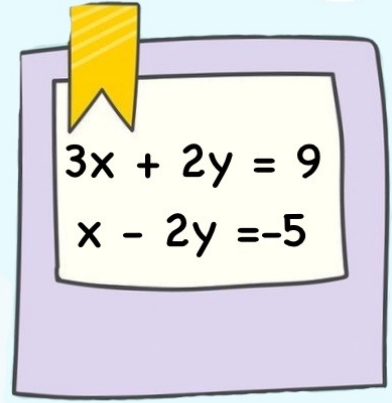
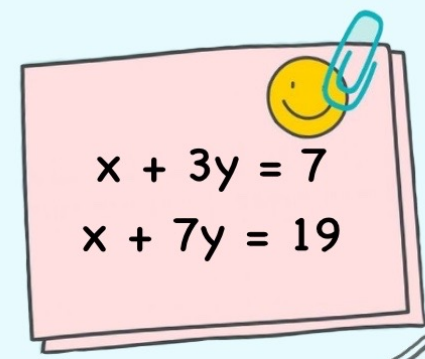


$$x + 3y = 6$$

$$x - y = 2$$


$$3x + 2y = 9$$

$$x - 2y = -5$$


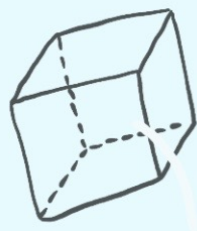
$$x + 3y = 7$$

$$x + 7y = 19$$

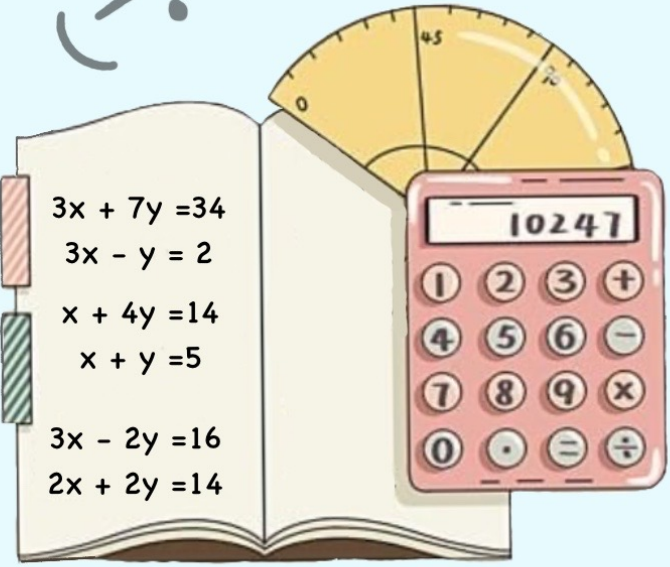

(+)



# Simultaneous



(x)

$$3x + 7y = 34$$

$$3x - y = 2$$

$$x + 4y = 14$$

$$x + y = 5$$

$$3x - 2y = 16$$

$$2x + 2y = 14$$


$\sqrt{3}$

## Question 1

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

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

[3]

$$\begin{aligned}x &= 9 - 2y \\ 18 - 4y + 3y &= 13 \\ -y &= -5 \\ y &= 5 \\ x &= 9 - 10 \\ &= -1\end{aligned}$$

## Question 2

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

$$\begin{aligned}\frac{1}{2}x - 8y &= 1 \\ x + 2y &= 6\frac{1}{2}\end{aligned}$$
$$\begin{aligned}x - 16y &= 2 \\ x + 2y &= 6.5\end{aligned}$$

[3]

$$\begin{aligned}-18y &= -4.5 \\ y &= \frac{4.5}{18} = \frac{1}{4} \\ x + 2y &= 6.5 \\ x + \frac{1}{2} &= 6.5 \\ x &= 6\end{aligned}$$

### 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.

$$\begin{array}{r} 2x - 7y = 2 \times 2 \\ 4x + 5y = 42 \\ -4x + 14y = 4 \\ \hline 19y = 38 \\ y = 2 \\ 2x - 14 = 2 \\ 2x = 16 \\ x = 8 \end{array} \quad [3]$$

### Question 5

Solve the simultaneous equations.

