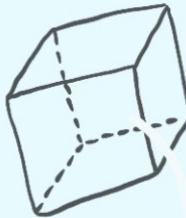


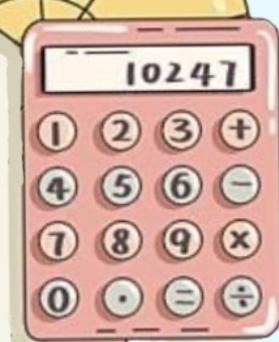
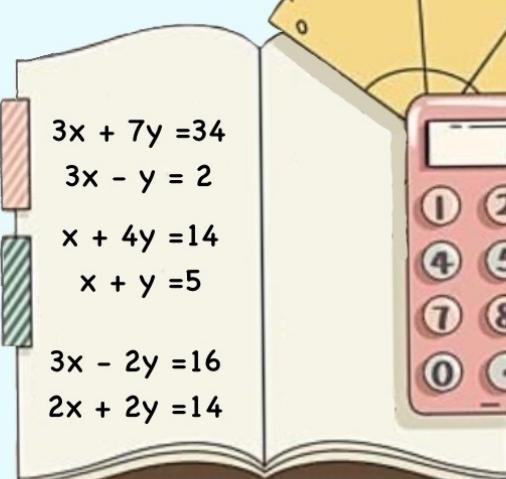
(+)



Simultaneous



(X)



$\sqrt{3}$

Question 1

Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned} 2x + 3y &= 13 \\ x + 2y &= 9 \end{aligned}$$

[3]

$$x = 9 - 2y$$

$$18 - 4y + 3y = 13$$

$$-y = -5$$

$$y = 5$$

$$x = 9 - 10$$

$$= -1$$

Question 2

Solve the simultaneous equations.
You must show all your working.

$$\begin{cases} \frac{1}{2}x - 8y = 1 \\ x + 2y = 6\frac{1}{2} \end{cases}$$

[3]

$$x - 16y = 2$$

$$x + 2y = 6.5$$

$$\underline{-18y = -4.5}$$

$$y = \frac{4.5}{18} = \frac{1}{4}$$

$$x + 2y = 6.5$$

$$x + \frac{1}{2} = 6.5$$

$$x = 6$$

Question 3

Solve the simultaneous equations.

$$\begin{array}{r} 2x - y = 7 \\ 3x + y = 3 \\ \hline 5x = 10 \\ x = 2 \\ 6 + y = 3 \\ y = -3 \end{array} \quad [2]$$

Question 4

Find the co-ordinates of the point of intersection of the two lines.

$$\begin{array}{r} 2x - 7y = 2 \quad \times 2 \\ 4x + 5y = 42 \\ \hline 4x + 14y = 4 \\ 19y = 38 \\ y = 2 \end{array} \quad [3]$$

$$4x + 5y = 42$$

$$4x + 14y = 4$$

$$19y = 38$$

$$y = 2$$

$$2x - 14 = 2$$

$$2x = 16$$

$$x = 8$$

Question 5

Solve the simultaneous equations.

$$\begin{array}{l} 3x + 5y = 24 \\ x + 7y = 56 \times 3 \end{array}$$

$$\begin{array}{r} y \\ 56 \\ \times 3 \\ \hline 168 \end{array}$$

$$\begin{array}{r} 168 \\ - 24 \\ \hline 144 \end{array}$$

[3]

$$\begin{array}{r} 3x + 21y = 168 \\ 3x + 5y = 24 \\ \hline \end{array}$$

$$16y = 144$$

$$y = \frac{72}{8} = 9$$

$$\begin{array}{r} 568 \\ - 56 \\ \hline 7 \end{array}$$

$$\begin{array}{l} x = 56 - 63 \\ = - 7 \end{array}$$

Question 6

Solve the simultaneous equations.

$$\begin{array}{l} x + 5y = 22 \\ x + 3y = 12 \end{array}$$

$$\begin{array}{l} 2y = 10 \\ y = 5 \end{array}$$

$$x = 12 - 15$$

$$x = - 3$$

[2]

