

### 9.1 Classwork: Linear and quadratic graphs

1. A linear function  $f$  is graphed below.

(a) Write down it's slope.

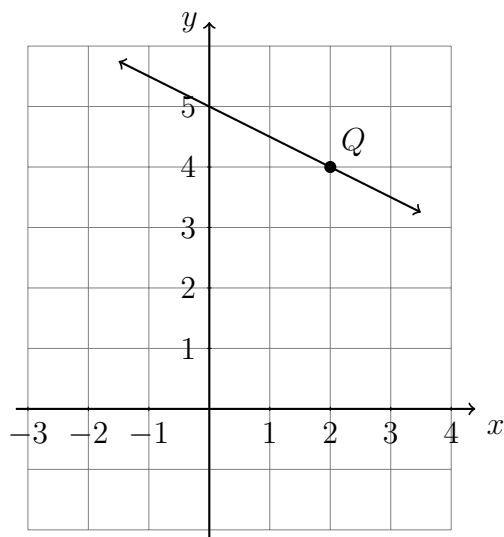
$m =$

(b) Write down it's  $y$ -intercept.

$b =$

(c) Write down the equation of the line.

(d) State the coordinates of the point  $Q$ .

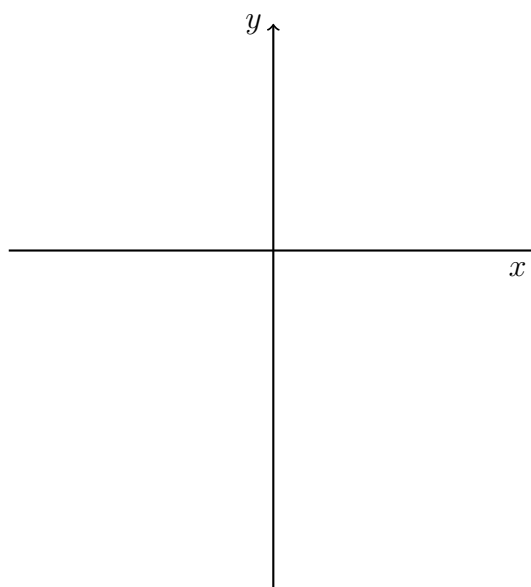


2. Write the linear equation  $y - 1 = \frac{1}{2}(x + 8)$  in the form  $y = mx + c$ .

3. Given  $f(x) = (x - 1)(x + 5)$

(a) Sketch the function. Label the vertex as an ordered pair and mark the intercepts with their values.

(b) Expand the function to standard form,  $f(x) = ax^2 + bx + c$  where  $a, b, c \in \mathbb{R}$ .



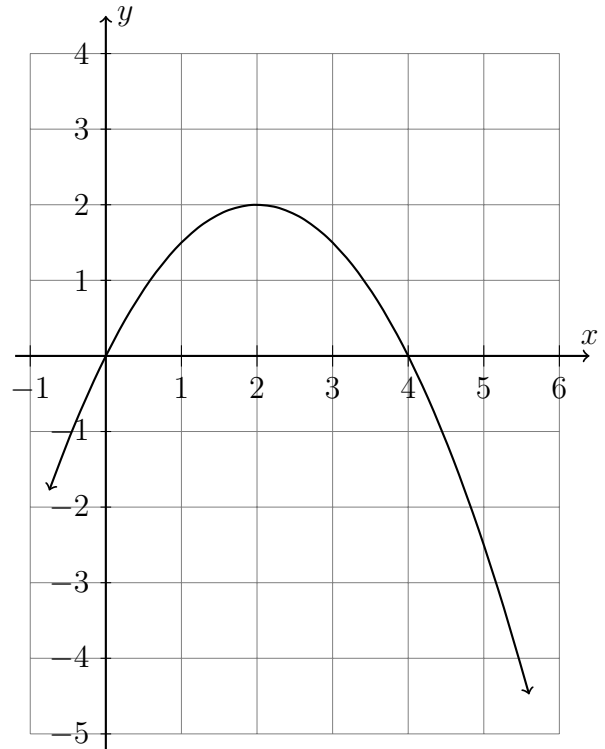
4. The function  $f(x) = -\frac{1}{2}x^2 + 2x$  is shown on the graph.

(a) Write down its vertex as an ordered pair.

(b) Write down its domain and range.

(c) Write down  $f(0)$ .

(d) Write down two solutions to  $f(x) = 0$ .



