

## Answers Sheet

### Simultaneous Equations

1.

$$x + 2y = 15 \dots\dots\dots (i)$$

$$x + 3y = 19$$

$$\underline{\hspace{2cm}} \text{ (Subtract)}$$

$$0 - y = -4$$

$$\mathbf{y = 4}$$

Put  $y = 4$  in equation (i)

$$x + 2(4) = 15$$

$$x + 8 = 15$$

$$x = 15 - 8$$

$$\mathbf{x = 7}$$

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2.

$$3x + 4y = 24 \quad (\times 3) \dots\dots\dots (i)$$

$$4x + 3y = 22 \quad (\times 4)$$

$$9x + 12y = 72$$

$$16x + 12y = 88$$

$$\underline{-16x - 12y = -88} \text{ (Subtract the bigger equation)}$$

$$-7x + 0 = -16$$

$$x = -16 / -7$$

$$\mathbf{x = 16 / 27 = 0.59}$$

Put  $x = 0.59$  in equation (i)

$$3(0.59) + 4y = 24$$

$$(1.77) + 4y = 24$$

$$+ 4y = 24 - 1.77$$

$$4y = 22.23$$

$$Y = 22.23/4$$

$$5.55$$

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3.

$$4x + y = 7 \quad (\times 2) \dots\dots\dots (i)$$

$$3x + 2y = 9$$

$$8x + 2y = 14$$

$$3x + 2y = 9$$

$$\underline{\hspace{1cm}} \quad (\text{Subtract})$$

$$5x + 0 = 5$$

$$x = 5 / 5$$

$$\mathbf{x = 1}$$

Put  $x = 1$  in equation (i)

$$4(1) + y = 7$$

$$4 + y = 7$$

$$y = 7 - 4$$

$$\mathbf{y = 3}$$

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4.

$$x + y = 6 \quad \dots\dots\dots (i) \quad \text{make eq negative}$$

$$-x - y = -6$$

$$-3x + y = 2$$

$$\underline{\hspace{1cm}} \quad (\text{Subtract both})$$

$$4x + 0 = -4$$

$$x = 4 / -4$$

$$\mathbf{x = -1}$$

Put  $x = -1$  in equation (i)

$$-1 + y = 6$$

$$y = 6 + 1$$

$$\mathbf{y = 7}$$

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5.

$$5x + y = 39$$

$$x - y = 3 \quad \dots\dots\dots (i)$$

$$\underline{\hspace{1cm}} \quad (\text{Add})$$

$$6x + 0 = 42$$

$$x = 42 / 6$$

$$\mathbf{x = 7}$$

Put  $x = 7$  in equation (i)

$$7 - y = 3$$

$$-y = 3 - 7$$

$$\mathbf{y = 4}$$

6.

$$4x - 2y = 4 \quad (\times 3)$$

$$5x + 3y = 16 \quad (\times 2) \dots\dots (i)$$

$$12x - 6y = 12$$

$$10x + 6y = 32$$

$$\underline{\hspace{2cm}} \quad (\text{cancel it})$$

$$22x + 0 = 44$$

$$x = 44 / 22$$

$$\mathbf{x = 2}$$

Put  $x = 2$  in equation (i)

$$5(2) + 3y = 16$$

$$10 + 3y = 16$$

$$3y = 16 - 10$$

$$3y = 6$$

$$\mathbf{y = 2}$$

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7.

$$3x - 6y = 24$$

$$2x + y = 1 \quad (\times 6) \dots\dots (i)$$

$$3x - 6y = 24$$

$$12x + 6y = 6$$

$$\underline{\hspace{2cm}} \quad (\text{Add})$$

$$15x + 0 = 30$$

$$x = 30 / 15$$

$$\mathbf{x = 2}$$

Put  $x = 2$  in equation (i)

$$2(2) + y = 1$$

$$4 + y = 1$$

$$y = 1 - 4$$

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

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**8.**

$$x - 2y = -2 \quad (\times 3) \dots\dots\dots (i)$$

$$2x + 3y = 10 \quad (\times 2)$$

$$3x - 6y = -6$$

$$4x + 6y = 20$$

$$\underline{\hspace{1cm}} \quad (\text{cancel them})$$

$$7x + 0 = 14$$

$$x = 14 / 7$$

$$\mathbf{x = 2}$$

Put  $x = 2$  in equation (i)

