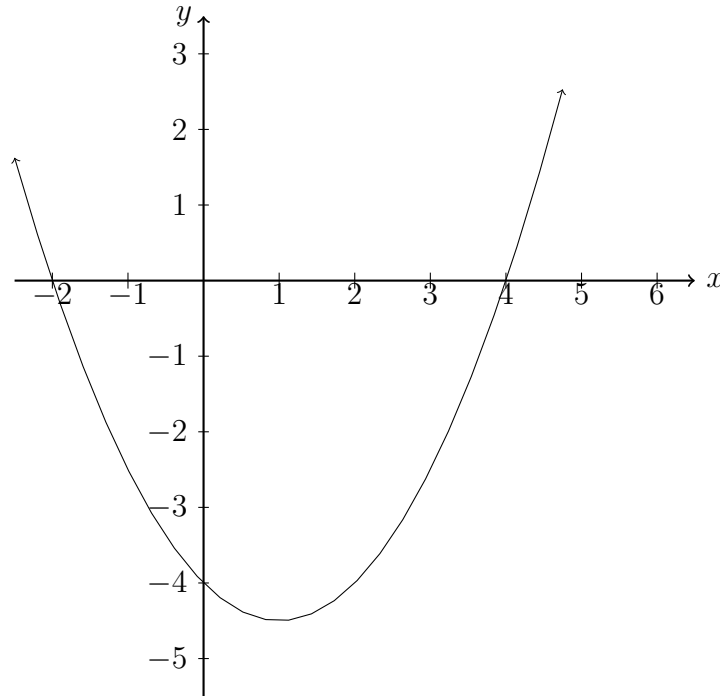


3 February 2020

5.4 Do Now: Graphing quadratic functions

1. A quadratic function f is graphed below with x -intercepts of -2 and 4 , and y -intercept of -4 .



- (a) Write down the two values of x for which $f(x) = 0$.
- (b) Write down the equation of the axis of symmetry.

The function can be written in factored form, $f(x) = a(x - x_1)(x - x_2)$

- (c) Write down the value of x_1 .
- (d) Write down the value of x_2 .
- (e) Find a .
- (f) Write the function f in vertex form $f(x) = a(x - h)^2 + k$.

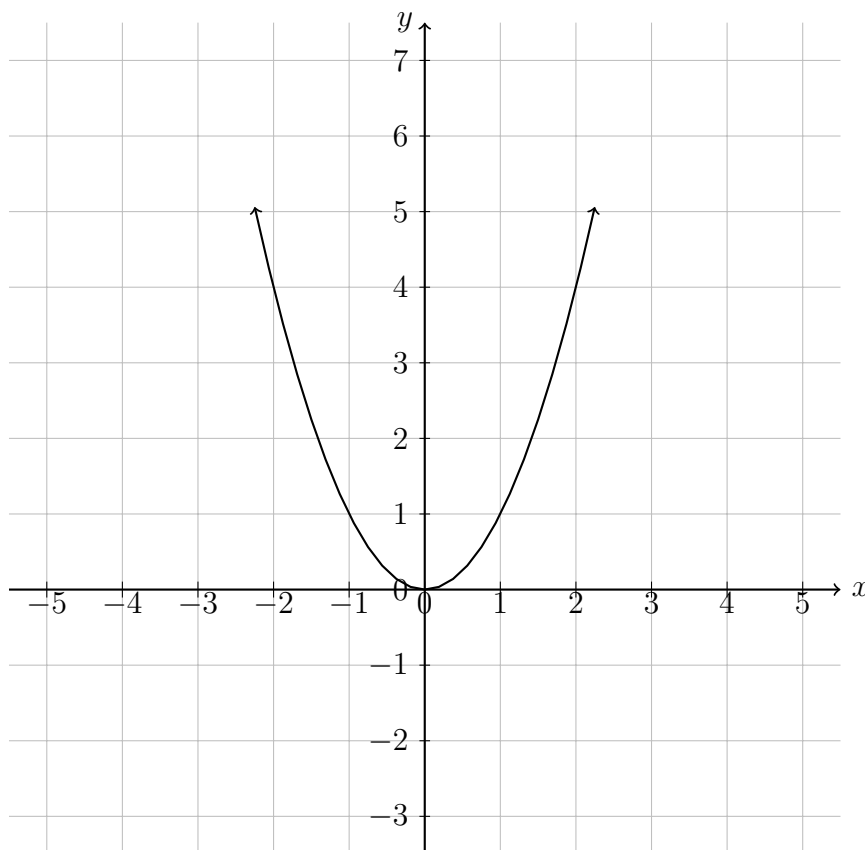
2. Graph the $f(x) = 2x^2 - 12x + 11$ on your calculator and use its functions to answer these questions.

