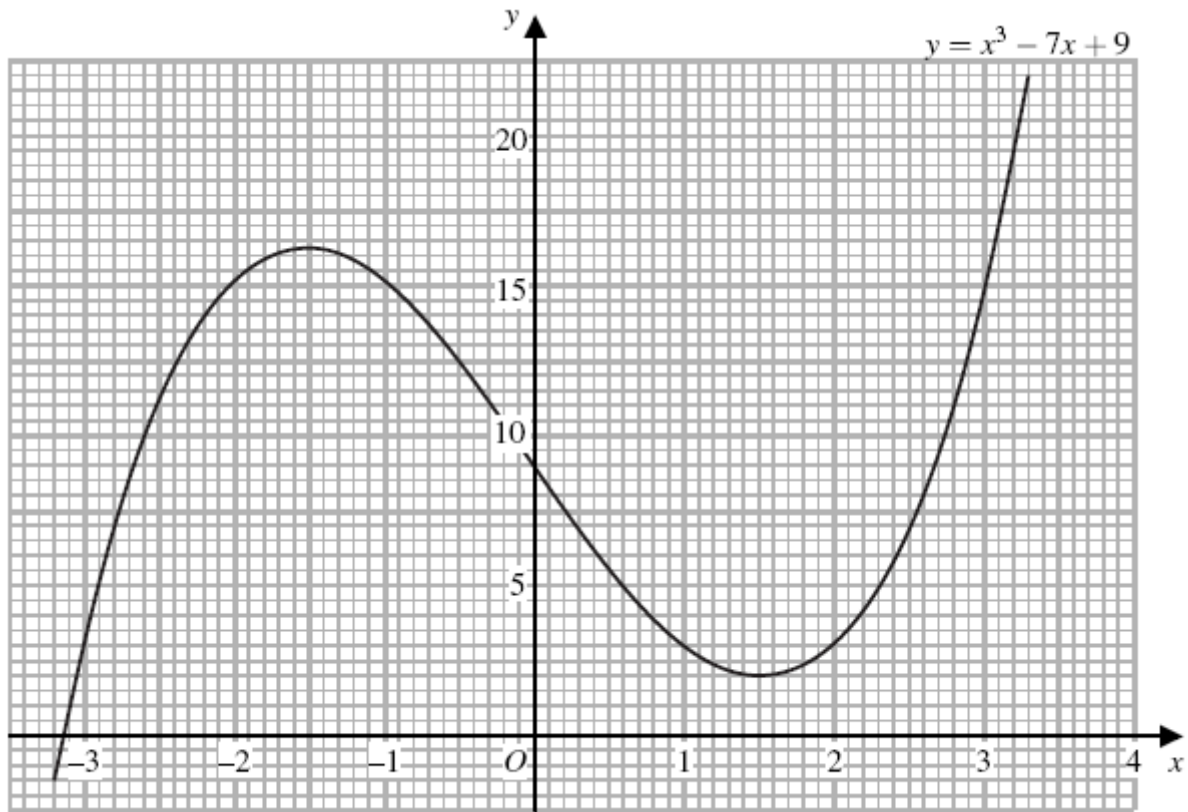


Solving equations using graphs

Part of the graph of $y = x^3 - 7x + 9$ is shown on the grid.



- (a) The graph of $y = x^3 - 7x + 9$ and the line with equation $y = k$, where k is an integer, have 3 points of intersection. Find the greatest possible value of the integer k .
- (b) By drawing a suitable straight line on the grid, find estimates of the solutions of the equation $x^3 - 6x - 2 = 0$. Give your answers correct to 1 decimal place.
- (c) State the number of solutions of each of the following equations:
 (i) $x^3 - 7x + 9 = 8$ (ii) $x^3 - 7x + 9 = 20$ (iii) $x^3 - 7x + 9 = 1$
- (d) The graph of $y = x^3 - 7x + 9$ and the line with equation $y = k$, where k is an integer, have 3 points of intersection. Find the least possible value of the integer k .
- (e) By drawing a suitable straight line on the grid, find estimates of the solutions of each of the following equations. Give your answers correct to 1 decimal place.
 (i) $x^3 - 7x + 4 = 0$ (ii) $x^3 - 9x + 1 = 0$ (iii) $x^3 - 8x + 3 = 0$
- (f) Find the equation of the straight line you would need to draw on the graph above in order to solve each of the following equations (don't actually draw the line):
 (i) $x^3 - 4x + 2 = 0$ (ii) $x^3 - 10x + 13 = 0$ (iii) $x^3 - 5x - 3 = 0$
 (iv) $x^3 - 11x = 0$ (v) $2x^3 - 12x + 8 = 0$ (vi) $2x^3 + 4x + 7 = 0$