavior:
  - As  $x \to -\infty$ ,  $y \to$
  - $\circ \quad \text{As } x \to \infty, \ y \to \_\_\_$
- # of Zeros/X-Intercepts \_\_\_\_\_

Example 1:  $\sum_{x} x^2$  $\mathbf{v} = \mathbf{x}^2$ 9 4 1 0 1 4 9



Next graph is  $y = -x^2$ 

-Notice a difference?

-What do you think the difference will change about the graph?



- Opens:
  - Up or Down
- y-intercept: • ( , )
- Axis of Symmetry: • x = \_\_\_\_
- Vertex: • ( , ) • Max or Min
- Domain:
- \_\_\_\_ ≤ x ≤ \_\_\_\_
   Range:

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- \_\_\_\_ ≤ y ≤ \_\_\_\_
- End Behavior:

• As 
$$x \to -\infty$$
,  $y \to$ 

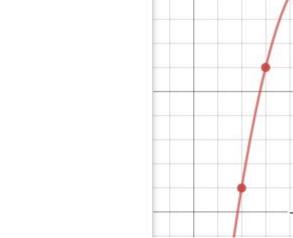
- As  $x \to \infty$ ,  $y \to$
- # of Zeros/X-Intercepts \_\_\_\_\_

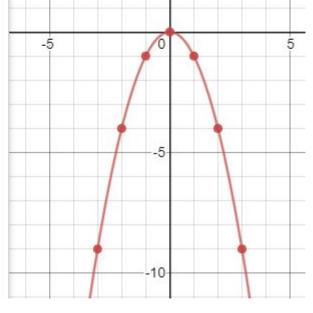
 $-x^2$ х Example 2:  $v = -x^2$ -9 -3-2-4-1-10 0 1 -1-42

-9

3

**Practice:** Identify the key parts of the quadratic:





Next graph is  $y = -2x^2$ 

-What do you know about the next graph using what we just went over?

-What do you think the 2 out in front will do to the table values?

#### Inspiring Greatness **Practice:** Identify the key parts of the quadratic: NDEPENDENCE SCHOOL DISTRICT Example 3: Opens: x $-2x^{2}$ • Up or Down $v = -2x^2$ y-intercept: -3-18-5 • ( , ) -2-8Axis of Symmetry: • **x =**\_\_\_\_ -1-2Vertex: 0 0 • ( , ) • Max or Min 1 -2 Domain: ○ \_\_\_\_≤ x ≤ \_\_\_\_ 2 -8 Range: 3 -18o \_\_\_\_≤y≤ End Behavior: • As $x \to -\infty$ , $y \to -\infty$ Next graph is $y = 1/2x^2$ • As $x \to \infty$ , $y \to \_$ -What do you know about the next graph? # of Zeros/X-Intercepts \_\_\_\_ -What do you think the 1/2 out in front will do to the table values?

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Inspiring Greatness	Ide		ractice: ne key parts of the quadratic:
<ul> <li>Opens:</li> <li>Up or Down</li> </ul>	x	$\swarrow \frac{1}{2}x^2$	Example 4:
<ul> <li>y-intercept:</li> <li>( , )</li> </ul>	-3	4.5	$y = 1/2x^2$
<ul> <li>Axis of Symmetry:</li> </ul>	-2	2	
<ul> <li> x =</li> <li>Vertex:</li> </ul>	-1	0.5	
o ( , )	0	0	
<ul> <li>Max or Min</li> <li>Domain:</li> </ul>	1	0.5	
○≤x≤	2	2	
<ul> <li>Range:</li> <li>○≤ y ≤</li> </ul>	3	4.5	-5 0 5
• End Behavior: • As $x \to -\infty$ , $y \to \_$ • As $x \to \infty$ , $y \to \_$ • As $x \to \infty$ , $y \to \_$			At graph is $\mathbf{y} = \mathbf{x}^2 + 1$ Hice anything we haven't seen yet?

# of Zeros/X-Intercepts \_\_\_\_

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-Name one thing you can state about the graph? -What do you think the difference will change about the graph?

