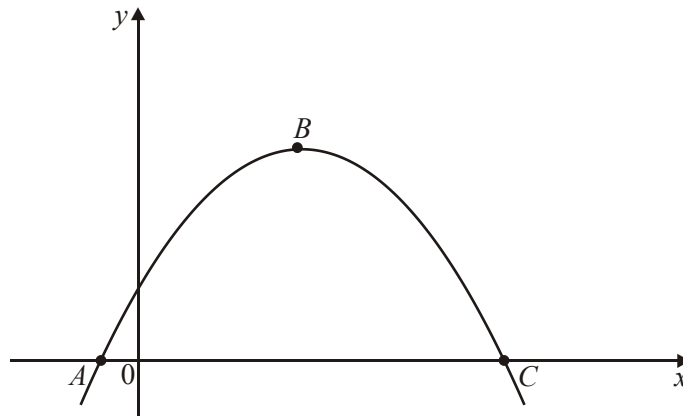


## Quadratics

- Factorize  $x^2 - 3x - 10$ .
  - Solve the equation  $x^2 - 3x - 10 = 0$ .

(Total 4 marks)

- The diagram shows the parabola  $y = (7 - x)(1 + x)$ . The points  $A$  and  $C$  are the  $x$ -intercepts and the point  $B$  is the maximum point.

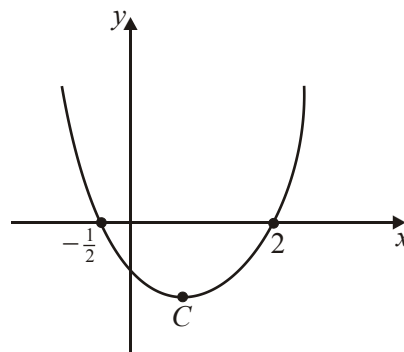


Find the coordinates of  $A$ ,  $B$  and  $C$ .

(Total 4 marks)

- The diagram represents the graph of the function

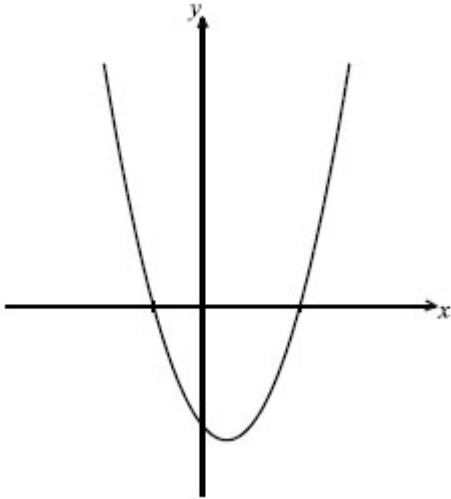
$$f: x \mapsto (x - p)(x - q).$$



- Write down the values of  $p$  and  $q$ .
- The function has a minimum value at the point  $C$ . Find the  $x$ -coordinate of  $C$ .

(Total 4 marks)

4. The following diagram shows part of the graph of  $f$ , where  $f(x) = x^2 - x - 2$ .



- (a) Find both  $x$ -intercepts.

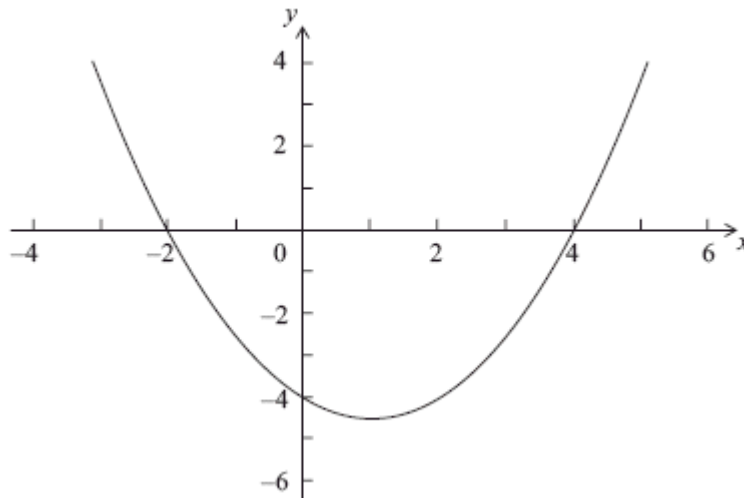
(4)

- (b) Find the  $x$ -coordinate of the vertex.