(a) Write down the coordinates of the vertex.

(b) Hence or otherwise, express the function in the form $f(x) = 3(x - h)^2 + k$.

(c) Solve the equation $f(x) = 0$.

3. The diagram below shows part of the graph of the function $f(x) = x^2$.

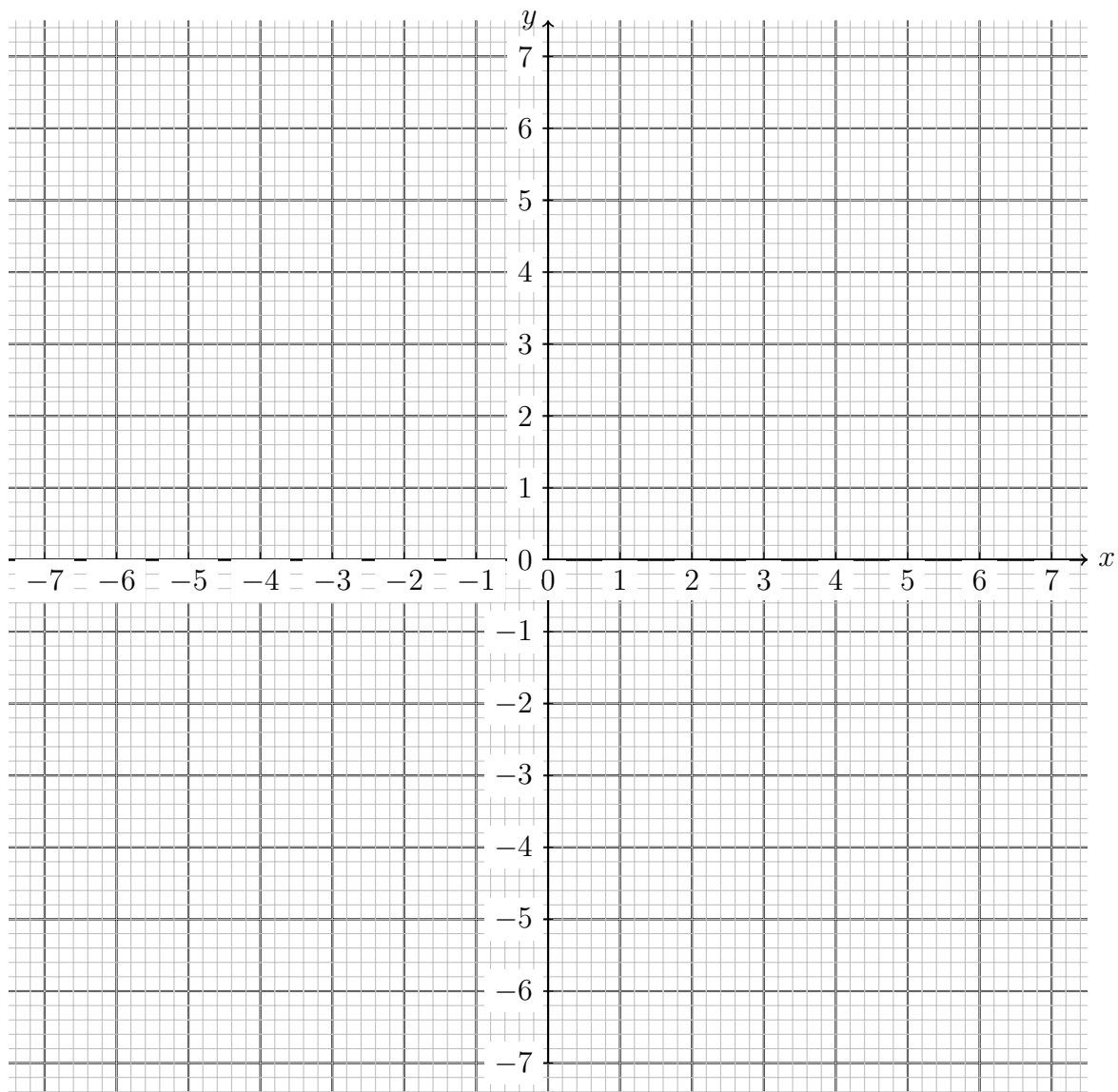


(a) $g(x)$ is the image of f after a translation right 3 and down 1. Draw g .

