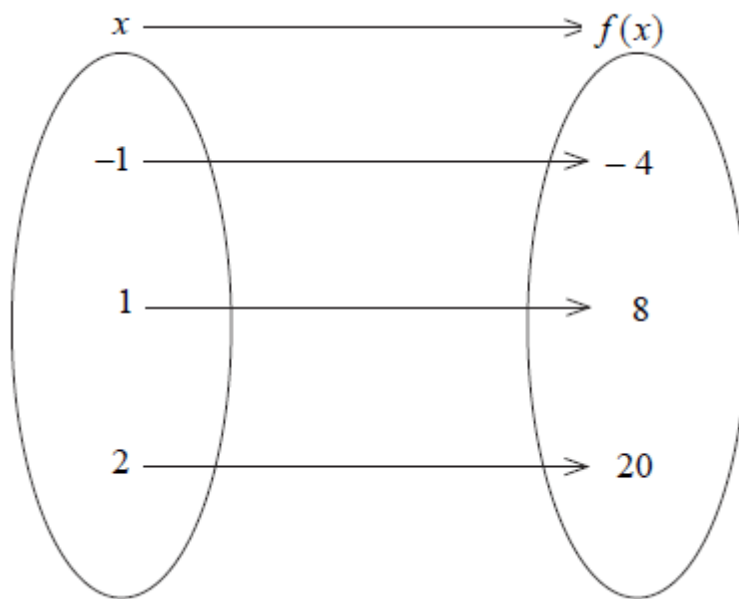


1. A quadratic function, $f(x) = ax^2 + bx$, is represented by the mapping diagram below.



- (a) Use the mapping diagram to write down **two** equations in terms of a and b .

(2)

- (b) Find the value of

(i) a ;

(ii) b .

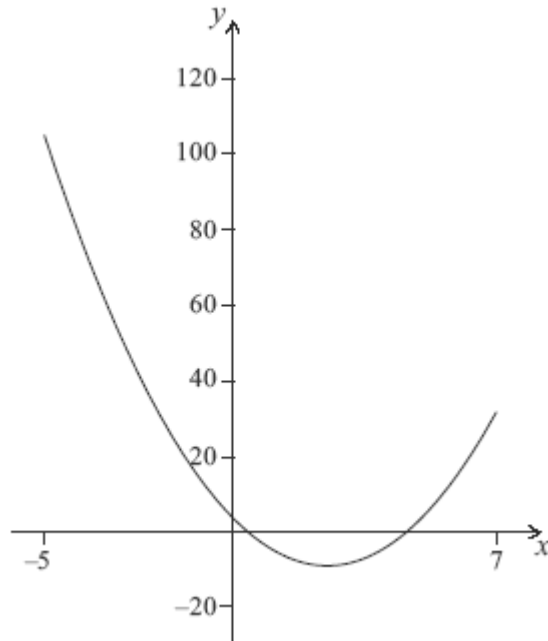
(2)

- (c) Calculate the x -coordinate of the vertex of the graph of $f(x)$.

(2)

(Total 6 marks)

2. The graph of $y = 2x^2 - rx + q$ is shown for $-5 \leq x \leq 7$.



The graph cuts the y -axis at $(0, 4)$.

- (a) Write down the value of q .

(1)

The axis of symmetry is $x = 2.5$.

- (b) Find the value of r .

(2)

- (c) Write down the minimum value of y .

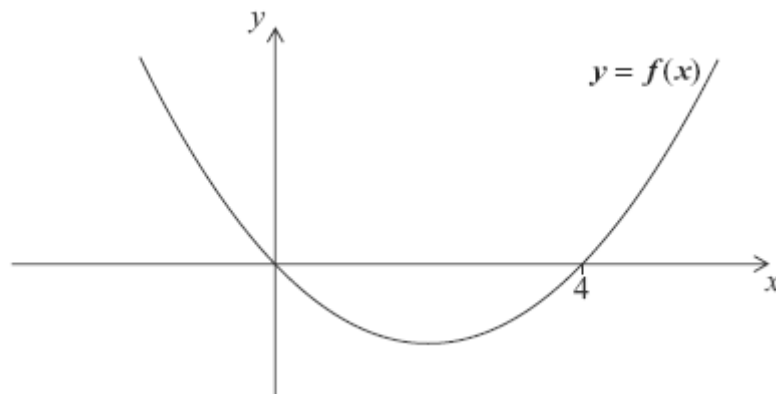
(1)

- (d) Write down the range of y .

