EXAM PAPERS PRACTICE

GCSE Edexcel Math
1MA1
Linear
Simultaneous Equations

Answers

"We will help you to achieve A Star "

Answer 1

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

Solve the simultaneous equations

$4x + y = 25$ — (A)
$x - 3y = 16$ — (B)

$3 \times$ (A) $\quad 12x + 3y = 75$ — (C)

(B) $\quad + \; x - 3y = 16$

(C) + (B) $\quad 13x = 91$

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

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

$x = 7$

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

→ (A) $\quad 4 \times 7 + y = 25$

$28 + y = 25$

$-28 \qquad -28$

$y = -3$

CHECK IN (B)

$7 - 3 \times (-3) = 7 + 9$

$= 16$ ✓

Answer 2

Solve the simultaneous equations

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$3x + y = -4$ — (A)
$3x - 4y = 6$ — (B)

(A) − (B)

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

$y = -2$

→ (A) $3x - 2 = -4$

$+2 \quad +2$

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

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

CHECK IN (B)

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

$= -2 + 8$

$= 6$

Answer 3

Solve the simultaneous equations

$$y - 2x = 6 \quad (1)$$
$$y + 2x = 0 \quad (2)$$

Show clear algebraic working.

(2) − (1)

$(y - y) + 2x - (-2x) = 0 - 6$

$0 + 4x = -6$

$x = -1.5$

Sub in (2)

$y + (-3) = 0$

$y = +3$

$x =$ -1.5 / 3

$y =$ .....

(Total for Question is 3 marks)

Answer 4

Solve $x + 2y = 3$

$x - y = 6$

Show clear algebraic working.

Rearrange x-y = 6 to make x the subject.
X = 6 + y
Sub into first equation

(6+y) +2y = 3
3y +6 = 3
3y =-3
y = -1

Sub into
X = 6 +y
X = 5

$x =$ 5

$y =$ -1

Answer 5

Solve the simultaneous equations

$2x - y = 13$ — (A)

$x - 2y = 11$ — (B)

LINEAR SIMULTANEOUS EQUATIONS

USE "ELIMINATION" METHOD

(A) $2x - y = 13$

$2 \times$ (B) $2x - 4y = 22$ — (C)

$-y - (-4y)$

$= -y + 4y$

$= 3y$

(A) − (C) $+3y = -9$

$\frac{+3y}{3} = \frac{-9}{3}$

$y = -3$

→ (B) $x - 2(-3) = 11$

$x + 6 = 11$

$-6 \quad -6$

$x = 5$

CHECK IN (A)

$2 \times 5 - (-3)$

$= 10 + 3$

$= 13$ ✓

Answer 6

Solve the simultaneous equations (LINEAR) → TUTORIAL.

$5x + 2y = 11$ — (A)
$4x - 3y = 18$ — (B)

ELIMINATION METHOD

$3 \times$ (A) $\quad 15x + 6y = 33$
$2 \times$ (B) $\quad 8x - 6y = 36$ $\quad +$

$23x = 69$

$\frac{23x}{23} = \frac{69}{23}$

$x = 3$

SUB → (A) $\quad 5 \times 3 + 2y = 11$

$15 + 2y = 11$

$-15 \qquad -15$

$2y = -4$

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

$y = -2$

CHECK IN (B)

$4 \times 3 - 3 \times (-2)$

$= 12 + 6$

$= 18$ ✓

$x =$ 3

$y =$ -2

Answer 7

Solve the simultaneous equations

$4x + 7y = 1$ — (A)
$3x + 10y = 15$ — (B)

LINEAR SIM EQS
BALANCE METHOD

3 × (A) $12x + 21y = 3$ — (C)

4 × (B) $12x + 40y = 60$ — (D)

(D) − (C)

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

$y = 3$

→ (A) $4x + 7 \times 3 = 1$

$4x + 21 = 1$
$-21 \quad -21$

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

$x = -5$

$x = -5$

$y = 3$

CHECK IN (B)

$3 \times (-5) + 10 \times 3 = -15 + 30$

$= 15$ ✓

Answer 8

3 kg of potatoes and 4 kg of carrots have a total cost of 440p.
4 kg of potatoes and 3 kg of carrots have a total cost of 470p.