Question 7

Solve the simultaneous equations.

$$\begin{array}{r} 3x + y = 30 \times 3 \\ 2x - 3y = 53 \\ \hline 9x + 3y = 90 \end{array}$$

$$11x = 143$$

$$x = 13$$

$$39 + y = 30$$

$$y = -9$$

[3]

Question 8

Solve the simultaneous equations.

$$\begin{array}{r} x - 5y = 0 \times 2 \\ 15x + 10y = 17 \\ \hline 2x - 10y = 0 \end{array}$$

$$17y = 17$$

$$y = 1$$

$$x - 5 = 0$$

$$x = 5$$

[3]

Question 9

Solve the simultaneous equations.

$$\begin{array}{r} x + 2y = 3 \quad \times 2 \\ 2x - 3y = 13 \\ \hline 2x + 4y = 6 \\ - 3y = 7 \\ y = -1 \\ x - 2 = 3 \\ x = 5 \end{array} \quad [3]$$

Question 1

Solve the simultaneous equations $2x + y = 5$ and $2y = x - 10$. [3]

$$\begin{aligned} y &= 5 - 2x \\ 2(5 - 2x) &= x - 10 \\ 10 - 4x &= x - 10 \\ -5x &= -20 \\ x &= 4 \\ y &= 5 - 8 \\ &= -3 \end{aligned}$$

Question 2

Solve the simultaneous equations.

[3]

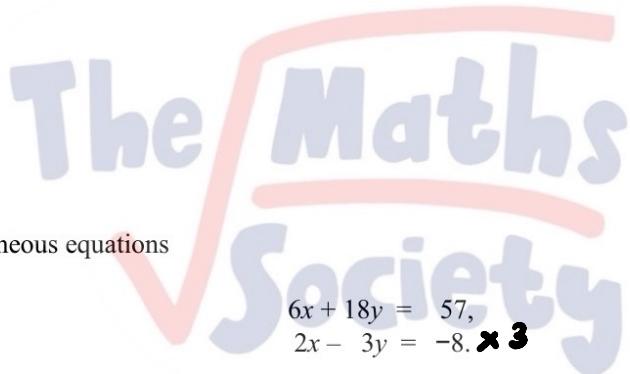
$$\begin{array}{r} 5x - y = -10 \quad \times 2 \\ x + 2y = 9 \end{array}$$

$$\begin{array}{r} 10x - 2y = -20 \\ \hline 11x = -11 \\ x = -1 \end{array}$$

$$\begin{array}{r} -1 + 2y = 9 \\ 2y = 10 \\ y = 5 \end{array}$$

Question 3

Solve the simultaneous equations



[3]

$$6x + 18y = 57,$$

$$2x - 3y = -8. \quad \times 3$$

$$6x - 9y = -24$$

$$6x = -24 + 9y$$

$$\therefore -24 + 9x + 18y = 57$$

$$27y = 81$$

$$y = 3$$

$$\therefore 2x - 3(3) = -8$$

$$2x = 1 \quad x = \frac{1}{2}$$

Question 4

Solve the simultaneous equations

$$2y + 3x = 6, \quad x = 4y + 16. \quad [3]$$

$$2y + 3(4y + 16) = 6$$

$$2y + 12y + 48 = 6$$

$$14y = -42$$

$$y = -3$$

$$x = 4(-3) + 16 \\ = 4$$

Question 5

Solve these simultaneous equations.

$$x + 2y - 18 = 0 \\ 3x - 4y - 4 = 0 \quad [3]$$

$$x = 18 - 2y$$

$$3(18 - 2y) - 4y - 4 = 0$$

$$54 - 6y - 4y - 4 = 0$$

$$10y = 50$$

$$y = 5$$

$$x = 18 - 2(5)$$

$$= 8$$

The Maths Society

Question 6

Solve the simultaneous equations

$$2x + \frac{1}{2}y = 1, \quad [3]$$

$$6x - \frac{3}{2}y = 21.$$

$$\begin{array}{r} 6x + \frac{3}{2}y = 3 \\ 6x - \frac{3}{2}y = 21 \\ \hline 12x = 24 \\ x = 2 \end{array}$$

