

Before we begin, are there any questions from last day's work?

Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) make connections between polynomials given in factored form, and the x -intercepts of the graph of the polynomial.
- b) identify the zeros of a function or the roots of the corresponding equation and the connection between the two.

Be ready for Unit 2 Summative Tomorrow!!

3.1.1: Up to Now With Polynomials

Date: _____

Anticipation Guide

Instructions:

- Check “Agree” or “Disagree” beside each statement *before* you start the task.
- Compare your choice and explanation with a partner.
- Revisit your choices after completing the Part C on BLM 3.1.2.

Before		Statement	After	
Agree	Disagree		Agree	Disagree
		1. The zeros are the y-intercepts on a given graph.		
		2. The solutions of an equation and the zeros of a function are the same thing.		
		3. $x^2 + 5x + 6$ is $(x+3)(x+2)$ in factored form.		
		4. All parabolas have at least one root/solution.		
		5. The degree of the polynomial $y = 3x^2 - 6x^3 - 2$ is 5.		
		6. The function $y = (x-4)(x+5)$ has two real solutions/roots.		
		7. The function $y = (x-4)(x-4)$ has one real solution/root.		
		8. The graph of $y = -7x^3 - 1$ is linear.		
		9. All cubic functions have at least one root/solution.		

3.1.2: Getting to Know Polynomials

Date: Oct-8/19☒ X-Axis

$$-10 \leq x \leq 10$$

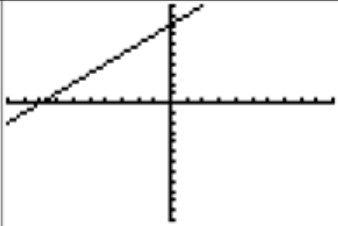
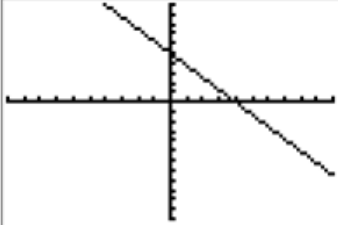
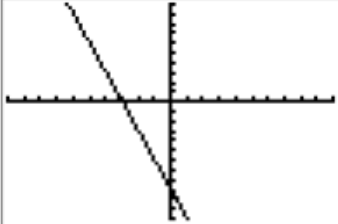
Part A: Before you begin, change your window settings to:

1. For each function in the chart below, do the following:

- Set the function equal to zero and solve.
- Sketch a graph of the function.
- Determine the x -intercept.

☒ Y-Axis

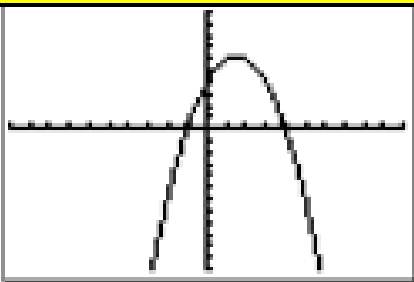
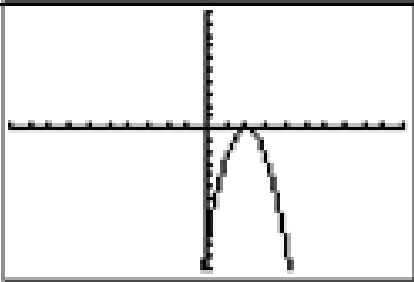
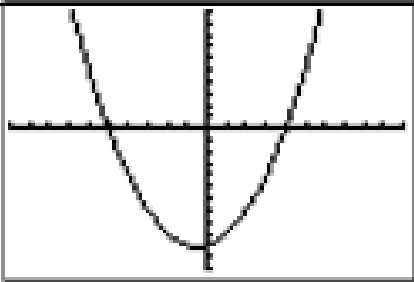
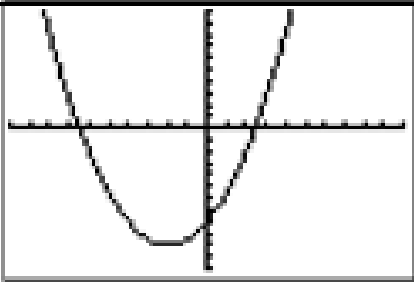
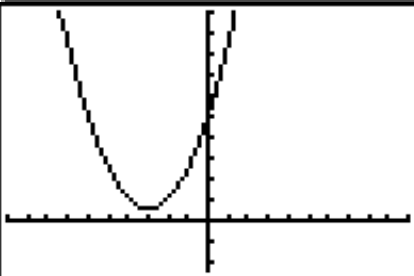
$$-24 \leq y \leq 20$$

Function	Solution when $y = 0$	Sketch	x -intercept
$y = 2x + 16$ $0 = 2x + 16$	$(0) = 2x + 16$ $-2x = 16$ $x = -8$		-8
$5x + 2y - 20 = 0$	$5x + 2(0) - 20 = 0$ $5x - 20 = 0$ $5x = 20$ $x = 4$		4
$y = -6(x + 3)$	$(0) = -6(x + 3)$ $0 = x + 3$ $x = -3$		-3

2. Compare your answer for the solutions to the x -intercepts. What do you notice?The x -intercept is the solution when $y=0$.3. If you were given the function $5y = 10$, how many x -intercepts would it have? Justify your answer.