Work out the total cost of 1 kg of potatoes and 1 kg of carrots.

Cost = P Cost = C

$3P + 4C = 440$

$4P + 3C = 470$ +

$7P + 7C = 910$

÷7

$P + C = \frac{910}{7}$

$P + C = 130p$

440
470 +
110

400
400 +
800

7×
1: 7
2: 14
3: 21
4: 28
5: 35
10: 70
11: 77
12: 84
13: 91
130: 910

Answer 9

(a) Solve the simultaneous equations $3x + 5y = 14$ (1)
$4x + 3y = 4$ (2)

Show clear algebraic working.

(1) × 3
9x + 15y = 42

Eq 2 x 5
20x +15y = 20

Eq 2-1

20x -9x +15y -15y = 20-42
11x = -22
X= -2, sub back into eq 1
-6 + 5y = 14
5y = 20
y = 4

$x =$ -2

$y =$ 4

Answer 10

Solve the simultaneous equations

$3x + 2y = 4$ — (A)
$4x + 5y = 17$ — (B)

4 × (A) $12x + 8y = 16$ — (C)
3 × (B) $12x + 15y = 51$ — (D)

(D) − (C)

$7y = 35$

$\frac{7y}{7} = \frac{35}{7}$

$y = 5$

(A) $3x + 2 \times 5 = 4$

$-10 \quad -10$

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

$x = -2$

CHECK IN (B)

$4 \times -2 + 5 \times 5 =$

$-8 + 25 = 17$ ✓

$x = -2$

$y = 5$

Answer 11

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.

a c

SIMULTANEOUS EQUATION

ELIMINATION METHOD

$3a + c = 30$ — (1)

$a + 3c = 22$ — (2)

(1) × 3 $\quad 9a + 3c = 90$ — (3)

(3) − (2) $\quad 8a = 68$

$\frac{8a}{8} = \frac{68}{8}$

$a = 8.5 = £8.50$

(1) $\quad 3 \times 8.5 + c = 30$

$25.5 + c = 30$

$-25.5 \qquad -25.5$

$c = 4.5 = £4.50$

CHECK IN (2)

$8.5 + 3 \times 4.5 = 22$ ✓

Answer 12

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

$3t + 2c = 7.80$ — (A)

$5t + 4c = 14.20$ — (B)

$2 \times$ (A) $6t + 4c = 15.60$ — (C)

$2 \times 7.80 = 15.60$

(C) − (B) $t = £1.40$

(A) $3 \times 1.40 + 2c = 7.80$

$4.20 + 2c = 7.80$

$-4.20 \quad -4.20$

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

$c = £1.80$

Answer 13

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.

$3n + 4p = 10.8$ (1)

$5n + 2p = 14.5$ (2)

Multiply (2) by 2

$10n + 4p = 29$ (3)

Subtract (1) from (3)

$$7n = 18.2$$

$$\rightarrow \boldsymbol{n = 2.6}$$

Sub this into (1)

$$7.8 + 4p = 10.8$$

$$\rightarrow 4p = 3$$

$$\rightarrow \boldsymbol{p = 0.75}$$

Answer 14

Solve

$2x + 3y = \frac{2}{3}$ — (A)

$3x - 4y = 18$ — (B)

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

3 × (A) $6x + 9y = 2$ — (C)

2 × (B) $6x - 8y = 36$ — (D)

(C) − (D) $17y = -34$

$\frac{17y}{17} = \frac{-34}{17}$

$y = -2$

→ (B) $3x - 4(-2) = 18$

$3x + 8 = 18$

$-8 \quad -8$

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

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

CHECK IN (A)

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

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

$= \frac{20}{3} - \frac{18}{3} = \frac{2}{3}$ ✓

Answer 15

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

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

Substitute equation (1) into equation (2)

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

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

$$\rightarrow 3x = 2$$

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

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

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