(2)

(Total 6 marks)

5. Let  $f(x) = p(x - q)(x - r)$ . Part of the graph of  $f$  is shown below.



The graph passes through the points  $(-2, 0)$ ,  $(0, -4)$  and  $(4, 0)$ .

- (a) Write down the value of  $q$  and of  $r$ .

(2)

- (b) Write down the **equation** of the axis of symmetry.

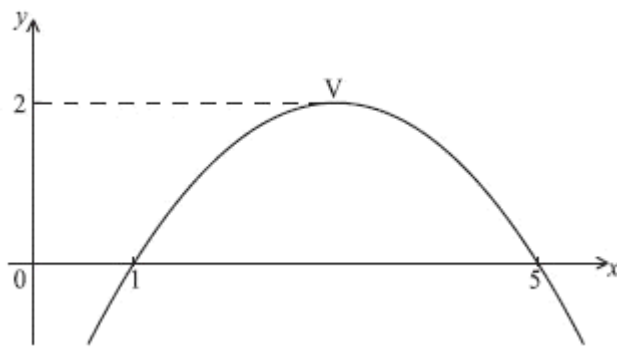
(1)

- (c) Find the value of  $p$ .

(3)

(Total 6 marks)

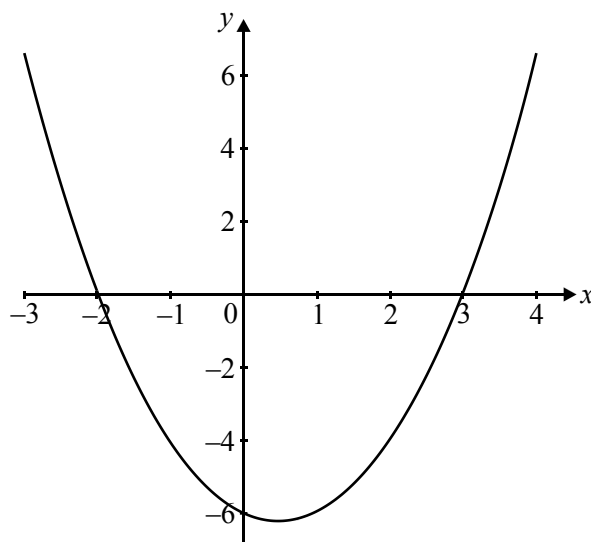
6. Part of the graph of the function  $y = d(x - m)^2 + p$  is given in the diagram below. The  $x$ -intercepts are  $(1, 0)$  and  $(5, 0)$ . The vertex is  $V(m, 2)$ .



- (a) Write down the value of
- (i)  $m$ ;
  - (ii)  $p$ .
- (b) Find  $d$ .

**(Total 6 marks)**

7. The diagram shows part of the graph with equation  $y = x^2 + px + q$ . The graph cuts the  $x$ -axis at  $-2$  and  $3$ .

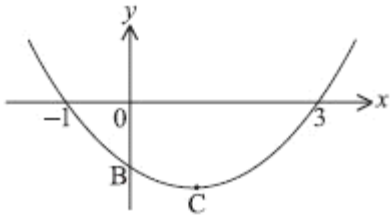


Find the value of

- (a)  $p$ ;
- (b)  $q$ .