$$2 - 2y = -2$$

$$- 2y = -2 - 2$$

$$- 2y = - 4$$

$$\mathbf{y = 2}$$

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**9.**

$$y = 2x + 1$$

$$2x - y = -1 \quad (\times 2) \dots\dots\dots (i)$$

$$x + 2y = 17$$

$$4x - 2y = -2$$

$$x + 2y = 17$$

$$\underline{\hspace{1cm}} \quad (\text{cancel them})$$

$$5x + 0 = 15$$

$$x = 15 / 5$$

$$\mathbf{x = 3}$$

Put  $x = 3$  in equation (i)

$$2 (3) - y = -1$$

$$6 - y = -1$$

$$- y = -1 - 6$$

$$\mathbf{y = 7}$$

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10.

$$5x + 4y = 14 \quad (\times 2) \dots\dots\dots (i)$$

$$2x + 5y = 19 \quad (\times 5)$$

$$10x + 8y = 28$$

$$10x + 25y = 95$$

$$-10x - 25y = -95$$

\_\_\_\_\_ (Subtract them)

$$0 - 17y = -67$$

$$y = -67 / -17$$

$$y = 67 / 17 = 3.9$$

Put  $y = 3.9$  in equation (i)

$$5x + 4y = 14$$

$$5x + 4(3.9) = 14$$

$$5x + (15.6) = 14$$

$$5x = 14 - 15.6$$

$$5x = -1.6$$

$$X = -0.32$$

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11.

$$3x = 2y + 14$$

$$3x - 2y = 14 \dots\dots\dots (i)$$

$$x + 2y = 10$$

\_\_\_\_\_ (Add)

$$4x + 0 = 24$$

$$x = 24 / 4$$

$$x = 6$$

Put  $x = 6$  in equation (i)

$$3(6) - 2y = 14$$

$$18 - 2y = 14$$

$$-2y = 14 - 18$$

$$-2y = -4$$

$$y = -4 / -2$$

$$y = 2$$

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**12.**

$$\begin{array}{ll} 3x = -5y + 1 & 3x + 5y = 1 \quad (\times 3) \dots\dots\dots (i) \\ 2x - 3y - 7 = 0 & 2x - 3y = 7 \quad (\times 5) \end{array}$$

$$\begin{array}{l} 9x + 15y = 3 \\ 10x - 15y = 35 \\ \hline \end{array} \text{ (Add)}$$

$$19x + 0 = 38$$

$$x = 38 / 19$$

$$\mathbf{x = 2}$$

Put  $x = 2$  in equation (i)

$$3(2) + 5y = 1$$

$$6 + 5y = 1$$

$$5y = 1 - 6$$

$$5y = -5$$

$$y = -5 / 5$$

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

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**13.**

$$\begin{array}{ll} 4a + 2c = 47.00 & (\times 3) \\ a + 3c = 25.50 & (\times 2) \dots\dots\dots (i) \end{array}$$

$$12a + 6c = 141.00$$

$$2a + 6c = 51.00$$

$$-2a - 6c = -51.00$$

$$\hline \text{ (Subtract them)}$$

$$10a + 0 = 90$$

$$a = 90 / 10$$

$$\mathbf{a = 9}$$

Put  $a = 9$  in equation (i)

$$4(9) + 2c = 47$$

$$36 + 2c = 47$$

$$2c = 47 - 36$$

$$2c = 11$$

$$\mathbf{c = 11 / 2}$$

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**14.**

$$3x + 4y = 50 \quad \dots\dots\dots (i)$$

$$8x - y = 30 \quad (\times 4)$$

$$3x + 4y = 50$$

$$32x - 4y = 120$$

$$\underline{\hspace{2cm}} \quad (\text{Add})$$

$$34x + 0 = 170$$

$$x = 170 / 34$$

$$\mathbf{x = 5}$$

Put  $x = 5$  in equation (i)

$$8(5) - y = 30$$

$$40 - y = 30$$

$$-y = 30 - 40$$

$$-y = -10$$

$$\mathbf{y = 10}$$

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