Inspiring Greatness	Ider		actice: key parts of the o	quadratic:
<ul> <li>Opens:</li> <li>Up or Down</li> </ul>	x	$x^2 + 1$	×	
● y-intercept: ○ ( , )	-3	10	Example 5:	10
<ul> <li>Axis of Symmetry:</li> </ul>	-2	5	$y = x^2 + 1$	10
<ul> <li>○ x =</li> <li>Vertex:</li> </ul>	-1	2		
o ( , )	0	1		
<ul><li>Max or Min</li><li>Domain:</li></ul>	1	2		5
<ul> <li>○ ≤ x ≤</li> <li>• Range:</li> </ul>		5		
• Range: • $\sum_{x \to -\infty} \le y \le \underline{\qquad}$ • End Behavior: • As $x \to -\infty$ , $y \to \underline{\qquad}$		10		
• As $x \to \infty$ , $y \to \_$ • # of Zeros/X-Intercepts			graph is $\mathbf{y} = \mathbf{x}^2 - 3$	aph compared to example 5?

0

-What is going to happen to the graph compared to example 5? -Name one thing you can state about the graph?

Inspiring Greatness		Prac	tice:		
	denti	fy the ke	ey parts of t	he qua	dratic:
Opens:     Output	x	$\sqrt{x^2 - 3}$		×	
<ul> <li>Up or Down</li> <li>y-intercept:</li> </ul>	-3	6	Example 6:		5
<ul><li>○ ( , )</li><li>Axis of Symmetry:</li></ul>	-2	1	$\mathbf{y} = \mathbf{x}^2 - 3$		
• x =	-1	-2	J		
● Vertex: ○ ( , )	0	-3			
<ul> <li>Max or Min</li> <li>Domain:</li> </ul>	1	-2		-5	
o≤ x ≤	2	1		-9	
<ul> <li>Range:</li> <li>○ ≤ y ≤</li> </ul>	3	6			
<ul> <li>End Behavior:</li> <li>As x → -∞, y →</li> <li>As x → ∞, y →</li> <li># of Zeros/X-Intercepts</li> </ul>		-Notice a	aph is <b>y = x<sup>2</sup> + x</b> anything we haven't s one thing you can stat		e graph?

-What do you think the difference will change about the graph?

Inspiring Greatness	_	Due	4.000		
	ldenti <sup>.</sup>		e <mark>tice:</mark> The parts of the second s	of the qu	adratic:
Opens:     Oup or Down	x	$\sqrt{2}x^2 + x$		×	
● y-intercept: ○ ( , )	-3	6	Example 7:	-	10
<ul> <li>Axis of Symmetry:</li> </ul>	-2	2	$y = x^2$	+ x	
<ul> <li>o x =</li> <li>● Vertex:</li> </ul>	-1	0			\/
o ( , )	0	0			5
<ul> <li>Max or Min</li> <li>Domain:</li> </ul>	1	2			
○≤ x ≤	2	6			
<ul> <li>Range:</li> <li> ≤ y ≤</li> </ul>	3	12			<b>1</b>
End Behavior:		3	•		
• As $x \to -\infty$ , $y \to \_$ • As $x \to \infty$ , $y \to \_$ • # of Zeros/X-Intercepts _ •	_	-Notice a -What is	aph is <b>y = x<sup>2</sup> -</b> anything we hav going to happe one thing you ca	ven't seen yet? In to the graph	compared to example 7?

