



EXAM PAPERS PRACTICE

GCSE OCR Math J560

Linear Simultaneous Equations

Answers

*"We will help you to
achieve A Star "*



Answer 1

Solve the simultaneous equations

$$2x - y = 13 \quad \text{--- (A)}$$

$$x - 2y = 11 \quad \text{--- (B)}$$

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$$\text{(A)} \quad 2x - y = 13$$

$$2 \times \text{(B)} \quad 2x - 4y = 22 \quad \text{--- (C)}$$

$$\text{(A)} - \text{(C)} \quad \frac{+3y}{3} = \frac{-9}{3}$$

$$y = -3$$

$$\rightarrow \text{(B)} \quad 2x - 2(-3) = 11$$

$$2x + 6 = 11$$

$$\underline{2x = 5}$$

$$\begin{aligned} -y - (-4y) \\ = -y + 4y \\ = 3y \end{aligned}$$

CHECK IN (A)

$$2 \times 5 - (-3)$$

$$= 10 + 3$$

$$= 13 \quad \checkmark$$



Answer 2

Showing clear algebraic working, solve the simultaneous equations

$$3a + 2b = 1 \quad (1)$$

$$a + 2b = 5 \quad (2)$$

$$(2) - (1)$$

$$(a - 3a) + (2b - 2b) = 5 - 1$$

$$-2a = 4$$

$$a = -2$$

Sub a into (2)

$$-2 + 2b = 5$$

$$2b = 7 \therefore b = 3.5$$

$$a = -2$$

$$b = 3.5$$

Answer 3

Solve the simultaneous equations

$$5y - 4x = 8$$

$$y + x = 7$$

Show clear algebraic working.

$$(y + x = 7) \times 4$$

$$4y + 4x = 28$$

Add equations 1 & 2

$$9y + 0x = 36$$

$$y = 4$$

Sub back into

equation 2

$$4 + x = 7$$

$$x = 3$$



Answer 4

Solve the simultaneous equations

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$$\begin{aligned} 4x + y &= 25 & \text{--- (A)} \\ x - 3y &= 16 & \text{--- (B)} \end{aligned}$$

$$3 \times \text{(A)}$$

$$\text{(B)}$$

$$\begin{aligned} 12x + 3y &= 75 & \text{--- (C)} \\ + & \\ x - 3y &= 16 & \\ \hline \end{aligned}$$

$$\text{(C)} + \text{(B)}$$

$$\frac{13x}{13} = \frac{91}{13}$$

$$x = \frac{91}{13}$$

$$\underline{x = 7}$$

$$\rightarrow \text{(A)}$$

$$4 \times 7 + y = 25$$

$$\begin{aligned} 28 + y &= 25 \\ -28 & \quad -28 \end{aligned}$$

$$\underline{y = -3}$$

CHECK IN (B)

$$\begin{aligned} 7 - 3 \times (-3) &= 7 + 9 \\ &= 16 \quad \checkmark \end{aligned}$$

	<u>13x</u>
1:	13
2:	26
3:	39
4:	52
5:	65
6:	78
7:	91



Answer 5

Solve the simultaneous equations

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$$\begin{array}{r} 3x + y = -4 \quad \text{--- (A)} \\ 3x - 4y = 6 \quad \text{--- (B)} \end{array}$$

$$\text{(A)} - \text{(B)}$$

$$\frac{5y}{5} = \frac{-10}{5}$$

$$\underline{y = -2}$$

$$\rightarrow \text{(A)}$$

$$\begin{array}{r} 3x - 2 = -4 \\ +2 \quad \quad +2 \end{array}$$

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

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

CHECK IN (B)

$$\cancel{3}x - \frac{2}{\cancel{3}} - 4 \times (-2)$$

$$= -2 + 8$$

$$= 6$$



Answer 6

Solve the simultaneous equations

$$\begin{aligned} 3x + 2y &= 4 && \text{--- (A)} \\ 4x + 5y &= 17 && \text{--- (B)} \end{aligned}$$

$$\begin{aligned} 4 \times \text{(A)} & \quad 12x + 8y = 16 && \text{--- (C)} \\ 3 \times \text{(B)} & \quad 12x + 15y = 51 && \text{--- (D)} \\ \hline \text{(D)} - \text{(C)} & && \\ & && \frac{7y}{7} = \frac{35}{7} \\ & && \underline{y = 5} \end{aligned}$$

$$\begin{aligned} \rightarrow \text{(A)} \quad 3x + 2 \times 5 &= 4 \\ & \quad \quad \quad -10 \quad -10 \\ \hline 3x &= -6 \\ \frac{3x}{3} &= \frac{-6}{3} \end{aligned}$$

$$\underline{\underline{x = -2}}$$

CHECK IN (B)

$$\begin{aligned} 4x - 2 + 5 \times 5 &= \\ -8 + 25 &= \underline{\underline{17}} \quad \checkmark \end{aligned}$$

$$\begin{aligned} x &= \underline{\underline{-2}} \\ y &= \underline{\underline{5}} \end{aligned}$$