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

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

$$16y = 144$$

$$y = \frac{144}{8} = 18$$

$$\begin{aligned} x &= 56 - 63 \\ &= -7 \end{aligned}$$

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

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

$$\begin{array}{r} 568^{13} \\ -56 \\ \hline 7 \end{array}$$

[3]

### Question 6

Solve the simultaneous equations.

$$\begin{array}{r} x + 5y = 22 \\ -x + 3y = 12 \\ \hline \end{array}$$

$$2y = 10$$

$$y = 5$$

$$x = 12 - 15$$

$$x = -3$$

[2]

## Question 7

Solve the simultaneous equations.

$$\begin{aligned}3x + y &= 30 \times 3 \\2x - 3y &= 53 \\ \hline 9x + 3y &= 90 \\ \hline 11x &= 143 \\ x &= 13 \\ 39 + y &= 30 \\ y &= -9\end{aligned}$$

[3]

## Question 8

Solve the simultaneous equations.

$$\begin{aligned}x - 5y &= 0 \times 2 \\15x + 10y &= 17 \\ \hline 2x - 10y &= 0 \\ \hline 17y &= 17 \\ y &= 1 \\ x - 5 &= 0 \\ x &= 5\end{aligned}$$

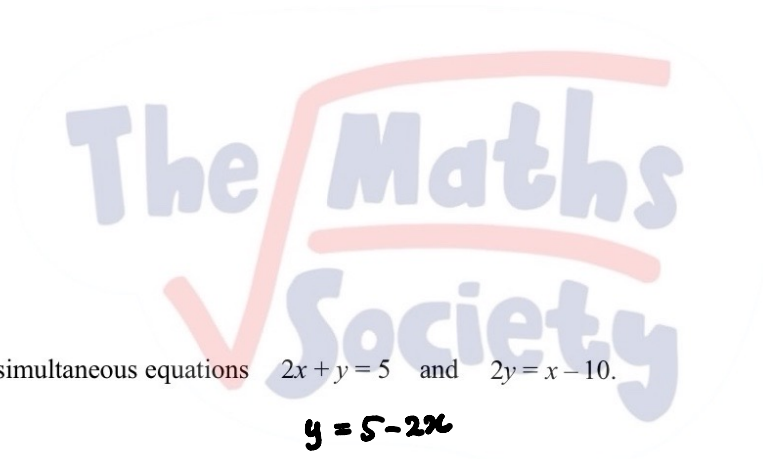
[3]

### Question 9

Solve the simultaneous equations.

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

[3]



### Question 1

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

[3]

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

## Question 2

Solve the simultaneous equations.

$$\begin{aligned}5x - y &= -10 \quad \times 2 \\x + 2y &= 9\end{aligned}$$
$$\begin{array}{r}10x - 2y = -20 \\ \hline 11x = -11 \\ x = -1\end{array}$$
$$\begin{aligned}-1 + 2y &= 9 \\ 2y &= 10 \\ y &= 5\end{aligned}$$

[3]

## Question 3

Solve the simultaneous equations

$$\begin{aligned}6x + 18y &= 57, \\ 2x - 3y &= -8. \quad \times 3\end{aligned}$$

[3]

$$\begin{aligned}6x - 9y &= -24 \\ 6x &= -24 + 9y \\ \therefore -24 + 9y + 18y &= 57 \\ 27y &= 81 \\ y &= 3 \\ \therefore 2x - 3(3) &= -8 \\ 2x - 9 &= -8 \\ 2x &= 1 \quad x = \frac{1}{2}\end{aligned}$$

### Question 4

Solve the simultaneous equations

$$\begin{aligned}2y + 3x &= 6, \\ x &= 4y + 16.\end{aligned}$$

[3]

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

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

$$14y = -42$$

$$y = -3$$

$$\begin{aligned}x &= 4(-3) + 16 \\ &= 4\end{aligned}$$

### Question 5

Solve these simultaneous equations.

$$\begin{aligned}x + 2y - 18 &= 0 \\ 3x - 4y - 4 &= 0\end{aligned}$$

[3]

$$x = 18 - 2y$$

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

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

$$10y = 50$$

$$y = 5$$

$$\begin{aligned}x &= 18 - 2(5) \\ &= 8\end{aligned}$$

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## Question 6

Solve the simultaneous equations

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

[3]

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

$$\cancel{6x + \frac{3}{2}y = 3}$$

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

---

$$12x = 24$$

$$x = 2$$

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

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

$$y = -6$$

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## Question 7

Solve the simultaneous equations

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

$$2x + \frac{1}{2}y = 19.$$

[3]

$$\frac{1}{2}x = 16 - 2y$$

$$x = 32 - 4y$$

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

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

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

$$y = 6$$

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

$$\frac{1}{2}x = 4$$

$$x = 8$$

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### Question 8

Solve the simultaneous equations

$$\begin{aligned}4x + 5y &= 0, \\ 8x - 15y &= 5.\end{aligned}$$

[4]

$$4x = -5y$$

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

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

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$$-25y = 5$$

$$y = -\frac{1}{5}$$

$$x = -\frac{5}{4} \cdot \left(-\frac{1}{5}\right) = \frac{1}{4}$$

$$x = \frac{1}{4}$$

### Question 1

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

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

$$2x - y = 1$$

[3]

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

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

$$x = -\frac{2}{3}$$

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

$$y = -\frac{1}{3}$$

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## 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]

$$\begin{aligned}x &= 2 + 2y \\ \therefore \frac{1}{2}(2 + 2y) + y &= 8 \\ 1 + y + y &= 8 \\ 2y &= 7 \\ y &= \frac{7}{2} \\ x - 2\left(\frac{7}{2}\right) &= 2 \\ x - 7 &= 2 \\ x &= 9\end{aligned}$$

## Question 3

Solve the simultaneous equations.  
Show all your working.

