

# Functions

## Class 1

**Example 1** If  $f(x) = 3x - 2$  find  $f(4)$ .

**Example 2** If  $f(x) = 3x^2 - 5x$  find

- (i)  $f(3)$
- (ii)  $f(-2)$

**Example 3** Let  $g(x) = \frac{1}{2x-1}$ . Evaluate  $g(3)$ .

**Example 4** Given  $h(x) = \frac{1}{x-1}$ , find  $h\left(\frac{1}{2}\right)$

**Example 5** Given that  $h(x) = x^2$ , write down  $h(x+3)$ .  
Hence, find the values of  $x$  for which  $h(x) = h(x+3)$ .

**Example 6** Given  $g(x) = x^2$  and  $h(x) = 2x + 3$ , find the values of  $x$  for which  $g(x) = h(x)$ .

**Example 7** Given  $f(x) = x^2 - 5x + 2$  and  $g(x) = x^2 + 1$  find

- (i)  $g(1)$
- (ii)  $x$  if  $f(x) = g(1)$

## Class 2

**Example 1** Let  $f$  be the function  $f: x \rightarrow 3x - 2$  find  $k$  if  $f(k) = 19$  where  $k \in R$

**Example 2** If  $g(x) = 2x - 5$  find  $k$  if  $g(k+1) = 19$ , where  $k \in R$ .

**Example 3** If  $f(x) = 4x + b$  find the value of  $b$  given that  $f(2) = 11$ , where  $b \in R$

**Example 4** Given that  $g(x) = ax + 5$  find the value of  $a$  given that  $g(2) = -9$ , where  $a \in R$

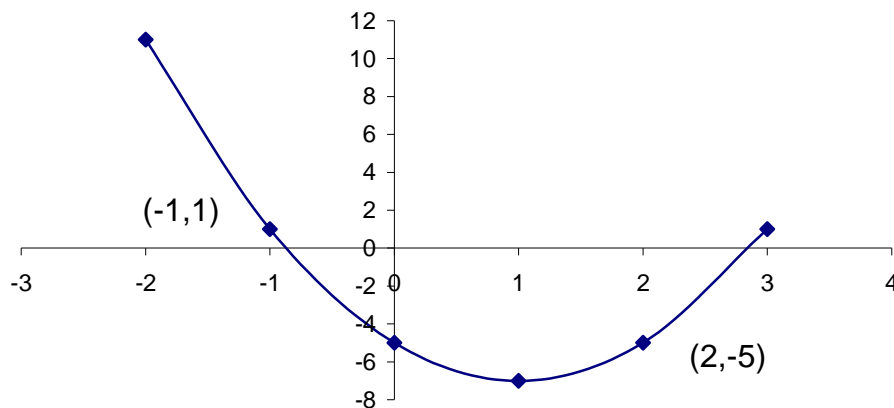
**Example 5** If  $f(x) = 2x - 9$  find the value of  $k$  if  $f(0) = k[f(3)]$ , where  $k \in R$ .

**Example 6** If  $f(x) = ax + b$  find the value of  $a$  and  $b$  given that  $f(2) = 7$  and  $f(3) = 13$

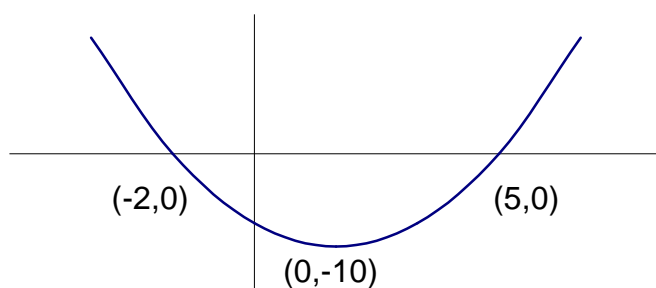
**Example 7**  $f(x) = ax^2 + bx - 8$ , where  $a$  and  $b$  are real numbers.

If  $f(1) = -9$  and  $f(-1) = 3$ , find the value of  $a$  and the value of  $b$ .

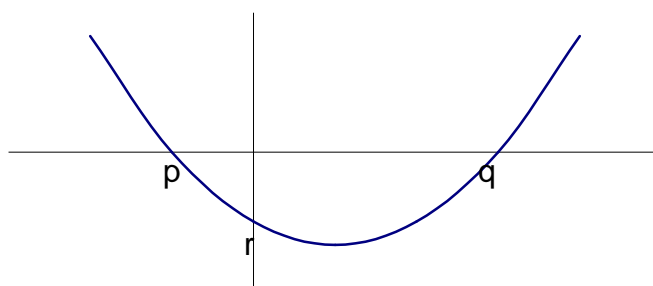
**Example 8** If  $g(x) = 2x^2 + ax + b$  find the value of  $a$  and the value of  $b$ .



**Example 9** If  $f(x) = ax^2 + bx + c$  find the values of  $a, b$  and  $c$ .



**Example 10** The curve  $f(x) = x^2 - 2x - 3$  is as shown find the points  $p, q$  and  $r$ .



## Graphs

### Class 3

**Example 1** Using the same axes draw the graph of  $x + 2y = 6$  and  $x - 2y = 2$ .

Use the graph to find the point of intersection and using simultaneous equations verify this point is the point of intersection.

**Example 2** Draw the graph of  $f(x) = 2x^2 - 2x - 3$  in the domain  $-2 \leq x \leq 3$ ,  $x \in R$ .

**Example 3** Draw the graph of  $f(x) = 3 + x - 2x^2$  in the domain  $-2 \leq x \leq 3$ ,  $x \in R$ .

## Class 4

**Example 1** Using the same axes and the same scales, draw a graph of

$$f(x) = x^2 + 3x - 2$$

$$g(x) = 3x + 5 \text{ in the domain } -4 \leq x \leq 3, x \in R.$$

**Example 2** A rectangle has one-side  $x$  meters long. The rectangle has a total perimeter of 10 meters. Show that the area of the rectangle is  $x(5 - x)$ .

Draw the graph of the function

$$f(x) = 5x - x^2 \text{ in the domain } 0 \leq x \leq 5, x \in R.$$

Use your graph to find

- (i) the width of the rectangle when the area is  $4.7m^2$
- (ii) the maximum area of the rectangle
- (iii) the dimensions of the maximum area
- (iv) the area when the width is  $4.5m$ .

**Example 3** The height of a missile above the ground  $x$  seconds after being fired is given by  $f(x)$ , where

$$f(x) = 6x - x^2 \text{ in the domain } 0 \leq x \leq 6, x \in R.$$

Draw a graph of  $f(x)$  and use it to find

- (i) the height of the missile after 1.5 seconds
- (ii) the maximum height reached by the missile
- (iii) the time taken to reach the maximum height
- (iv) the time the missile is over the ground.