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 equati and the connection between the two.

Be ready for Unit 2 Summave Tomorrow!!

3.1.1: Up to Now With Polynomials

Date: _____

Anticipation Guide

<u>Instructions:</u>

- 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 <u>Part C</u> on BLM 3.1.2.
  Compare the choices you made before the task and after the task.

Before		Statement	After	
Agree	Disagree		Agree	Disagree
	15	1. The zeros are the y-intercepts on a given graph.		
12	3	2. The solutions of an equation and the zeros of a function are the same thing.		
14	1	3. $x^2 + 5x + 6$ <u>is</u> $(x+3)(x+2)$ in factored form.		
6	8	4. All parabolas have at least one root/solution.		
2	13	5. The degree of the polynomial $y = 3x^2 - 6x^3 - 2$ is 5.		
11	3	6. The function $y = (x-4)(x+5)$ has two real solutions/roots.		
10	4	7. The function $y = (x-4)(x-4)$ has one real solution/root.		
	14	8. The graph of $y = -7x^3 - 1$ is linear.		
14		9. All cubic functions have at least one root/solution.		

3.1.2: Getting to Know Polynomials

Date: _Oct.10/18_

☑ X-Axis

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

$-10 \leq x \leq 10$

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.
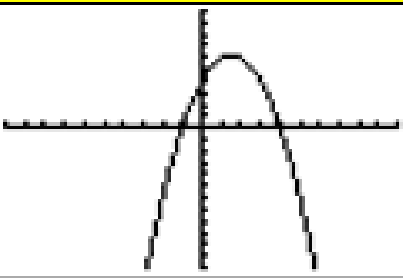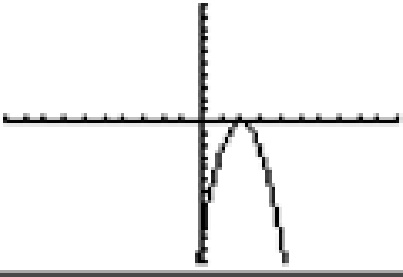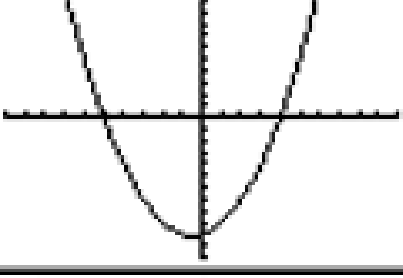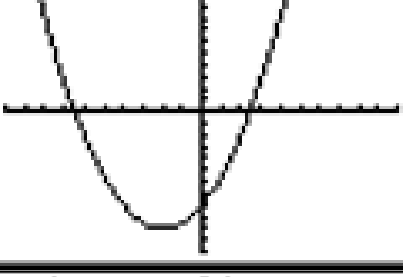   - Determine the x-intercept.

☑ Y-Axis

$-24 \leq y \leq 20$
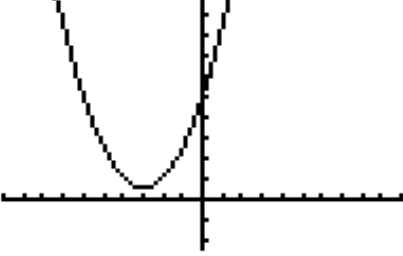
Function	Solution when y = 0	Sketch	x-intercept
$y = 2x + 16$	$(0) = 2x + 16$ $-2x = 16$ $x = -8$		-8
$5x + 2y - 20 = 0$	$5x + 2(0) - 20 = 0$ $5x - 20 = 0$ $5x = 20$ $x = 4$		4
$y = -6(x + 3)$	$(0) = -6(x + 3)$ $0 = x + 3$ $x = -3$		-3

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.

   $5y = 10$

   $5y = 10$
   $y = 2$
   $(1, 2), (3, 2)$
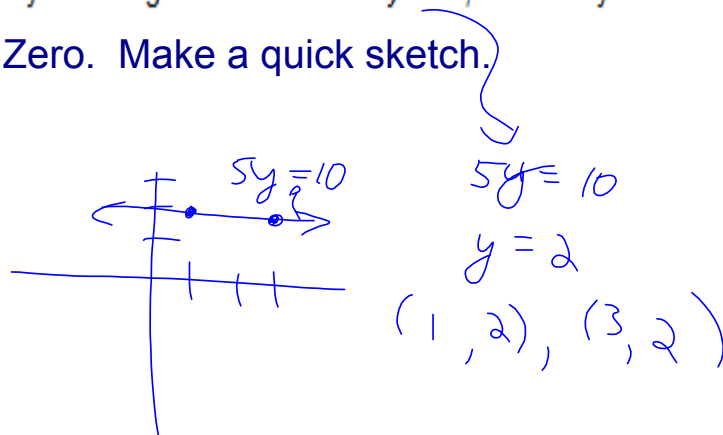
Part B: Use the same window settings as in Part A to complete the chart below.

Function	Solution when y = 0	Sketch	x-intercept
Recall: If $A \times B = 0$ $\quad$ **A** $\quad$ **B** $y = -2(x-4)(x+1)$	$(0) = -2(x-4)(x+1)$ $\therefore x-4=0$ or $x+1=0$ $\quad x=4$ or $x=-1$		4 , -1
$y = -4.9(x-2)^2$	$(0) = -4.9(x-2)^2$ $\therefore x-2=0$ or $x-2=0$ $\quad x=2$ or $x=2$		2
$y = x^2 + x - 20$	$y = (x-4)(x+5)$ $(0) = (x-4)(x+5)$ $\therefore x-4=0$ or $x+5=0$ $\quad x=4$ or $x=-5$		4 , -5
$y = x^2 + 4x - 16$ $y = (x+2)^2 - 20$	$y = x^2+4x+2^2-2^2-16$ $y = x^2+4x+4-4-16$ $(0) = (x+2)^2-20$ $20 = (x+2)^2$ $\pm\sqrt{20} = x+2$ $x=-2+\sqrt{20}$ $x=-2\pm4.472$ $\therefore x=2.472$ 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
$y = -2(x-3)(x+1)(x-5)$			
$y = (x-2)^2(x+2)$			
$y = (x+4)^3$			
$y = x^3 - x^2 - 6x$ $= x(x^2 - x - 6)$ $= x(x-3)(x+2)$	If $y = 0$ $0 = x(x-3)(x+2)$ $x = 0$ $x = -2$ $x = 3$		$x = 0, 3, -2$

3.1.3: The Root of All Knowledge   <small>Date: _____</small>

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
$y = x^2 + 4x - 60$ $y = (x-6)(x+10)$ $0 = (x-6)(x+10)$ $x = 6 \ and \ x = -10$	$y = x^2 + 4x - 60$ $y = (x+6)(x-10)$ $0 = (x+6)(x-10)$ $x = 6 \ and \ x = -10$	$y = x^2 + 4x - 60$ $y = (x-6)(x+10)$ $0 = (x-6)(x+10)$ $x = -6 \ and \ x = +10$

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?)