Simultaneous Equations

Exam Style Questions

1. Solve the following simultaneous equations

$$\begin{aligned} 7x + 2y &= 46 \\ -\quad x + 2y &= 10 \end{aligned}$$

$6x = 36$

$x = 6$

$6 + 2y = 10$

$2y = 4$

$y = 2$

$x = 6$

$y = 2$

(3 marks)

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2. Solve the following simultaneous equations

$$\begin{aligned} 6x + y &= 20 \\ -\quad x + y &= 5 \end{aligned}$$

$5x = 15$

$x = 3$

$5 + y = 5$

$y = 0$

$x = 3$

$y = 0$

(3 marks)

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3. Solve the following simultaneous equations

$$\begin{aligned} & x + 8y = 36 \\ - \quad & x + y = 1 \end{aligned}$$

$7y = 35$

$y = 5$

$x + 5 = 1$

$x = -4$

$x = \ldots -4 \ldots$

$y = \ldots 5 \ldots$

(3 marks)

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4. Solve the following simultaneous equations

$$\begin{aligned} & 7x - 4y = 22 \\ + \quad & 3x + 4y = 8 \end{aligned}$$

$10x = 30$

$x = 3$

$3(3) + 4y = 8$

$4y = -1$

$y = -\frac{1}{4} = -0.25$

$3x + 4(-0.25) = 8$

$3x - 1 = 8$

$3x = 9$

$x = 3$

$x = \ldots 3 \ldots$

$y = \ldots -0.25 \ldots$

(3 marks)

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5. Solve the following simultaneous equations

$$+ \quad \begin{aligned} 3x + 2y &= 12 \\ x - 2y &= 4 \end{aligned}$$

$4x = 16$

$x = 4$

$4 - 2y = 4$

$-2y = 0$

$y = 0$

$x =$ 4

$y =$ 0

(3 marks)

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6. Solve the following simultaneous equations

$$- \quad \begin{aligned} 12x - 5y &= 20 \\ 8x - 5y &= 16 \end{aligned}$$

$4x = 4$

$x = 1$

$8 - 5y = 16$

$-5y = 8$

$y = -\frac{8}{5} = -1.6$

$x =$ 1

$y =$ −1.6

(3 marks)

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7. Solve the following simultaneous equations

$$3x - 8y = 17$$
$$7x - 8y = 5$$

$-4x = 12$

$x = -3$

$7(-3) - 8y = 5$

$-21 - 8y = 5$

$-8y = 26$

$y = -\frac{26}{8} = -\frac{13}{4} = -3.25$

$x =$ -3

$y =$ -3.25

(3 marks)

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8. Solve the following simultaneous equations

$$3x + 7y = 4 \quad \times 2$$
$$2x + 5y = 1 \quad \times 3$$

$6x + 14y = 8$

$6x + 15y = 3$

$-y = 5$

$y = -5$

$3x + 7(-5) = 4$

$3x - 35 = 4$

$3x = 39$

$x = 13$

$x =$ 13

$y =$ -5

(3 marks)

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9. Solve the following simultaneous equations

$$4x + y = 5 \quad \times 3$$
$$5x + 3y = 1 \quad \times 1$$

$12x + 3y = 15$

$-\ 5x + 3y = 1$

$7x = 14$

$x = 2$

$4(2) + y = 5$

$8 + y = 5$

$y = -3$

$x = 2$

$y = -3$

(3 marks)

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10. Solve the following simultaneous equations

$$3x + 2y = 6 \quad \times 1$$
$$x + 6y = 8 \quad \times 3$$

$3x + 2y = 6$

$-\ 3x + 18y = 24$

$-16y = -18$

$y = \frac{-18}{-16} = \frac{9}{8}$

$x + 6\left(\frac{9}{8}\right) = 8$

$x + \frac{54}{8} = 8$

$x = 8 - \frac{54}{8} = \frac{10}{8} = \frac{5}{4}$

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

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

(3 marks)

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11. Solve the following simultaneous equations

$$4x + y = 5 \quad \times 3$$
$$5x + 3y = 1 \quad \times 1$$

$12x + 3y = 15$

$-\ 5x + 3y = 1$

$7x = 14$

$x = 2$

$5(2) + 3y = 1$

$10 + 3y = 1$

$3y = -9$

$y = -3$

$x =$ 2

$y =$ -3

(3 marks)