Answer 7

Solve the simultaneous equations

$$3x + 4y = 5$$

$$2x - 3y = 9$$

LINEAR SIMULTANEOUS EQUATIONS
- USE ELIMINATION METHOD

$$3x + 4y = 5 \quad \text{--- (A)}$$

$$2x - 3y = 9 \quad \text{--- (B)}$$

$$2 \times \text{(A)} \quad 6x + 8y = 10 \quad \text{--- (C)}$$

$$3 \times \text{(B)} \quad 6x - 9y = 27 \quad \text{--- (D)}$$

$$\text{(C)} - \text{(D)}$$

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

$$\underline{\underline{y = -1}}$$

$$\rightarrow \text{(B)}$$

$$2x - 3(-1) = 9$$

$$2x + 3 = 9$$

$$\frac{2x}{2} = \frac{6}{2}$$

$$\underline{\underline{x = 3}}$$

CHECK IN

$$3 \times 3 + 4 \times -1$$

$$= 9 - 4 = 5 \quad \checkmark$$

$$x = \underline{\quad 3 \quad}$$
$$y = \underline{\quad -1 \quad}$$



Answer 8

Solve the simultaneous equations

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$$\begin{aligned} 2x - 4y &= 19 && \text{--- (A)} \\ 3x + 5y &= 1 && \text{--- (B)} \end{aligned}$$

$$3 \times \text{(A)} \quad 6x - 12y = 57 \quad \text{--- (C)}$$

$$2 \times \text{(B)} \quad 6x + 10y = 2 \quad \text{--- (D)}$$

$$\text{(D)} - \text{(C)} \quad 0 + \frac{22y}{22} = \frac{-55}{22}$$

$$y = \underline{\underline{-2.5}}$$

$$\rightarrow \text{(B)} \quad 3x + 5 \times (-2.5) = 1$$

$$\begin{aligned} 3x - 12.5 &= 1 \\ +12.5 & \quad +12.5 \end{aligned}$$

$$\frac{3x}{3} = \frac{13.5}{3}$$

$$x = \underline{\underline{4.5}}$$

CHECK IN (A)

$$2 \times 4.5 - 4 \times (-2.5)$$

$$= 9 + 10$$

$$= 19 \quad \checkmark$$



Answer 9

Solve the simultaneous equations (LINEAR) → TUTORIAL.

ELIMINATION
METHOD

$$\begin{aligned} 5x + 2y &= 11 && \text{--- (A)} \\ 4x - 3y &= 18 && \text{--- (B)} \end{aligned}$$

$$\begin{array}{r} 3 \times \text{(A)} \quad 15x + 6y = 33 \\ 2 \times \text{(B)} \quad 8x - 6y = 36 \quad + \\ \hline 23x \qquad \qquad = 69 \\ \hline 23 \qquad \qquad \quad 23 \end{array}$$

$$\underline{\underline{x = 3}}$$

SUB → (A) $5 \times 3 + 2y = 11$

$$\begin{array}{r} 15 + 2y = 11 \\ -15 \qquad \qquad -15 \end{array}$$

$$\frac{2y}{2} = \frac{-4}{2}$$

$$\underline{\underline{y = -2}}$$

CHECK IN (B)

$$\begin{aligned} 4 \times 3 - 3 \times (-2) \\ = 12 + 6 \\ = 18 \quad \checkmark \end{aligned}$$

$$\begin{aligned} x &= \dots \dots \dots 3 \\ y &= \dots \dots \dots -2 \end{aligned}$$



Answer 10

Solve the simultaneous equations

$$\begin{aligned} 4x + 7y &= 1 & \text{--- (A)} \\ 3x + 10y &= 15 & \text{--- (B)} \end{aligned}$$

