Algebra RH

Essential Question: How are quadratic equations in standard form written in vertex form?

Do Now:

Given the following equations, identify the vertex, axis of symmetry, and direction of the parabola.

(a) $y = (x-5)^2 - 1$

Vertex: _____

Axis of Symmetry: _____

Opens:_____

(b) $y = -(x-6)^2 + 2$

Vertex: _____

Axis of Symmetry: _____

Opens:_____

VERTEX FORM OF A QUADRATIC FUNCTION

$$f(x) = a(x-h)^2 + k$$

where h and k are real numbers, (h, k) is the vertex and $x = h$ is the axis of symmetry

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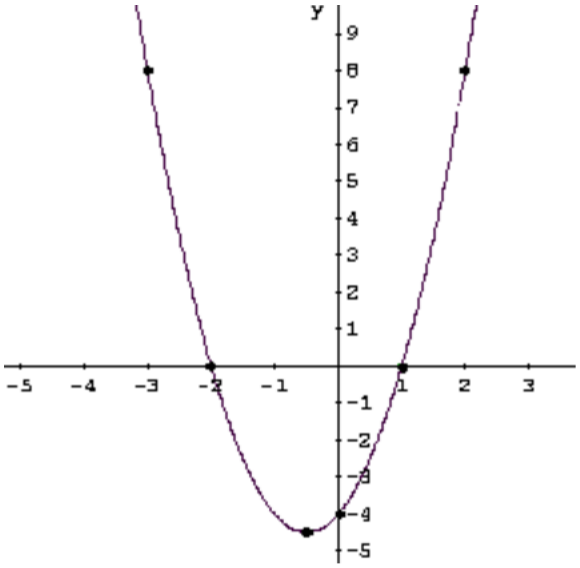
If you have the graph of a parabola, can you determine the exact equation of the function that created the graph?



(1) Let's look at the graph at the right.

The x-intercepts are integer values,

_____ and _____.

so we know that the roots (zeros) of the equation

will be x = _____ and x = _____.

With this information we can write the equation of the

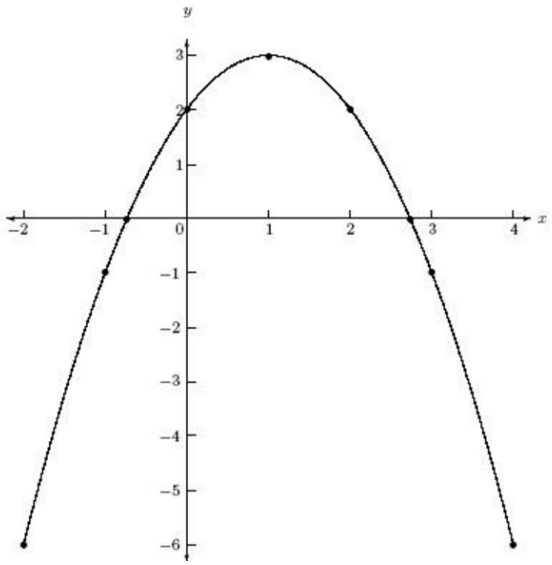
quadratic in factored form, y = _____.

BEWARE

You cannot assume that the a-value will always be 1.

How can we determine the numeric factor, a, for this equation? (Hint… we need to check another point, i.e. the y-intercept)

(2) Given the parabolic graph at the right, the vertex is _____ and another random point on the graph is _____. Write the equation of the function which created the graph.



It does not appear that the roots (zeros) of this parabola cross the x-axis at integer values, so we will not be able to write the equation in factored form. However, we can write the equation in vertex form,

y = _____.

Now, determine the value of a.

Reminder: The zeros obtained from the x-intercepts of a graph can determine the equation of a "family" of graphs. But, ONE MORE POINT is needed to guarantee a specific, individual function's equation.

Match the following equations to their graphs.

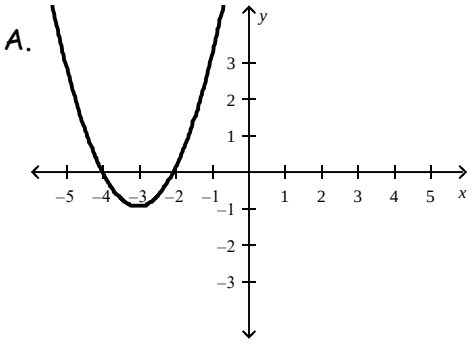
3) $y = -4(x+1)^2 + 2$

4) $y = -\frac{1}{4}(x+1)^2 + 2$

5) $y = (x+3)^2 - 1$

6) $y = (x-3)^2 - 1$

A.



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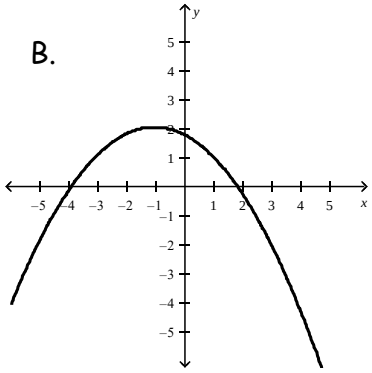

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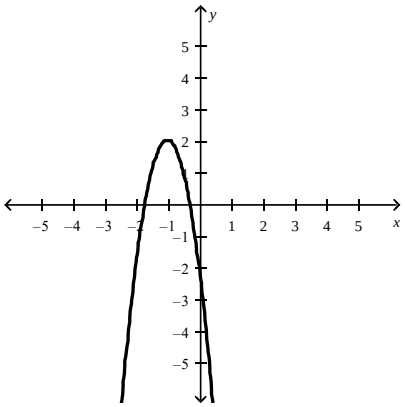

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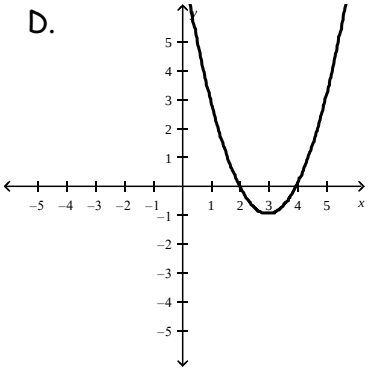

Convert the following equations into vertex form by completing the square and identify the vertex.

7) $y = x^2 + 2x - 4$

8) $y = x^2 + 16x + 71$

9) $y = x^2 - 2x - 5$

10) $y = x^2 - 12x + 46$

Shown below is the equation for function $f(x)$, and the graph of parabolic function $g(x)$. Which function has the larger maximum?

$$f(x) = -(x-4)^2 + 5$$