BECA / Huson / 11.1 IB Math SL Name:
23 October 2017

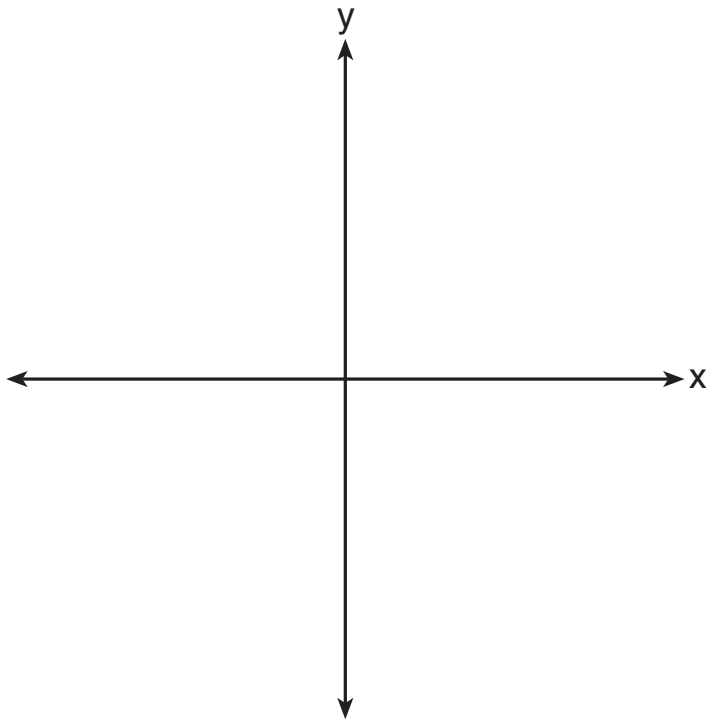
Test Corrections: Functions and Quadratics

Redo the graphs on which you missed any points. Due Thursday.

Sketching a quadratic function

Answer on lined paper and use this sheet for the graph.

1. Given $f(x) = -(x-3)^2 + 16$
   (a) Write down the vertex of the function as an ordered pair.
   (b) Write down the equation of the axis of symmetry.
   (c) Expand the function from vertex form to standard form, $ax^2 + bx + c$ where $a, b, c \in \mathbb{R}$.
   (d) Write down the value of $f(0)$. Explain what this represents on the graph.
   (e) Hence factor the function. Write down the roots.
   (f) Sketch the function, labeling the intercepts with values and the vertex as an ordered pair. Show the axis of symmetry as a dotted line and label it with its equation.



   (g) Write down the domain and range of the function.

Graphing quadratics

Answer on lined paper. Graph the function on the grid shown below.

2. Given the function $f(x) = -x^2 - x + 6$.

   (a) Write down the y-intercept.

   (b) State whether the parabola opens upward or downward. Explain how you know this from the function expressed in standard form.

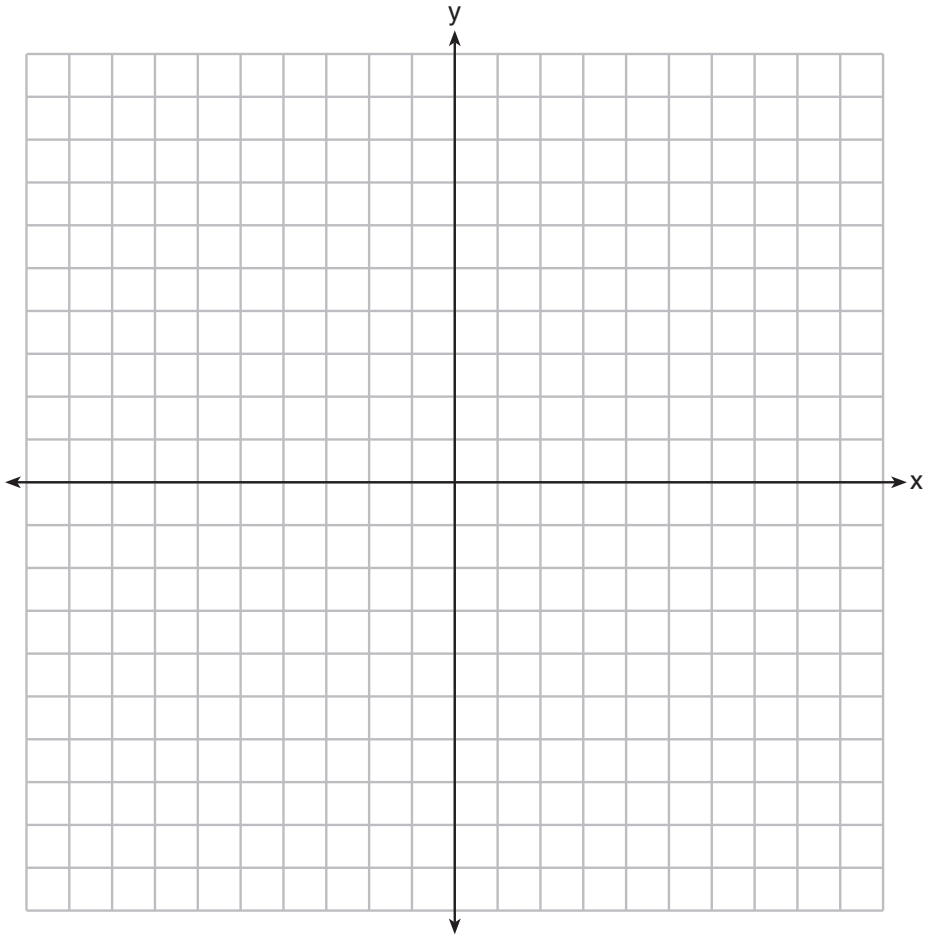
   (c) Express the function in factored form. Hence state the solutions to $f(x) = 0$.