$$4 + \frac{1}{2}y = 1$$

$$\begin{aligned} \frac{1}{2}y &= -3 \\ y &= -6 \end{aligned}$$

Question 7

Solve the simultaneous equations

$$\frac{1}{2}x + 2y = 16,$$

$$2x + \frac{1}{2}y = 19. \quad [3]$$

$$\begin{aligned} \frac{1}{2}x &= 16 - 2y \\ x &= 32 - 4y \end{aligned}$$

$$2(32 - 4y) + \frac{1}{2}y = 19$$

$$64 - 8y + \frac{1}{2}y = 19$$

$$- \frac{15}{2}y = -45$$

$$\frac{1}{2}x + 12 = 16$$

$$\begin{aligned} \frac{1}{2}x &= 4 \\ x &= 8 \end{aligned}$$

The Maths Society

Question 8

Solve the simultaneous equations

$$4x + 5y = 0, \quad [4]$$
$$8x - 15y = 5.$$

$$4x = -5y$$
$$x = -\frac{5}{4}y$$

$$2(8x) - 5\left(-\frac{5}{4}y\right) - 15y = 5$$

The Maths Society

$$\begin{aligned} -25y &= 5 \\ y &= -\frac{1}{5} \end{aligned} \quad \left. \begin{array}{l} x = -\frac{5}{4}x - \frac{1}{8} \\ x = \frac{1}{4} \end{array} \right\}$$

Question 1

Solve the simultaneous equations.
You must show all your working.

$$y = \frac{x}{2}$$
$$2x - y = 1 \quad [3]$$

$$2x - \frac{x}{2} = 1$$
$$\frac{3x}{2} = 1$$
$$x = -\frac{2}{3}$$
$$y = -\frac{2}{3} \times 1$$
$$y = -\frac{2}{3}$$

The Maths Society

Question 2

Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned}\frac{1}{2}x + y &= 8 \\ x - 2y &= 2\end{aligned}$$

[3]

$$x = 2 + 2y$$

$$- \cdot + y + y = 8$$

$$2y = 7$$

$$y = \frac{7}{2}$$

$$x - 2(7) = 2$$

Question 3

Solve the simultaneous equations.
Show all your working.

$$\begin{aligned}3x + 4y &= 14 \\5x + 2y &= 21 \quad \text{x } 2\end{aligned}$$

[3]

$$3x+4y=11$$

$$10x + 4y = 42$$

$$\begin{array}{r} -7x = -28 \\ x = 4 \end{array}$$

$$12 + 4y = 14$$

$$4y_j^2 = y_2$$

The Maths Society

Question 4

Solve the simultaneous equations.
You must show all your working.

[4]

$$\begin{array}{r} 5x + 2y = -2 \\ 3x - 5y = 17.4 \end{array}$$

$$\begin{array}{r} 15x + 6y = -6 \\ 15x - 25y = 87 \\ \hline 31y = -93 \\ y = -3 \end{array}$$

$$5x - 6 = -2$$

The Maths Society

Question 5

Solve the simultaneous equations.

$$\begin{array}{r} 0.4x - 5y = 27 \\ 2x + 0.2y = 9 \end{array}$$

[3]

$$\begin{array}{r} 2x - 25y = 135 \\ 2x + 0.2y = 9 \\ \hline - 25.2y = 126 \end{array}$$

$$y = \frac{-126}{25.2}$$

$$y = -5$$

$$\begin{aligned} 0.4x &= 2 \\ x &= \frac{2}{0.4} \\ x &= 5 \end{aligned}$$

The Maths Society

Question 6

Robbie pays \$10.80 when he buys 3 notebooks and 4 pencils.

Paniz pays \$14.50 when she buys 5 notebooks and 2 pencils.

Write down simultaneous equations and use them to find the cost of a notebook and the cost of a pencil.

