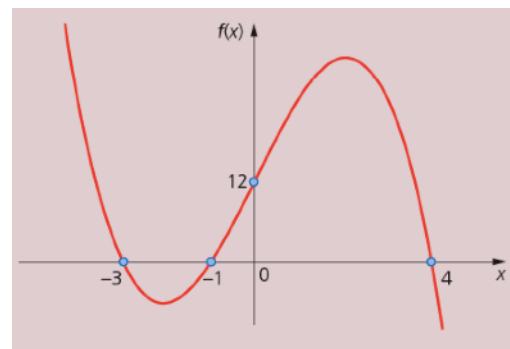


- 1 Determine the nature of the roots of;  $x^2 + 4x + 1 = 0$
- 2 For what value of  $p$  does  $x^2 - 2x + p = 0$  have equal roots?

3 Show that  $x-2$  is a factor of  $2x^3 - 11x^2 + 17x - 6$

4 Find the equation of the function shown.



5 Find the quotient and remainder when  $3x^3 - x^2 + 2x - 5$  is divided by  $x - 2$

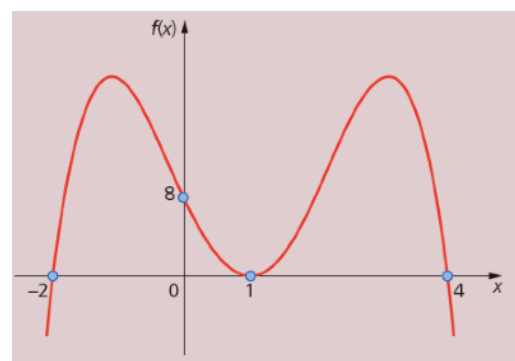
6 Solve  $2x^4 - 5x^2 - 12 = 0$

7 Show that the line  $y = 4x - 4$  is a tangent to  $y = x^2$  and find the point of contact.

8 Find the range of values for which  $5x^2 - 3mx + 5 = 0$  has two real and distinct roots.

9 Fully factorise  $x^3 - x^2 - 5x - 3$

10 Find the equation of the function shown.



11 Find  $m$ , given  $x^2 + (m + 1)x + 9 = 0$  has equal roots.

12 Find the coordinates of the points where the line  $y = 2x + 3$  meets the curve  $y = x^3 + 2x^2 + x + 1$ .

13 Find the value of  $c$  such that  $y = x + c$  is a tangent to  $y = x^2 - 3x$

14 The remainder when  $x^4 - x^3 + x^2 + ax + b$  is divided by  $(x - 1)$  is 0, and when divided by  $(x - 2)$  the remainder is 11. Find  $a$  and  $b$ .

15 Solve  $x^2 - 2x - 3 > 0$

16  $2x - 1$  is a factor of  $f(x) = 2x^3 - 17x^2 + 40x + p$ . Find  $p$ , and factorise  $f(x)$  fully.

17 Show that the roots of the equation  $(x - 2)(x - 3) = k^2$  are always real.