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

# Solving Quadratic Functions

*by factoring or completing the square*

## Solve for the roots or zeros of the function, $f(x) = 0$

For each function, first factor it (always show this step), then state the roots using the form, "$x = 3, 4$" (or whatever the values are).

1. $f(x) = x^2 + 7x + 12$

2. $f(x) = x^2 + 13x + 12$

3. $f(x) = x^2 - 4x - 12$

4. $f(x) = 2x^2 - 10x - 12$

5. $f(x) = -3x^2 + 6x - 3$

6. $f(x) = \frac{1}{2}x^2 + 2x + 2$

## Completing the square

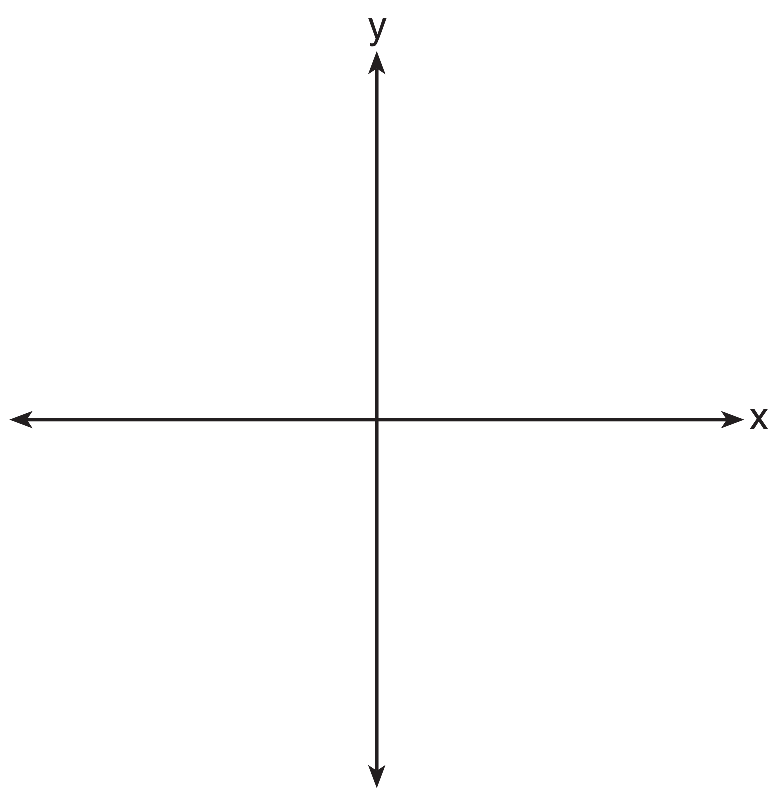
Rewrite the function in vertex form, $f(x) = (x - h)^2 + k$. Include the step showing the $(-\frac{b}{2a})^2$ term.

7. $f(x) = x^2 - 6x + 11$

8. $f(x) = x^2 + 8x + 9$

Expand the function from vertex form to standard form, $ax^2 + bx + c$ where $a, b, c \in \mathbb{R}$. Then factor the result and state the roots. Sketch the function, labeling the intercepts with values and the vertex as an ordered pair.

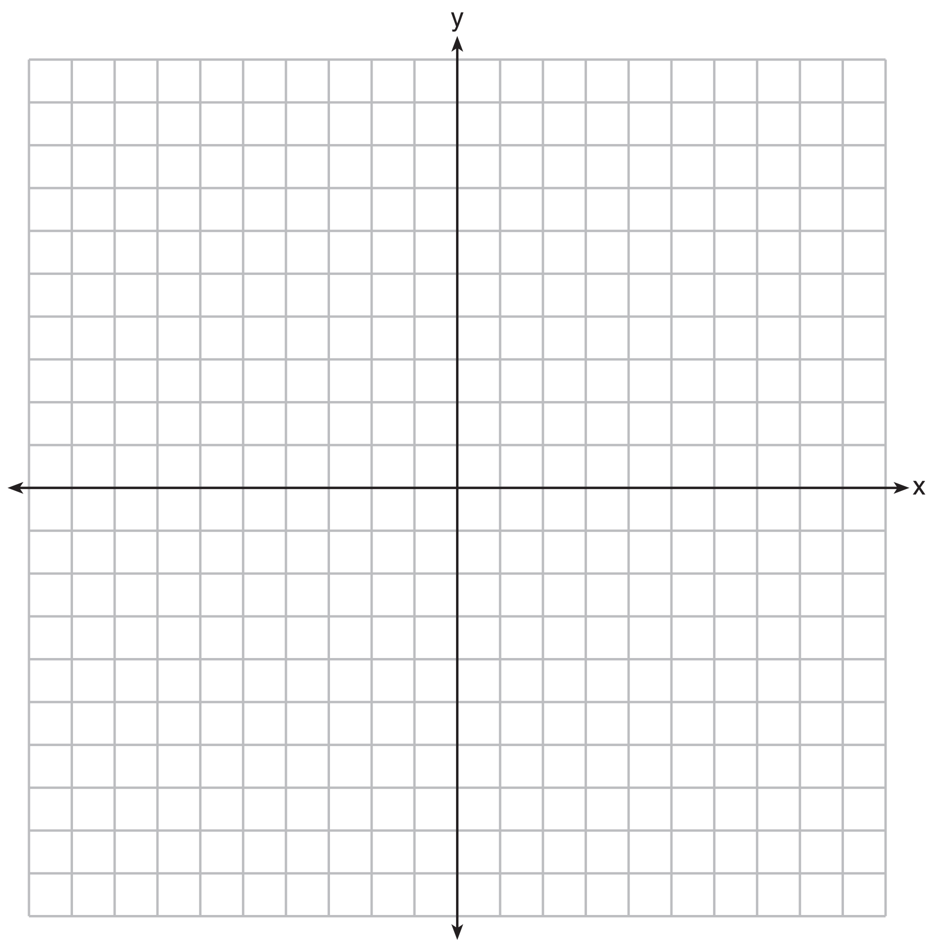
9. $f(x) = (x - 2)^2 - 9$



## Graphing quadratics

10. Graph the function $f(x) = -x^2 - 4x + 5$. You may use a graphing calculator rather than factoring the function and completing the square.

    Label the scales with at least a few values. Mark the vertex as an ordered pair and label each intercept with its value.



## Model situations with quadratic functions

Use a graphing calculator to view the graph and a table of values for the following function:

$$h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$$

where $h(x)$ represents the height of an object and $x$ it's horizontal position.

Make a table of values to the left of the graph, below. Include key values. Graph the function over domain where $h(x) \geq 0$. Use a horizontal scale of 1 square equals 10 units and vertical scale of 1 square equals 2.5 units. Label the intercepts and vertex.