Topic 2.2: Standard Form of a Quadratic Function

Essential Question:

How do you use quadratic equations to model the real world and solve problems?

Critique and Explain:

Please go online and submit your answers.

CONCEPT SUMMARY

Standard Form of a Quadratic Function

STANDARD FORM

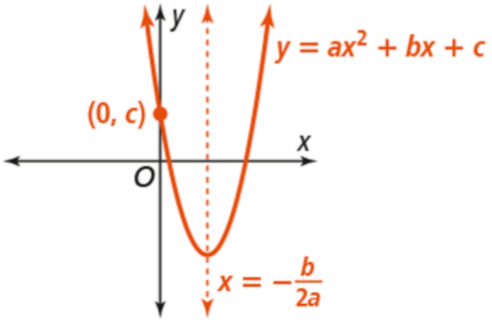
$y = ax^2 + bx + c$

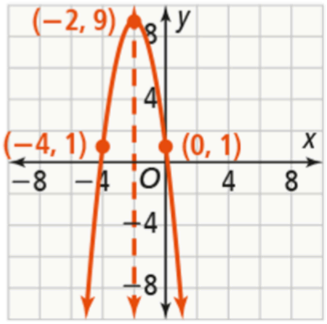
$y = -2x^2 - 8x + 1$

KEY FEATURES

Vertex	x-coordinate of vertex: $h = -\frac{b}{2a}$	$h = -\frac{(-8)}{2(-2)} = -2$
	Substitute h for x and solve for y to find the y-coordinate of the vertex.	$y = -2(-2)^2 - 8(-2) + 1$ $= -8 + 16 + 1$ $= 9$ The vertex is $(-2, 9)$.
Axis of Symmetry	$x = -\frac{b}{2a}$	$x = -2$
y-intercept	$(0, c)$	$(0, 1)$

GRAPHS





Notes:

Examples and Questions

Examples 1
Q: How are the variables of *a, b, and c* in the standard form and vertex form of the quadratic function related?

Examples 2
Q: What does the value of *a* tell you about the vertex and shape of the parabola?

Q: How does knowing the axis of symmetry help to graph a quadratic function?

Q: Why do you need to find vertex to graph the function?

Examples 3
Q: On the graph, what do you notice about the value of y when x=60?

Q: Explain why it would never make sense for this function to have a negative value for *b*.

Examples 4
Q: Does the vertex always need to be one of the three points in order to write the equation of a parabola?

Q: What is another strategy you could use to write the equation of a parabola given three points?

Examples 5
Q: If you substitute the values for x from the points on the graph into the quadratic equation obtained by regression, how would the calculated value for u be related to those in the graph?

Q: How does using quadratic regression help when determining the maximum height the discus will reach?

Practice and Problem Solving

Complete MathXL for School: Practice and Problem Solving (online)
Complete MathXL for School: Enrichment (online)

Challenge: #12, 14, 27, 28, 31

Lesson Quiz 2.1