LINEAR SIM EQS

BALANCE METHOD

$$3 \times \text{(A)}$$

$$4 \times \text{(B)}$$

$$\text{(D)} - \text{(C)}$$

$$\rightarrow \text{(A)}$$

$$12x + 21y = 3 \quad \text{--- (C)}$$

$$12x + 40y = 60 \quad \text{--- (D)}$$

$$\frac{19y}{19} = \frac{57}{19}$$

$$\underline{y = 3}$$

$$4x + 7 \times 3 = 1$$

$$4x + 21 = 1 \quad \begin{array}{r} -21 \\ -21 \end{array}$$

$$\frac{4x}{4} = \frac{-20}{4}$$

$$\underline{x = -5}$$

$$x = \underline{\underline{-5}}$$

$$y = \underline{\underline{3}}$$

CHECK IN (B)

$$\begin{aligned} 3 \times (-5) + 10 \times 3 &= -15 + 30 \\ &= 15 \quad \checkmark \end{aligned}$$



EXAM PAPERS PRACTICE

Answer 11

Solve

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

— (A)

$$3x - 4y = 18$$

— (B)

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$$3 \times (A) \quad 6x + 9y = 2 \quad \text{--- (C)}$$

$$2 \times (B) \quad 6x - 8y = 36 \quad \text{--- (D)}$$

$$(C) - (D) \quad \frac{17y}{17} = \frac{-34}{17}$$

$$y = -2$$

$$\rightarrow (B) \quad 3x - 4(-2) = 18$$

$$3x + 8 = 18$$

$$\frac{3x}{3} = \frac{10}{3}$$

$$x = \frac{10}{3}$$

CHECK IN (A)

$$2 \times \frac{10}{3} + 3 \times (-2)$$

$$= \frac{20}{3} - 6$$

$$= \frac{20}{3} - \frac{18}{3} = \frac{2}{3} \quad \checkmark$$



Answer 12

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

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

Substitute equation (1) into equation (2)

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

$$\rightarrow 4x - x = 2$$

$$\rightarrow 3x = 2$$

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

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

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



Answer 13

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

$$\begin{aligned}2x + 3y &= 11, \\3x - 5y &= -12.\end{aligned}$$

$$2x + 3y = 11 \quad (1)$$

$$3x - 5y = -12 \quad (2)$$

Multiply (1) by 5 and (2) by 3

$$10x + 15y = 55$$

$$9x - 15y = -36$$

Now add them

$$19x = 19$$

$$\rightarrow x = 1$$

Substitute this into (1)

$$2 + 3y = 11$$

$$\rightarrow 3y = 9$$

$$\rightarrow y = 3$$

Hence, point of intersection is

$$(1, 3)$$



Answer 14

A cinema sells adult tickets and child tickets.

The total cost of 3 adult tickets and 1 child ticket is £30

The total cost of 1 adult ticket and 3 child tickets is £22

Work out the cost of an adult ticket and the cost of a child ticket.



$$3a + c = 30 \quad \text{--- (1)}$$

$$a + 3c = 22 \quad \text{--- (2)}$$

$$\textcircled{1} \times 3 \quad 9a + 3c = 90 \quad \text{--- (3)}$$

$$\textcircled{3} - \textcircled{2} \quad \frac{8a}{8} = \frac{68}{8}$$

$$a = \underline{\underline{8.5}} = \underline{\underline{£8.50}}$$

$$\rightarrow \textcircled{1} \quad 3 \times 8.5 + c = 30$$

$$25.5 + c = 30$$
$$\quad \quad \quad -25.5 \quad \quad \quad -25.5$$

$$c = \underline{\underline{4.5}} = \underline{\underline{£4.50}}$$

CHECK IN $\textcircled{2}$

$$8.5 + 3 \times 4.5 = 22 \quad \checkmark$$

SIMULTANEOUS
EQUATION

ELIMINATION
METHOD



Answer 15

3 teas and 2 coffees have a total cost of £7.80
5 teas and 4 coffees have a total cost of £14.20

Work out the cost of one tea and the cost of one coffee.

t

c

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$$3t + 2c = 7.80 \quad \text{--- (A)}$$

$$5t + 4c = 14.20 \quad \text{--- (B)}$$

$$2 \times \text{(A)} \quad 6t + 4c = 15.60 \quad \text{--- (C)}$$

$$2 \times 7.80$$

$$= 15.60$$

$$\text{(C)} - \text{(B)} \quad t = \underline{\underline{£1.40}}$$

$$\rightarrow \text{(A)} \quad 3 \times 1.40 + 2c = 7.80$$

$$4.20 + 2c = 7.80$$

$$-4.20$$

$$-4.20$$

$$\frac{2c}{2} = \frac{3.60}{2}$$

$$c = \underline{\underline{£1.80}}$$