

5.1 Do Now: Function operations, algebra review, graphing quadratics

1. Let $f(x) = 3x - 4$ and $g(x) = 5x$, for $x \in \mathbb{R}$.

(a) Write down $g(-3)$.

(b) Find $(f \circ g)(x)$.

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

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

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

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

3. The diagram below shows the graph of a function f , composed of four points.

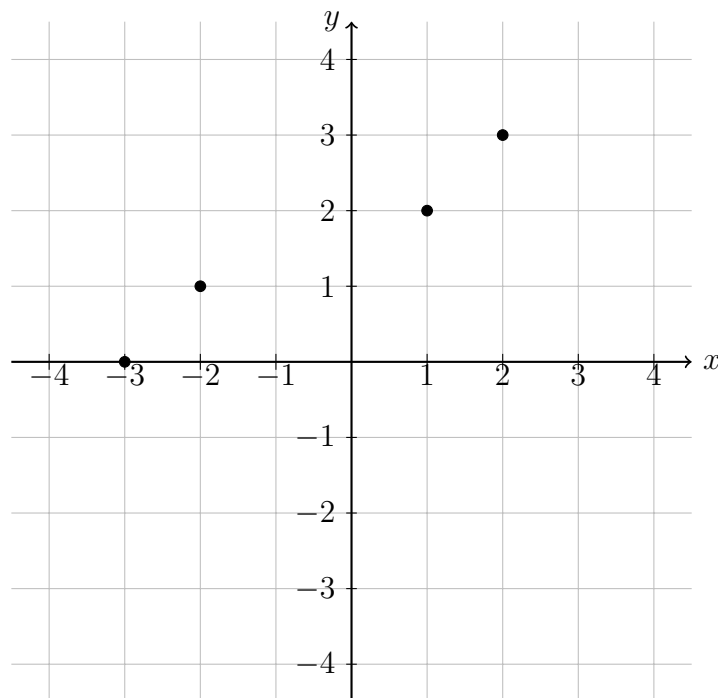
(a) Write down the value of $f(2)$.

(b) Write down the domain of f .

(c) Write down the range of f .

(d) Write down the value of $f^{-1}(1)$.

(e) Sketch the inverse of f , f^{-1} , on the grid at right.



Quadratics algebra competencies

4. Expand each binomial-squared expression to the form $ax^2 + bx + c$.

(a) $(x + 3)(x + 3)$

(c) $(x + 5)^2$

(b) $(x + 2)^2$

(d) $(x + 7)^2$

5. Simplify each radical.

(a) $\sqrt{50}$

(c) $\sqrt{27}$

(b) $\sqrt{18}$

(d) $\sqrt{24}$

6. Solve for the appropriate variable (h and r).

(a) $Area = \frac{1}{2}(14.8)h = 62.9$

(b) $Area = \pi r^2 = 483$

Graphing quadratic functions (you may use a calculator)

7. Consider the function $f(x) = x^2 + 2x - 3$.

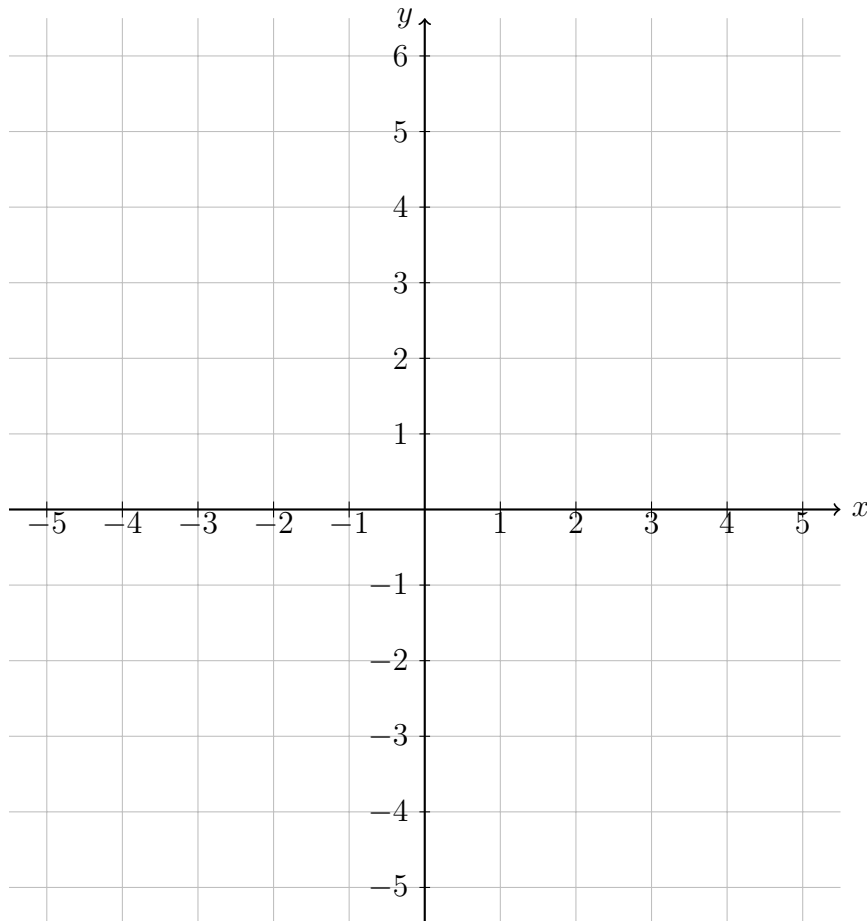
(a) Sketch the graph of f , for $-4 \leq x \leq 2$. Label the vertex and the intercepts.