Zero. Make a quick sketch.

Part B: Use the same window settings as in Part A to complete the chart below.

Function	Solution when $y = 0$	Sketch	x-intercept
Recall: If $A \times B = 0$ $A = 0$ or $B = 0$ $y = -2(x-4)(x+1)$	$(0) = -2(x-4)(x+1)$ $\therefore x-4=0$ or $x+1=0$ $x=4$ or $x=-1$		4, -1
$y = -4.9(x-2)^2$	$(0) = -4.9(x-2)^2$ $\therefore x-2=0$ or $x-2=0$ $x=2$ or $x=2$		2
$y = x^2 + x - 20$	$y = (x-4)(x+5)$ $(0) = (x-4)(x+5)$ $\therefore x-4=0$ or $x+5=0$ $x=4$ or $x=-5$		4, -5
$y = x^2 + 4x - 16$ $y = (x+2)^2 - 20$	$y = x^2 + 4x + 2^2 - 2^2 - 16$ $y = x^2 + 4x + 4 - 4 - 16$ $(0) = (x+2)^2 - 20$ $20 = (x+2)^2$ $\pm\sqrt{20} = x+2$ $x = -2 \pm \sqrt{20}$ $x = -2 \pm 4.472$ $\therefore x = 2.472$ or $x = -6.472$		2.472, -6.472
$y = x^2 + 6x + 10$ $y = (x+3)^2 + 1$ $v(-3, 1)$	$y = x^2 + 6x + 3^2 - 3^2 + 10$ $y = x^2 + 6x + 9 - 9 + 10$ $(0) = (x+3)^2 + 1$ $-1 = (x+3)^2$ $\pm\sqrt{-1} = x+3$ \therefore no Real roots		no Real roots

4. Which form of a quadratic function is easier to use for solving algebraically?

- ☐ Factored form ☐ Standard form (choose one). Give reasons.

Part C: Before you begin, change your window settings to:

☒ X-Axis

$$-10 \leq x \leq 10$$

☒ Y-Axis

$$-150 \leq y \leq 50$$

Function	Solution when $y = 0$	Sketch	x-intercept
$y = (x-6)(x+2)(x+5)$	$(0) = (x-6)(x+2)(x+5)$ $\therefore x-6=0$ or $x+2=0$ or $x+5=0$ $x=6$ or $x=-2$ or $x=-5$		6, -2, -5
$y = -2(x-3)(x+1)(x-5)$			
$y = (x-2)^2(x+2)$			
$y = (x+4)^2$			
$y = x^3 - x^2 - 6x$ $= x(x^2 - x - 6)$ $= x(x-3)(x+2)$	If $y = 0$ $0 = x(x-3)(x+2)$ $\swarrow \quad \downarrow \quad \searrow$ $x=0 \quad x=3 \quad x=-2$		$x = 0, 3, -2$

3.1.3: The Root of All Knowledge

Date: _____

1. On a test, students were asked to determine the roots of $y = x^2 + 4x - 60$

Michael's solution	Susie's solution	Jaspal's solution
$y = x^2 + 4x - 60$ $y = (x - 6)(x + 10)$ $0 = (x - 6)(x + 10)$ $x = 6 \text{ and } x = -10$	$y = x^2 + 4x - 60$ $y = (x + 6)(x - 10)$ $0 = (x + 6)(x - 10)$ $x = 6 \text{ and } x = -10$	$y = x^2 + 4x - 60$ $y = (x - 6)(x + 10)$ $0 = (x - 6)(x + 10)$ $x = -6 \text{ and } x = +10$

- a) Whose solution is correct?
- b) Explain what was done in the correct solution.
- c) Explain what was done incorrectly in the other two solutions.

2. a) Create a linear, quadratic, cubic and quartic function that has the x -intercept of $x = 3$.

b) Sketch each function on the grid provided.

c) Compare and contrast the functions.
(i.e. What is the same and what is different
about the functions?)