# Inspiring Greatness Practice: Identify the key parts of the quadratic:

X

-3

-2

-1

0

1

2

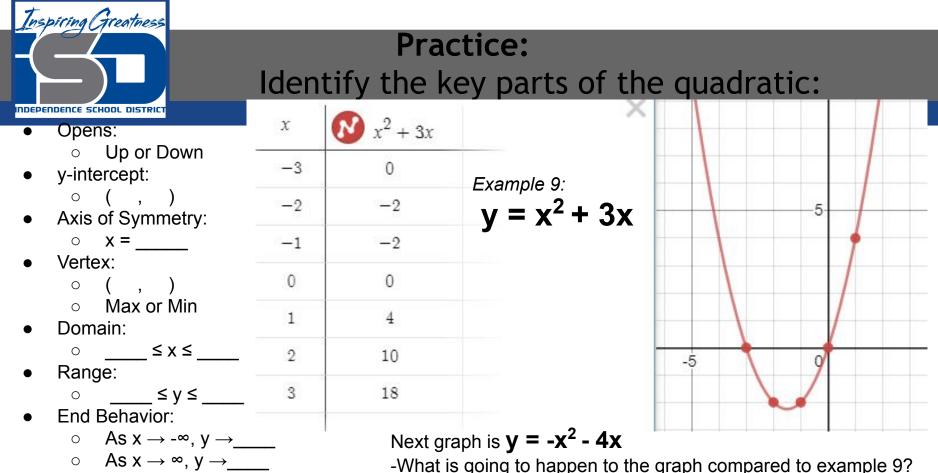
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- Opens:
   Opens Up or Down
- y-intercept: ○ ( , )
- Axis of Symmetry:
  - x = \_\_\_\_\_
- Vertex:
  - ( , )
  - Max or Min
- Domain:
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- # of Zeros/X-Intercepts \_\_\_\_\_

 $x^2 - 2x$ Example 8: 15  $y = x^2 - 2x$ 3 -1 0 3

Next graph is  $y = x^2 + 3x$ 

-What is going to happen to the graph compared to example 8? -Name one thing you can state about the graph?



# of Zeros/X-Intercepts

-What is going to happen to the graph compared to example 9? -Name one thing you can state about the graph?

#### **Practice:** Identify the key parts of the quadratic:

Example 10:  $y = -x^{2} - 4x^{2} - 4x^{2}$ 

x

-3

-2

-1

0

1

2

3

3

3

0

-5

-12

-21

Oper	IS.		
0	Up	or	Down

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Inspiring Greatness

- y-intercept: ○ ( , )
- Axis of Symmetry:
  - x = \_\_\_\_
- Vertex:
  - ( , )
     Max or Min
- Domain:
  - \_\_\_\_≤ X ≤ \_\_\_
- Range:
- \_ \_ ≤ y ≤ \_
- End Behavior:
  - As  $x \to -\infty$ ,  $y \to$
  - $\circ \quad \text{As } x \to \infty, \ y \to \_\_\_$
- # of Zeros/X-Intercepts \_\_\_\_

4x ×	1	
-	-5	0
	/	
_		
		5
-		



- 1. Quadratic Equations are in the shape of \_\_\_\_\_
- 2. Quadratic equation in Standard Form: y = ax2 + bx + c
  - a. If A is positive, then \_\_\_\_\_
  - b. If A is negative, then \_\_\_\_\_
- 3. What does the value of C do to the graph?
  - a. If C is positive, then \_\_\_\_\_
  - b. If C is negative, then \_\_\_\_\_
- 4. What does the value of B do to the graph(when A is positive)?
  - a. If B is positive, then \_\_\_\_\_
  - b. If B is negative, then \_\_\_\_\_
  - c. If A is negative, then it is the \_\_\_\_\_



- 5. The point that is the Max or the Min is the \_\_\_\_\_
- 6. The line that can be drawn down the middle of the quadratic function is called the \_\_\_\_\_
  - a. Always a \_\_\_\_\_\_ equation. It's the x value of the \_\_\_\_\_
- 7. Domain for quadratics is always \_\_\_\_\_, unless there are domain restrictions.
- 8. Range is written as a compound inequality -- <u>Small #</u>  $\leq y \leq$ <u>large #</u>
  - a. The y value of the \_\_\_\_\_\_ tells you the max/min number for the range.
  - **b.** Any inequality with infinity is not equal to.



#### **Independent Practice**

Complete the problems and then check your work with the key. Use desmos to help you graph and fill in the tables.

#### **Practice**





#### **Additional Practice:**

# Click on the links below to get additional practice and to check your understanding!