(2)

(Total 6 marks)

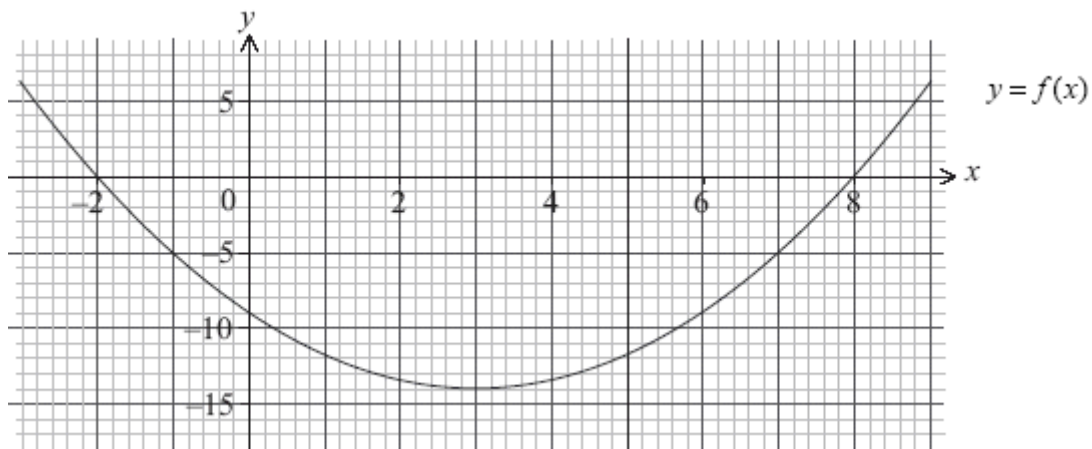
3. The following is the graph of the quadratic function $y = f(x)$.



- (a) Write down the solutions to the equation $f(x) = 0$. (2)
- (b) Write down the equation of the axis of symmetry of the graph of $f(x)$. (2)
- (c) The equation $f(x) = 12$ has two solutions. One of these solutions is $x = 6$. Use the symmetry of the graph to find the other solution. (1)
- (d) The minimum value for y is -4 . Write down the range of $f(x)$. (1)

(Total 6 marks)

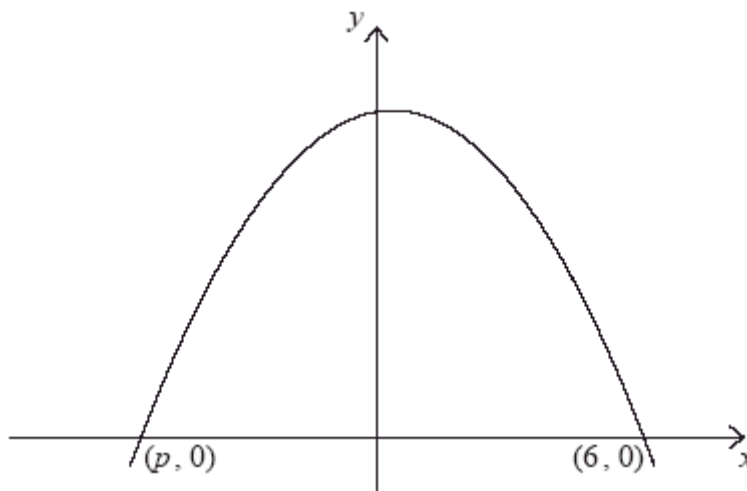
4. The graph of a quadratic function $y = f(x)$ is given below.



- (a) Write down the equation of the axis of symmetry. (2)
- (b) Write down the coordinates of the minimum point. (2)
- (c) Write down the range of $f(x)$. (2)

(Total 6 marks)

5. The diagram below shows the graph of a quadratic function. The graph passes through the points $(6, 0)$ and $(p, 0)$. The maximum point has coordinates $(0.5, 30.25)$.



(a) Calculate the value of p .

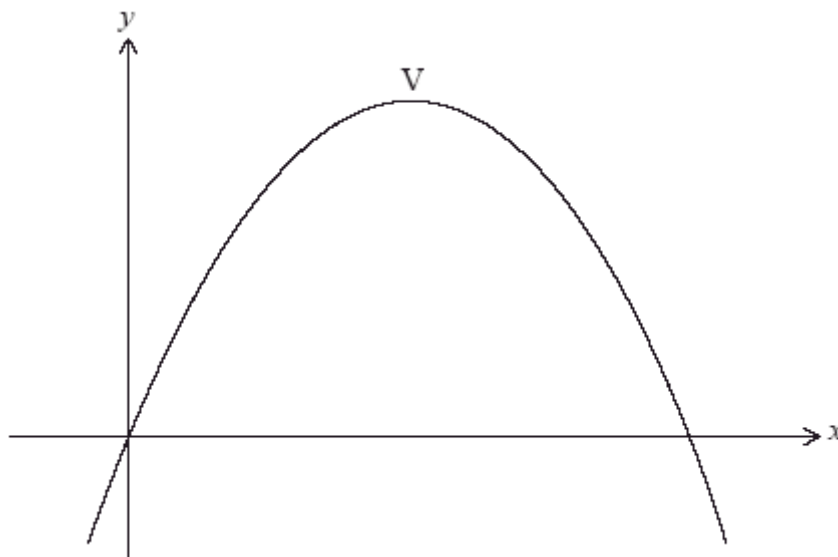
(2)