(b) This function can also be written in the form $f(x) = (x - p)^2 - 4$.

Write down the value of p .

(c) The graph of f has two solutions for $f(x) = 0$. Write down the solutions (or roots, zeros) of the function.

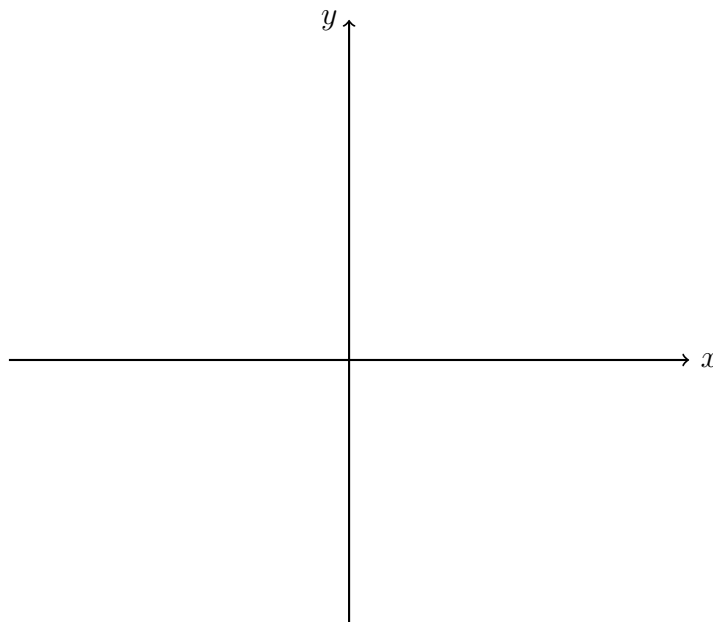
(d) Hence, write down the function in factored form, $f(x) = (x - a)(x - b)$.



Sketching a quadratic function

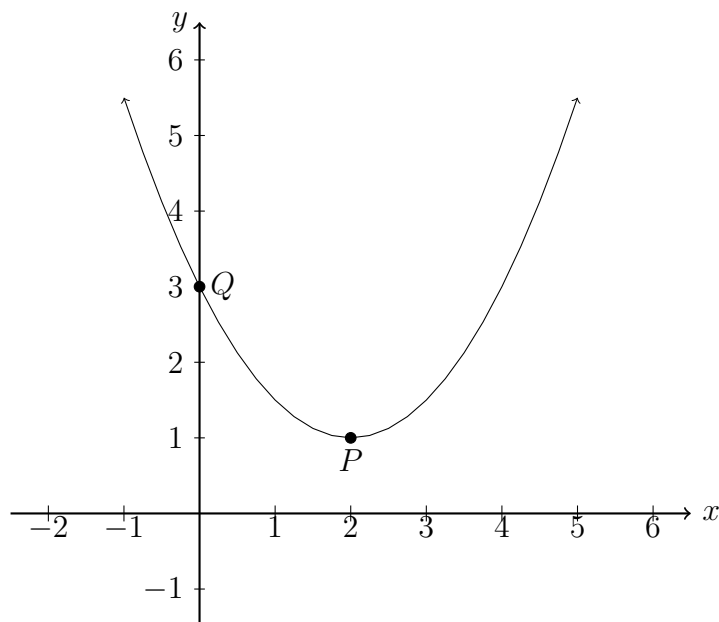
8. Given $f(x) = (x - 3)^2 - 4$

- (a) Write down the vertex of the function as an ordered pair.
- (b) Expand the function from vertex form to standard form, ax^2+bx+c where $a, b, c \in \mathbb{R}$.
- (c) Write down the value of $f(0)$. Explain what this represents on the graph.
- (d) Factor the function. Write down the roots.
- (e) 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.



- (f) Write down the domain and range of the function.

9. Let f be a quadratic function. Part of the graph of f is shown below. The vertex is at $P(2, 1)$ and the y -intercept is at $Q(0, 3)$.



- (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 .