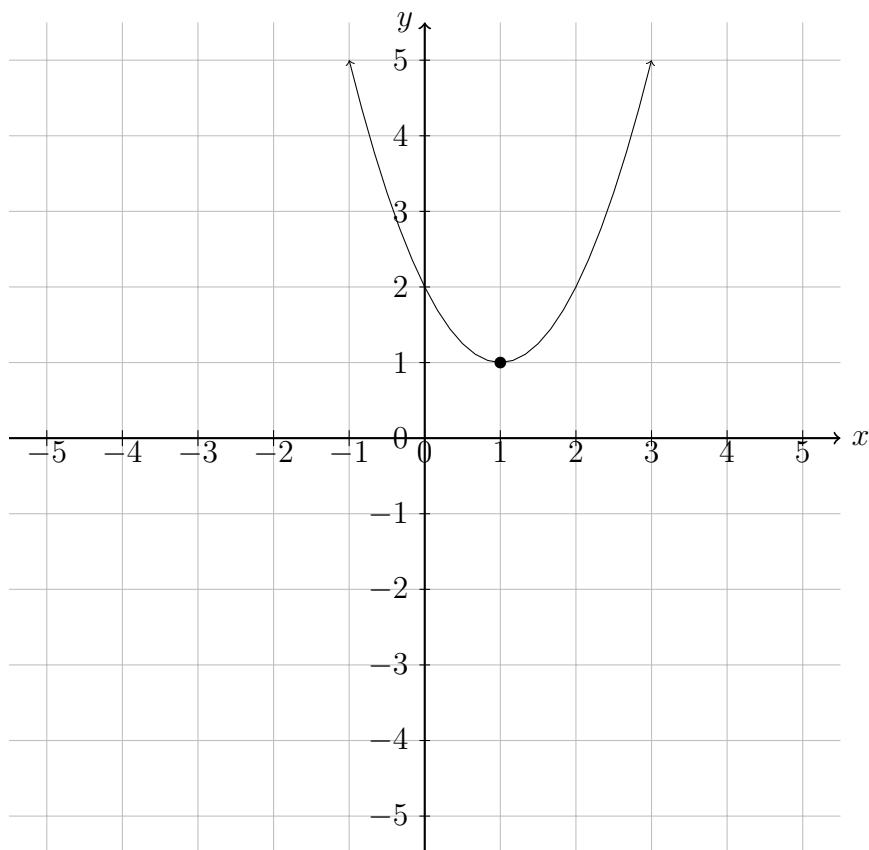
(b) g can be written in the form $g(x) = a(x - h)^2 + k$. Write down h and k .

(c) Expand g to standard form, $g(x) = ax^2 + bx + c$.

4. Graph the function $f(x) = x^2 + 2x + 2$ over the domain $-1 \leq x \leq 1$.
- (a) Mark points on the function representing $f(-1) = 1$ and $f(1) = 5$. Label them as coordinate pairs.
- (b) Graph and label the inverse of f , $f^{-1}(x)$, on the same axes over the domain corresponding to the range of f graphed. Mark the inverses of the points named in part (a), labeling them as coordinate pairs.
- (c) Write down the domain and range of $f^{-1}(x)$ in the space below.