(b) Given that the quadratic function has an equation $y = -x^2 + bx + c$ where $b, c \in \mathbb{Z}$, find b and c .

(4)

(Total 6 marks)

6. A quadratic curve with equation $y = ax(x - b)$ is shown in the following diagram.



The x -intercepts are at $(0, 0)$ and $(6, 0)$, and the vertex V is at $(h, 8)$.

(a) Find the value of h .

(2)

(b) Find the equation of the curve.

(4)

(Total 6 marks)

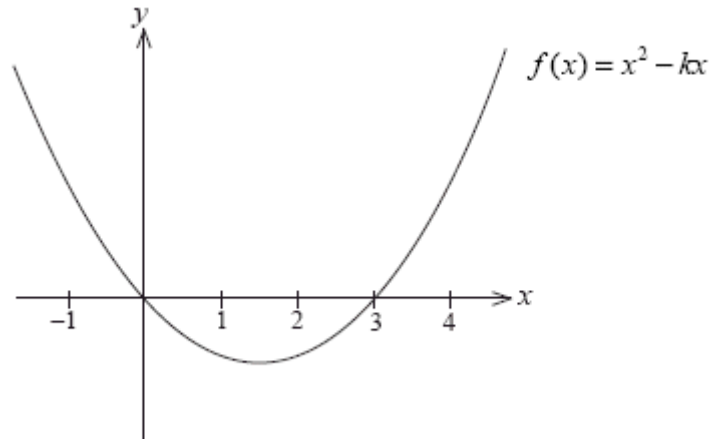
7. (a) Factorise the expression $x^2 - kx$.

(1)

- (b) Hence solve the equation $x^2 - kx = 0$.

(1)

The diagram below shows the graph of the function $f(x) = x^2 - kx$ for a particular value of k .



- (c) Write down the value of k for this function.

(1)

- (d) Find the minimum value of the function $y = f(x)$.

(3)

(Total 6 marks)

8. The graph of a quadratic function $f(x)$ intersects the horizontal axis at $(1, 0)$ and the equation of the axis of symmetry is $x = -1$.

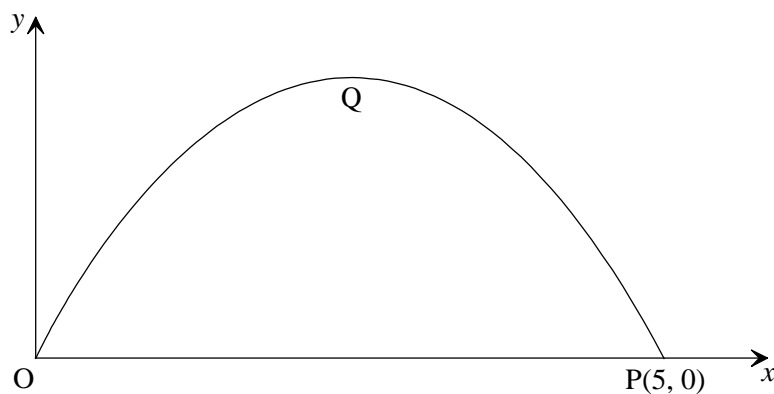
- (a) Write down the x -coordinate of the other point where the graph of $y = f(x)$ intersects the horizontal axis.
- (b) $y = f(x)$ reaches its maximum value at $y = 5$.
- (i) Write down the value of $f(-1)$.
- (ii) Find the range of the function $y = f(x)$.

(Total 6 marks)

9. (a) Sketch the graph of the function $y = 2x^2 - 6x + 5$.
- (b) Write down the coordinates of the local maximum or minimum of the function.
- (c) Find the equation of the axis of symmetry of the function.

(Total 6 marks)

10. The diagram below shows the graph of $y = c + kx - x^2$, where k and c are constants.



- (a) Find the values of k and c .
- (b) Find the coordinates of Q, the highest point on the graph.

(Total 8 marks)