   (d) Show that the axis of symmetry of the parabola is $x = -\frac{1}{2}$.

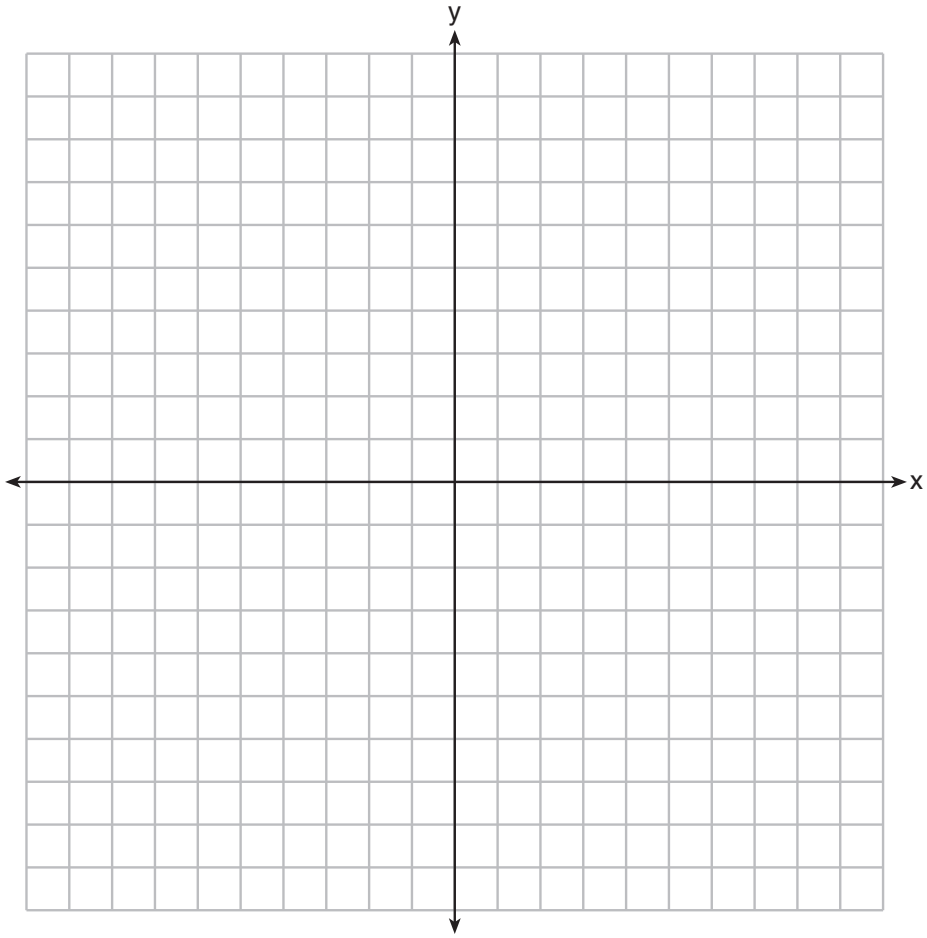
   (e) Hence state the vertex as an ordered pair.

   (f) Graph the function. Mark the vertex as an ordered pair and label each intercept with its value. Plot the axis of symmetry as a dotted line and label it with its equation.

   (g) Write down the domain and range of the function.



3. (a) Graph the parent function $f(x) = x^2$. Mark the point $P(3, f(3))$ on the graph
   (b) The function $g(x)$ is the function f after being translated to the right 5 and down 4. Graph g.
   (c) Mark the point on the function g, Q, that represents the point P after the translation.



Model situations with quadratic functions

4. The path of a diver is given by

$$f(x) = -5x^2 + 12x + 9$$

where y is the height (in meters) and x is time in seconds.

(a) On the grid below, graph the function over the domain where $x \geq 0$ and the range where $f(x) \geq 0$. Use a horizontal scale of 5 squares equals one second and vertical scale of 1 square equals one meter. Label the intercepts and vertex.

(b) What is the maximum height of the diver? Label the point on the graph with the work "max."

(c) What is the time when the diver enters the water? Label the point on the graph representing this with the word "splash."