

Simultaneous Equations

1. Calculate the values for x and y in the following pairs of equations.

(a) $5x + 3y = 9$ $2x - 3y = 12$

(b) $2x - y = 9$ $2x + 3y = 13$

(c) $x = 3y$ $4x - 5y = 35$

(d) $x + 7y = 10$ $3x - 2y = 7$

(e) $5x + y = 10$ $7x - 3y = 14$

(f) $\frac{1}{3}x + y = \frac{10}{3}$ $2x + \frac{y}{4} = \frac{11}{4}$

(g) $3x - 2y = \frac{5}{2}$ $\frac{x}{3} + 3y = -\frac{4}{3}$

(h) $7x + 3y = -15$ $12y - 5x = 39$

(i) $3x - 5y = 204$ $4x + 5y = 412$

(j) $x - 5y = 95$ $2x + y = 245$

2. An order of 500 bricks and 80 breeze blocks from a builder's merchant costs £392.00.

Another order of 200 bricks and 50 breeze blocks costs £191.00.

Calculate the cost of one breeze block and of 100 bricks.

Answers:

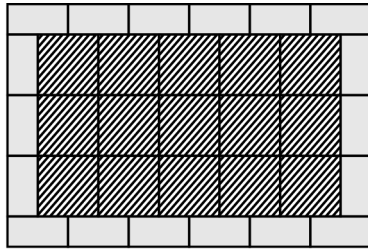
1. (a) $x = 3, y = -2$; (b) $x = 5, y = 1$; (c) $x = 15, y = 5$; (d) $x = 3, y = 1$;

(e) $x = 2, y = 0$; (f) $x = 1, y = 3$; (g) $x = \frac{1}{2}, y = -\frac{1}{2}$; (h) $x = -3, y = 2$;

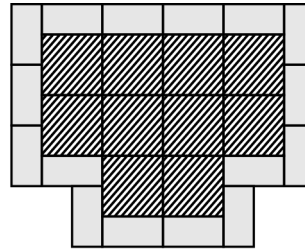
(i) $x = 88, y = 12$; (j) $x = 120, y = 5$.

2: breeze block = £1.90; 100 bricks = £48.00.


3. The two designs of patio shown below are constructed from paving slabs and edging as in the diagrams. The total cost of materials used in each patio is shown.




total cost of materials: £159.90



total cost of materials: £123.80

paving slab: 

edging: 

Use the information to write two simultaneous equations.

Solve them to find the cost of a paving slab and of a piece of edging.

4. A resistance thermometer has a resistance of 101.0Ω at a temperature of 20°C and 103.0Ω at 60°C .

The law relating resistance, R , with temperature, θ , is:

$$R = R_0(1 + \alpha\theta)$$

where R_0 is the resistance at 0°C , R is the resistance at temperature, θ , and α is the temperature coefficient of resistance.

Calculate R_0 and α for this resistance thermometer.

(hint: use $1/R_0$ as one of the unknowns, α as the other)

5. An aircraft, flying at a steady air speed A , takes 2 hours to travel 600 km against a head wind, speed W . The return trip take 1hr 40 mins.

(hint: work in km and hours)

(a) Write distance = speed x time equations, in terms of A and W , for the outward and return journeys.

(b) Solve the equations to find the airspeed and the windspeed.

Answers:

3. slab: £5.50, edging: £4.30

4. $R_0 = 100$; $\alpha = 5 \times 10^{-4}$

5. 330 km/hr, 30 km/hr