Name: _____ Date: _____ Period: _____

_____ **The Forms of a Quadratic Function**

Engage: *Will It Hoop?*

As you are working through the Desmos Activity, Will it Hoop?, Record your thoughts for each round.

Round 1 is just watching the clip of half the path of the shot. [Predictions]

Round 2 is when you fit a quadratic model to the path of the shot. [Parabolas]

Round 3 is the verification of watching the video of the complete shot. [Verify]

Shot #	Round 1 In/Out	Round 2 In/Out	Round 3 In/Out	Summarize your thoughts from the class results
1				
2				
3				
4				
5				
6				
7				

Explore: *Part 1 - Match My Parabola*

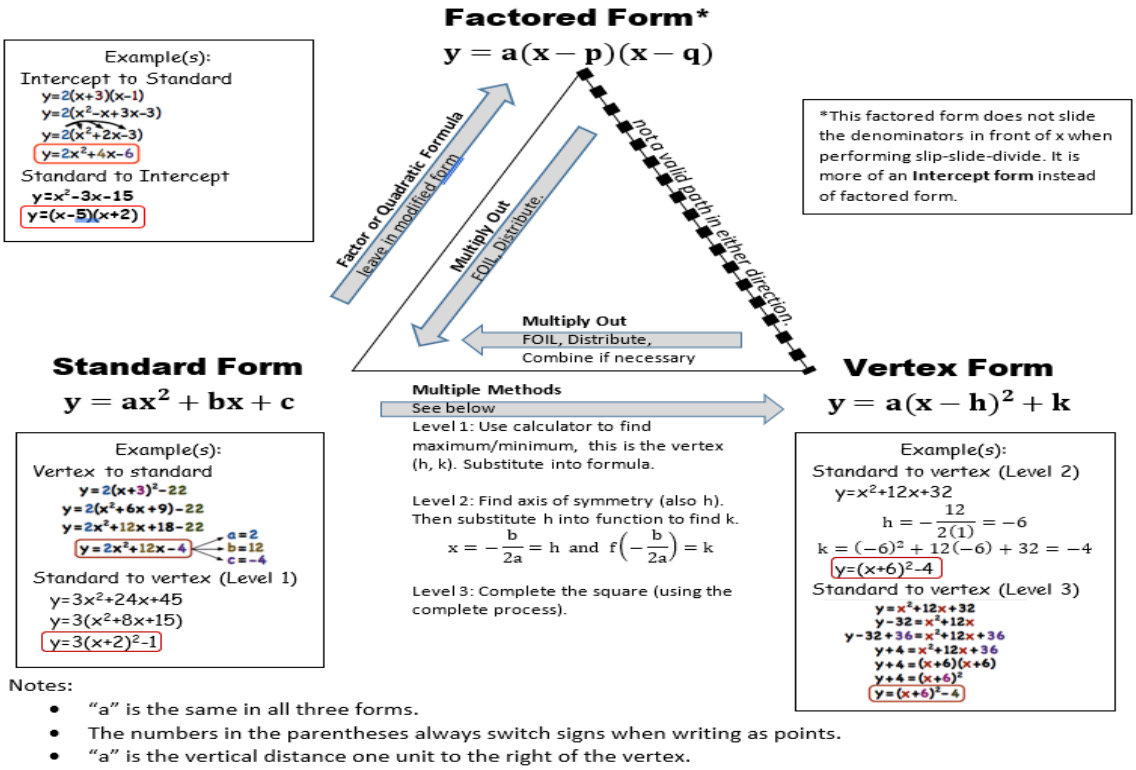
After completing the Match My Parabola activity on Desmos, answer the following questions:

1. Share one interesting insight or connection you made during the activity that you found particularly intriguing or surprising.

2. Which form was easiest for you to use and understand (standard, vertex or factored) and why?

3. Which form was most difficult for you to use and understand (standard, vertex, or factored) and why?

Part 2 - Quadratic Transformation Trek



Notes:

- "a" is the same in all three forms.
- The numbers in the parentheses always switch signs when writing as points.
- "a" is the vertical distance one unit to the right of the vertex.

Analyze each equation and convert it to the other two forms.

	Standard Form	Vertex Form	Factored Form
A	$y = -2x^2 + 4x - 1$		
B		$y = (x-2)^2 + 3$	
C			$y = (x+1)(x-3)$
D	$y = -0.5x^2 - 2x + 5$		
E		$y = (x+4)^2 - 6$	
F			$y = (x+2)(x-1)$

Use the next page to show the work for converting **A** and **B**.

Example **A**: Form given: _____

	Algebraically (no calculator)	Graphically (with calculator)
Change to ***vertex form***		
Change to ***factored form***		

Example **B**: Form given: _____

	Algebraically (no calculator)	Graphically (with calculator)
Change to ***standard form***		
Change to ***factored form***		

Note: Changing from Factored form to the other forms is the easiest algebraically. Multiply everything out to go to standard form and then find the vertex to put it in vertex form.

Apply: Quadratic Transformation Trek **Practice**

Identify the appropriate form of the quadratic equation that represents the given scenario and explain your reasoning. Assume a= 1 for all questions. Create a sketch of the graph of the quadratic function based on the chosen form and describe the key features of the graph within the context of the scenario.

Scenario 1: You are designing a roller coaster for an amusement park. The highest point of the roller coaster needs to be at a height of 100 feet, and the vertex of the parabolic path is at the point (10, 100). Which form of the quadratic equation represents the height of the roller coaster as it moves along the path?

Scenario 2: A soccer ball is kicked into the air with an initial velocity. The path of the ball can be modeled by a quadratic equation. The ball reaches its maximum height after 3 seconds and lands on the ground after 6 seconds. Which form of the quadratic equation best represents the height of the soccer ball?

Scenario 3: A drone is flying along a parabolic path, capturing aerial footage. The drone reaches its maximum height at x = 8, and the maximum height is 50 feet. Which form of the quadratic equation best represents the height of the drone as it moves along its path?