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

[3]

$$\begin{aligned}3x + 4y &= 14 \\ 10x + 4y &= 42 \\ \hline -7x &= -28 \\ x &= 4\end{aligned}$$

$$\begin{aligned}12 + 4y &= 14 \\ 4y &= 2 \\ y &= \frac{1}{2}\end{aligned}$$

## Question 4

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

[4]

$$\begin{aligned} 5x + 2y &= -2 && \times 3 \\ 3x - 5y &= 17.4 && \times 5 \end{aligned}$$

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

$$31y = -93$$

$$y = -3$$

$$5x - 6 = -2$$

$$5x = 4$$

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

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## Question 5

Solve the simultaneous equations.

$$\begin{aligned} 0.4x - 5y &= 27 && \times 5 \\ 2x + 0.2y &= 9 \end{aligned}$$

[3]

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

$$-25.2y = 126$$

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

$$y = -5$$

$$0.4x = 2$$

$$x = \frac{2 \times 10}{4}$$

$$24$$

$$x = 5$$

## 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]

$$3a + 4b = 10.8$$

$$5a + 2b = 14.5$$

$$3a + 4b = 10.8$$

$$10a + 4b = 29$$

$$-7a = -18.2$$

$$a = 2.6$$

$$3(2.6) + 4b = 10.8$$

$$4b = 3$$

$$b = \frac{3}{4} = 0.75$$

$\therefore$  notebook = \$2.60  
pencil = \$0.75

## Question 7

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

$$3x + 5y = 48$$

$$2x - y = 19$$

[4]

$$y = 2x - 19$$

$$3x + 10x - 95 = 48$$

$$13x = 143$$

$$x = 11$$

$$y = 2(11) - 19 = 3$$

$$2x + y = 2(11) + 3 = 25$$

### Question 8

Solve the simultaneous equations.

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

$$\frac{2x-y}{2} = 17$$

[3]

$$\rightarrow 2x + y = 14$$

$$2x - y = 34$$

$$\hline 4x = 48$$

$$x = 12$$

$$y = 14 - 24$$

$$= -10$$

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### Question 9

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

$$2x + 3y = 11, \times 3$$

$$3x - 5y = -12, \times 2$$

[3]

$$\rightarrow 6x + 9y = 33$$

$$\rightarrow 6x - 10y = -24$$

$$\hline 19y = 57$$

$$y = 3$$

$$2x + 9 = 11 \quad | \quad x = 1$$

$$2x = 2$$

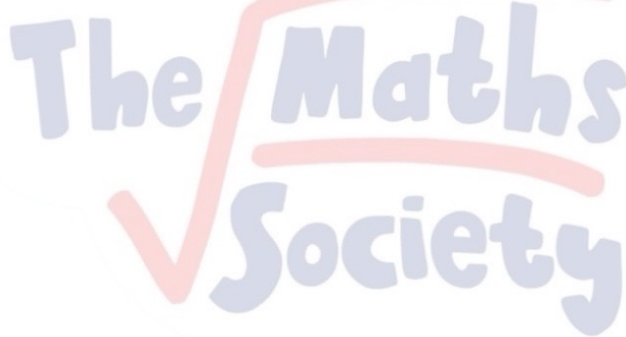
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### Question 10

Solve the simultaneous equations

[3]

$$\begin{aligned} 0.4x + 2y &= 10, & \times 5 \\ 0.3x + 5y &= 18. & \times 2 \end{aligned}$$
$$\begin{array}{r} 2x + 10y = 50 \\ -0.6x + 10y = 36 \\ \hline 1.4x = 14 \end{array}$$
$$x = \frac{140}{14} = 10$$
$$\begin{aligned} 4 + 2y &= 10 \\ 2y &= 6 \\ y &= 3 \end{aligned}$$



### Question 11

Solve the simultaneous equations

[3]

$$\begin{aligned} \frac{1}{2}x + y &= 5, & \times 2 \\ x - 2y &= 6. \end{aligned}$$
$$\begin{array}{r} x + 2y = 10 \\ \hline 2x = 16 \\ x = 8 \end{array}$$
$$\begin{aligned} 8 - 2y &= 6 \\ -2y &= -2 \\ y &= 1 \end{aligned}$$