**(Total 4 marks)**

8. Part of the graph of  $f(x) = (x - p)(x - q)$  is shown below.

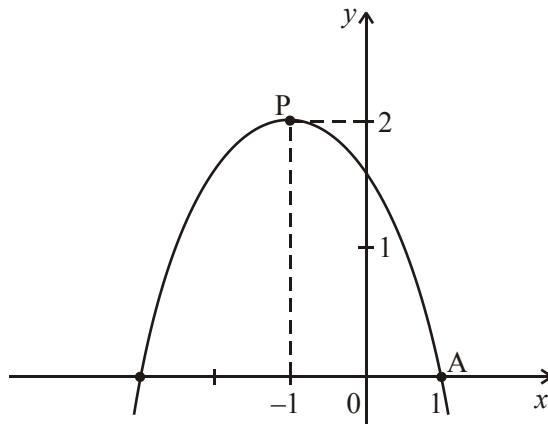


The vertex is at C. The graph crosses the  $y$ -axis at B.

- Write down the value of  $p$  and of  $q$ .
- Find the coordinates of C.
- Write down the  $y$ -coordinate of B.

**(Total 6 marks)**

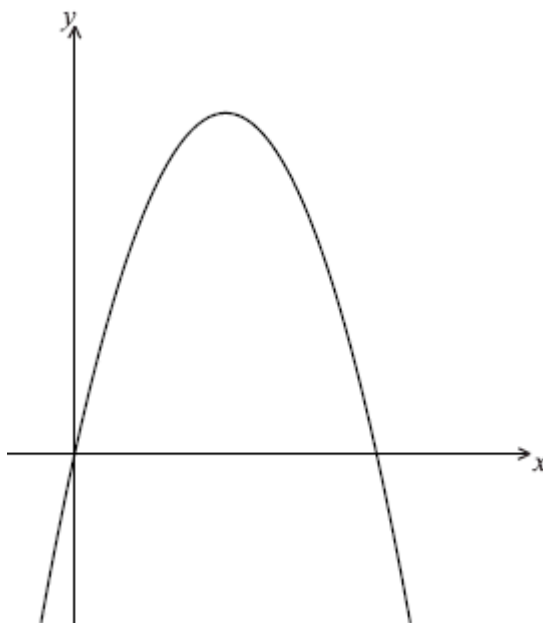
9. The diagram shows part of the graph of  $y = a(x - h)^2 + k$ . The graph has its vertex at P, and passes through the point A with coordinates  $(1, 0)$ .



- Write down the value of
  - $h$ ;
  - $k$ .
- Calculate the value of  $a$ .

**(Total 6 marks)**

10. Let  $f(x) = 8x - 2x^2$ . Part of the graph of  $f$  is shown below.



- (a) Find the  $x$ -intercepts of the graph.

(4)

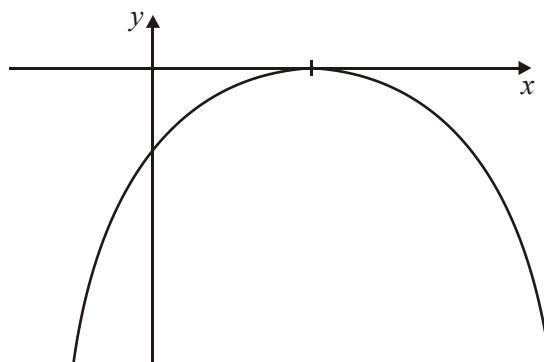
- (b) (i) Write down the equation of the axis of symmetry.

- (ii) Find the  $y$ -coordinate of the vertex.

(3)

(Total 7 marks)

11. The diagram shows the graph of the function  $y = ax^2 + bx + c$ .



Complete the table below to show whether each expression is positive, negative or zero.

Expression	positive	negative	zero
$a$			
$c$			
$b^2 - 4ac$			
$b$			

(Total 4 marks)

12. Consider the function  $f(x) = 2x^2 - 8x + 5$ .

- (a) Express  $f(x)$  in the form  $a(x - p)^2 + q$ , where  $a, p, q \in \mathbb{Z}$ .  
 (b) Find the minimum value of  $f(x)$ .

(Total 6 marks)

13. (a) Express  $f(x) = x^2 - 6x + 14$  in the form  $f(x) = (x - h)^2 + k$ , where  $h$  and  $k$  are to be determined.  
 (b) Hence, or otherwise, write down the coordinates of the vertex of the parabola with equation  $y = x^2 - 6x + 14$ .

(Total 4 marks)