

"Show that" with algebra

1 Show by substitution that $y = 5$ is the solution to the equation $19 - 3y = 4$

2 a) Show that when $a = 5$, $5a + 7 > 2a + 19$

b) Find the set of values for which $5a + 7 > 2a + 19$

3 a) Show that $4(5a + 2b) + 2(6a + 3b) \equiv 32a + 14b$.

b) Show that $4(3a + b) - 2(a + 2b) \equiv 10a$.

c) Show that $5(4a + 3b) - 3(2a - 3b) \equiv 2(7a + 12b)$.

4 a) Show that the point $(4, 3)$ lies on the line $y = 3x - 9$

b) Tick the points that lie on the line $y = 5 - 3x$

Show workings to justify your answers.

$(2, -1)$

$(-2, 1)$

$(4, -7)$

$(-3, 10)$

5 a) Show that $(x + 5)^2 \equiv x^2 + 10x + 25$

b) Show that $(x - 3)^2 \equiv x^2 - 6x + 9$

c) Show that $(x + a)^2 \equiv x^2 + 2ax + a^2$

6 Show that $y - 4$ is a factor of $y^2 + 4y - 32$

- 7 v , u , a and s are connected by the formula $v^2 = u^2 + 2as$.
- a) Show that when $u = 10$, $a = 2$ and $s = 11$, the value of v is an integer.

b) Show that when $v = 6$, $u = 9$ and $s = 5$, the value of a is negative.

- 8 Show that the lines with equations $y = 3x + 1$ and $6x - 2y = 10$ are parallel.

- 9 Show that $p = 4$, $q = 3$ is the solution to the simultaneous equations:
 $3p + 2q = 18$
 $2p - q = 5$

- 10 Show that the formula $p = \frac{3q + 2t}{4}$ can be rearranged to $q = \frac{4qp - 2t}{3}$

- 11 a) Show that $x = 8$ is a solution to the equation $x^2 = 5x + 24$

b) Determine the other solution to the equation $x^2 = 5x + 24$

$$x = \boxed{}$$

- 12 The volume, V , of a cone of radius r and height h is given by the formula $V = \frac{1}{3} \pi r^2 h$.

a) Show that $h = \frac{3V}{\pi r^2}$

b) Find a formula for r in terms of V and h .

- 13 Show that the lines with equations $x + 2y = 12$ and $4y = 6x + 7$ are not perpendicular.

- 14 Show algebraically that the product of two odd numbers is also odd.