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12. Solve the following simultaneous equations

$$3x - 2y = 2 \quad \times 3$$
$$5x - 3y = 1 \quad \times 2$$

$9x - 6y = 6$

$-\ 10x - 6y = 2$

$-1x = 4 \Rightarrow x = -4$

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

$-12 - 2y = 2$

$-2y = 14$

$y = -7$

$x =$ -4

$y =$ -7

(3 marks)

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13. Solve the following simultaneous equations

$$5x - 2y = 9 \quad \times 5$$
$$6x + 5y = 3 \quad \times 2$$

$25x - 10y = 45$

$+ \quad 12x + 10y = 6$

$37x = 51$

$x = \frac{51}{37}$

$5\left(\frac{51}{37}\right) - 2y = 9$

$\frac{225}{37} - 2y = 9$

$-2y = 9 - \frac{225}{37} = \frac{108}{37}$

$y = -\frac{108}{74} = -\frac{54}{37}$

$x = \frac{51}{37}$

$y = -\frac{54}{74}$

(3 marks)

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14. Solve the following simultaneous equations

$$11x - 2y = 13 \quad \times 3$$
$$2x + 3y = -1 \quad \times 2$$

$33x - 6y = 39$

$+ \quad 4x + 6y = -2$

$37x = 37$

$x = 1$

$11 - 2y = 13$

$-2y = 2$

$y = -1$

$x = 1$

$y = -1$

(3 marks)

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15. 4 apples and 2 bananas cost £10.
2 apples and 2 bananas cost £8.
Find the cost of 1 apple and 1 banana.

$4a+2b=10$
$-\quad 2a+2b=8$

$2a=2$
$a=1$

$4(1)+2b=10$
$4+2b=10$
$2b=6$
$b=3$

1 apple = £ 1
1 banana = £ 3

(3 marks)

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16. The weight of 3 guinea pigs and 9 rats is $11kg$.
The weight of 3 guinea pigs and 2 rats is $5kg$.
Find the total weight of 5 guinea pigs and 5 rats.
Give your answer correct to 3 significant figures.

$3G+9R=11$
$-\quad 3G+2R=5$

$7R=6$
$R=\frac{6}{7}$

$3G+9\left(\frac{6}{7}\right)=11$
$3G=11-\frac{54}{7}$
$3G=\frac{23}{7}$
$G=\frac{23}{21}$

$5G+5R$
$=5\times\frac{23}{21}+5\times\frac{6}{7}$
$=9.76\ kg$

9.76 kg

(3 marks)

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17. A T-shirt costs £9 more than a jumper.
The total price of 2 T-shirts and 1 jumper is £36.
Find the total cost of 3 T-shirts and 5 jumpers.

$T - J = 9$

$+$

$2T + J = 36$

$3T = 45$

$T = 15$

$15 - J = 9$

$J = 6$

$3T + 5J$

$= 3 \times 15 + 5 \times 6$

$= 45 + 30$

$= 75$

£ = 75

(3 marks)

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18. 3 cups of tea and 3 cups of coffee cost £4. 20.
2 cups of tea and 4 cups of coffee cost £3. 80.
Find the total cost of 5 cups of tea and 4 cups of coffee.

$3T + 3C = 4.20 \quad \times 4$

$2T + 4C = 3.80 \quad \times 3$

$12T + 12C = 16.8$

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$6T + 12C = 11.4$

$6T = 5.40$

$T = 0.90$

$2(0.90) + 4C = 3.80$

$1.80 + 4C = 3.80$

$4C = 2$

$C = 0.50$

$5T + 4C$

$= 5 \times 0.9 + 4 \times 0.5$

$= 4.50 + 2$

$= 6.50$

£ = 6.50

(3 marks)

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19. Solve the following simultaneous equations

$$x = 2y - 3$$
$$2x + 5y = 12$$

$2(2y-3) + 5y = 12$

$4y - 6 + 5y = 12$

$9y - 6 = 12$

$9y = 18$

$y = 2$

$x = 2(2) - 3$

$= 1$

$x = 1$

$y = 2$

(3 marks)

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20. Solve the following simultaneous equations

$$5x = 3y + 18$$
$$x = -2y + 27$$

$5(-2y+27) = 3y + 18$

$-10y + 135 = 3y + 18$

$-13y = -117$

$y = 9$

$x = -2(9) + 27$

$= -18 + 27$

$= 9$

$x = 9$

$y = 9$

(3 marks)
