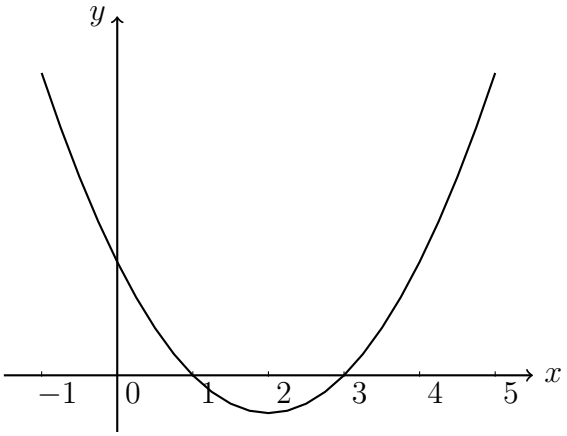
4.10 Do Now: Quadratics, function operations, linear equations

1. [Maximum mark: 6]

The diagram shows part of the graph of the quadratic function f.



The vertex is at $(2, -1)$ and the x-intercepts are at 1 and 3.

The function f can be written in the form $f(x) = (x - h)^2 + k$.

(a) Write down the value of h and k. [2]

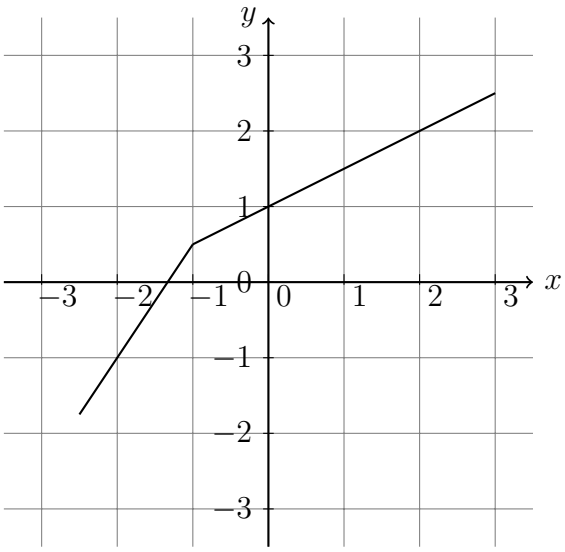
The function can also be written in the form $f(x) = (x - a)(x - b)$.

(b) Write down the value of a and b. [2]

(c) Find the y-intercept. [2]

2. [Maximum mark: 6]

The diagram below shows the graph of a function f for $-\frac{5}{2} \leq x \leq 3$.



(a) Write down the value of $f(-2)$. [1]

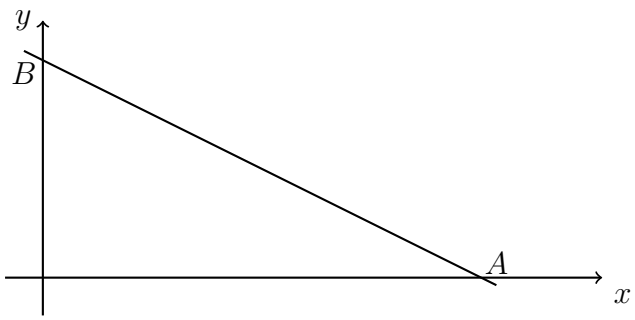
(b) Write down the value of $f^{-1}(1)$. [2]

(c) Sketch the graph of f^{-1} on the grid. [3]

3. [Maximum mark: 5]

The diagram shows the straight line L_1, which intersects the x-axis at $A(j, 0)$ and the y-axis at $B(0, k)$.

diagram is not to scale



The equation of L_1 is $y = -\frac{2}{5}x + 3$.

(a) Find the value of [2]

i. j

ii. k

(b) The line L_2 is perpendicular to L_1 and passes through $(4, 3)$.

i. Write down the gradient for the line L_2. [1]

ii. Hence, write down the equation of L_2. Leave your answer in the form $y - a = m(x - b)$. [2]

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4. [Maximum mark: 5]

Let $f(x) = x + 3$ and $g(x) = x^2$, for $x \in R$.

(a) Find x such that $f(x) = 0$. [1]

(b) Find $(f \div g)(1)$. [1]

(c) Find $(g \circ f)(x)$. [1]

(d) Find $f^{-1}(7)$. [2]