Let 1 notebook be a
1 pencil be b

[5]

$$3a + 4b = 10.8$$

$$5a + 2b = 14.5$$

$$3a + 4b = 10.8$$

$$\underline{10a + 4b = 29}$$

$$\underline{-7a = -18.2}$$

$$a = 2.6$$

Question 7

Find the value of $2x + y$ for the simultaneous equations.

$$\begin{aligned} 3x + 5y &= 48 \\ 2x - y &= 19 \end{aligned}$$

[4]

$$\begin{aligned} y &= 2x - 19 \\ 3x + 10x - 95 &= 48 \\ 13x &= 143 \\ x &= 11 \end{aligned}$$

$$\begin{aligned} y &= 22 - 19 \\ &= 3 \end{aligned}$$

The Maths Society

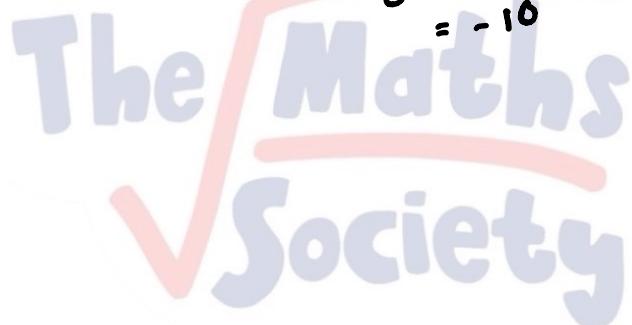
$$\begin{aligned} 2x + y &= 2(11) + 3 \\ &= 25 \end{aligned}$$

Question 8

Solve the simultaneous equations.

$$\begin{array}{r} \frac{2x+y}{2} = 7 \\ \frac{2x-y}{2} = 17 \\ \hline \end{array} \quad [3]$$
$$\rightarrow \begin{array}{r} 2x+y=14 \\ 2x-y=34 \\ \hline 4x=48 \\ x=12 \end{array}$$

$$\begin{array}{r} y=14-24 \\ = -10 \end{array}$$



Question 9

Find the co-ordinates of the point of intersection of the straight lines

$$\begin{array}{r} 2x+3y=11, \times 3 \\ 3x-5y=-12, \times 2 \\ \hline \end{array} \quad [3]$$
$$\begin{array}{r} -6x+9y=33 \\ +6x-10y=-24 \\ \hline 19y=57 \\ y=3 \end{array}$$

$$\begin{array}{l} 2x+9=11 \\ 2x=2 \end{array} \quad | \quad x=1$$

The Maths Society

Question 10

Solve the simultaneous equations

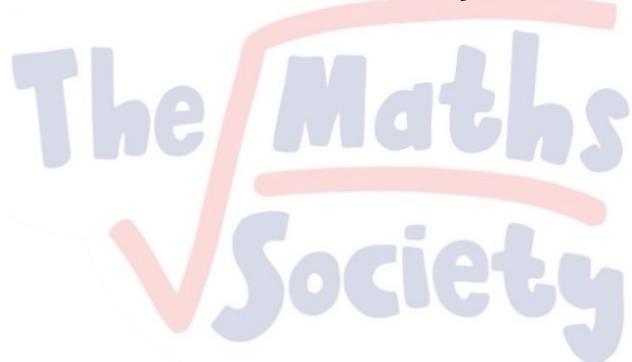
$$\begin{array}{l} 0.4x + 2y = 10, \quad \times 5 \\ 0.3x + 5y = 18. \quad \times 2 \\ \hline \end{array}$$

~~$$\begin{array}{r} 2x + 10y = 50 \\ -0.6x - 10y = -36 \\ \hline 1.4x = 14 \end{array}$$~~

$$x = \frac{140}{14} = 10$$

[3]

$$\begin{array}{l} 4 + 2y = 10 \\ 2y = 6 \\ y = 3 \end{array}$$



Question 11

Solve the simultaneous equations

$$\frac{1}{2}x + y = 5, \quad \times 2$$

$$x - 2y = 6.$$

$$\begin{array}{r} x + 2y = 10 \\ \hline 2x = 16 \\ x = 8 \end{array}$$

[3]

$$\begin{array}{r} 8 - 2y = 6 \\ -2y = -2 \\ y = 1 \end{array}$$