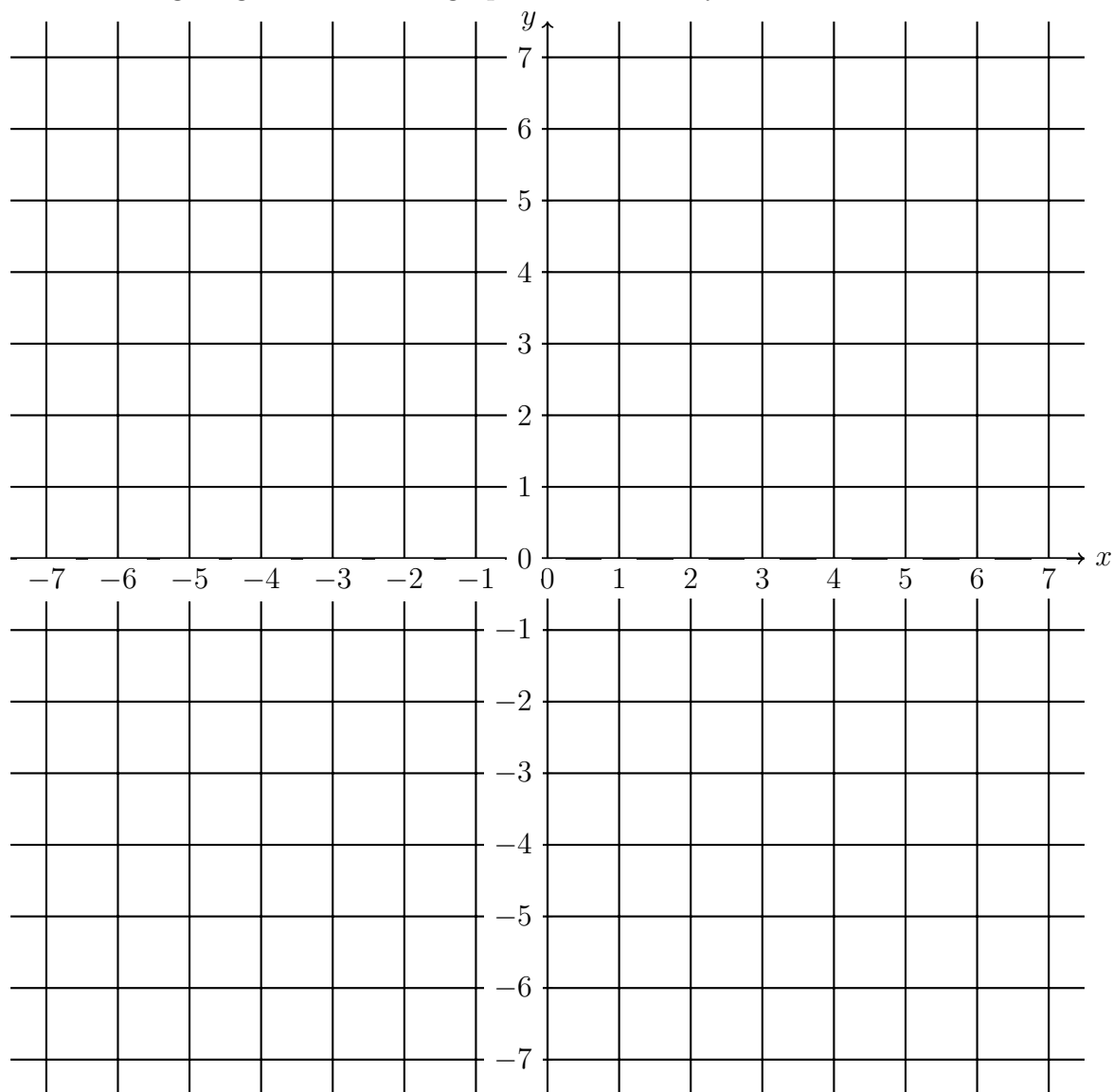


5. Let f be a quadratic function. Part of the graph of f is shown below. The vertex is at $P(3, 2)$ and the y -intercept is at $Q(0, 5)$.



- (a) Write down the equation of the axis of symmetry.
- (b) The function f can be written in the form $f(x) = a(x - h)^2 + k$. Write down the value of h and of k .
- (c) Find a .

6. The following diagram shows the graph of a function f .



(a) Find $f^{-1}(x)$.

(b) Find $(f \circ f)(-1)$.

(c) On the same diagram, sketch the graph of $y = -f(x)$.

7. The following diagram shows part of the graph of a quadratic function f .

Graphing calculators may be used on this section.

8. Let $f(x) = 2x^2 + 3x - 1$.

- (a) Write down the coordinates of the vertex.
- (b) Hence or otherwise, express the function in the form $f(x) = 2(x - h)^2 + k$.
- (c) Solve the equation $f(x) = 0$.

9. Consider the function $f(x) = x^2 - 6x - 1$.

- (a) Sketch the graph of f , for $-4 \leq x \leq 3$.
- (b) This function can also be written in the form $f(x) = (x - p)^2 - 10$.
Write down the value of p .
- (c) The graph of g is obtained by reflecting the graph of f in the x -axis, followed by a translation of $(0, 4)$.
Show that $g(x) = x^2 + 3x - 1$.
- (d) The graphs of f and g intersect at two points.
Write down the x -coordinates of these two points.

10. Consider the equation $x^2 + (k - 2)x = -4$, where k is a real number. Find the values of k for which the equation has two equal real solutions.