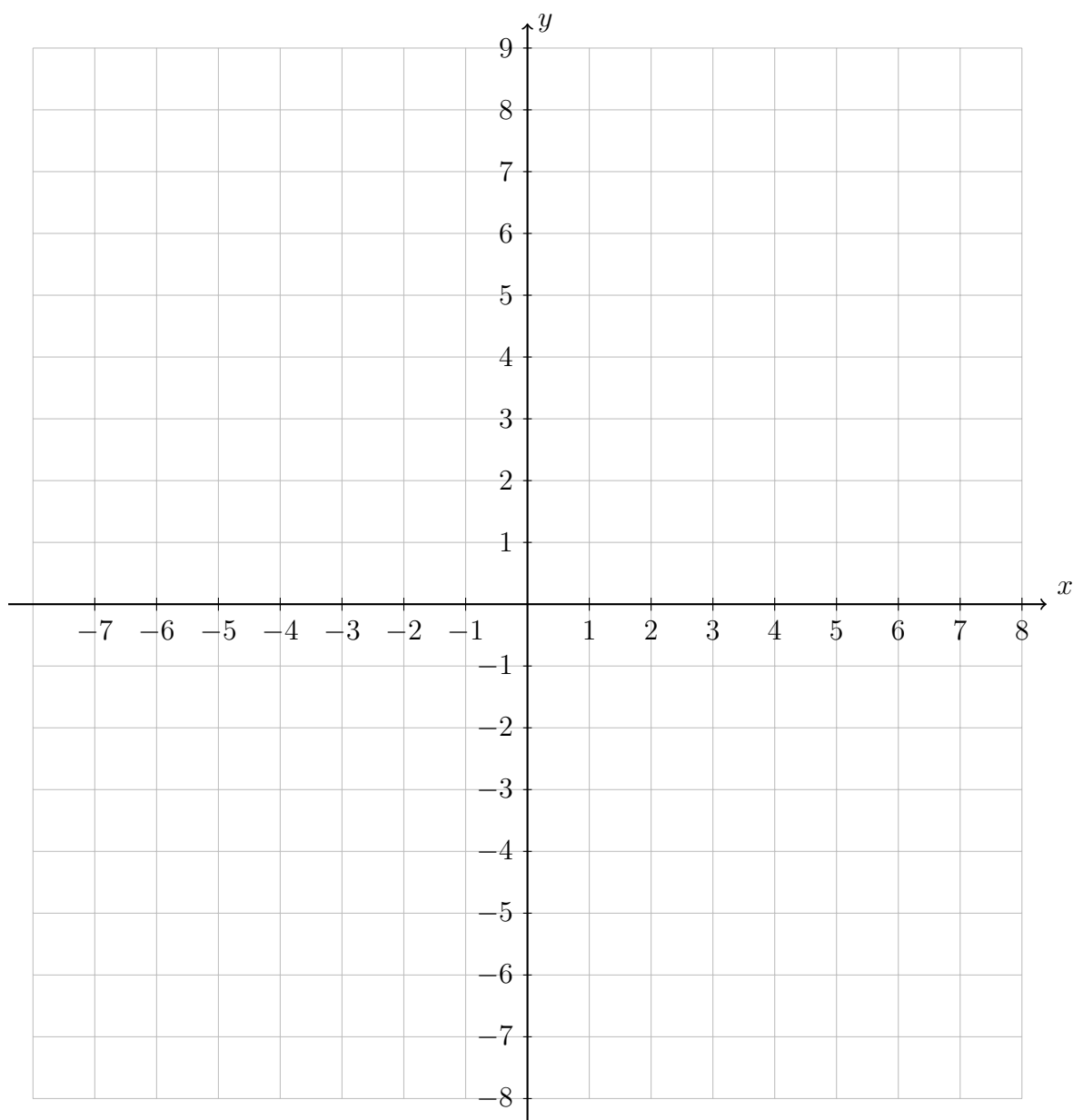
5. Consider the function  $f(x) = x^2 + 4x - 12$ . (graph it to answer the questions)

(a) This function can also be written in the form  $f(x) = (x - p)^2 - 16$ .  
Write down the value of  $p$ .

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

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

6. Given two functions, a quadratic function  $f(x) = 0.8x^2 + 3.2x - 2$  and a linear function  $g(x) = 0.8x + 1.2$ .
- (a) Graph the parabola  $y = f(x)$ , marking the  $y$ -intercept and the vertex as an ordered pair.
- (b) Find the coordinates of the two intercepts with the  $x$ -axis, the roots or zeros of  $f(x)$ .
- (c) Plot the linear function,  $y = g(x)$ . Mark and label the two intersections of the two functions  $f(x) = g(x)$  as ordered pairs.



7. A dart is shot vertically upwards.

The path of the dart can be modelled by the equation  $h(t) = 8t - t^2$  where  $h(t)$  is the height in meters of the dart after  $t$  seconds.

- (a) Plot a graph of this equation and hence sketch it below, showing the coordinates of the vertex and axes intercepts.
- (b) Find the  $t$ -intercepts and explain what these values represent.
- (c) Find the equation of the axis of symmetry, and state what this tells you in the context of the problem.

