Name: _____

GCSE (1 – 9)

Simultaneous Equations

Instructions

- Use **black** ink or ball-point pen.
- Answer all Questions.
- Answer the Questions in the spaces provided
  – *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each Question are shown in brackets
  – *use this as a guide as to how much time to spend on each Question.*

Advice

- Read each Question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every Question.
- Check your answers if you have time at the end

1 Solve the simultaneous equations

$$4x + 3y = 18$$
$$+ \quad x - 3y = 7$$

$$5x = 25$$
$$x = 5$$

$$4(5) + 3y = 18$$
$$20 + 3y = 18$$
$$3y = -2$$
$$y = \frac{-2}{3}$$

$x = $ 5

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

(Total for question 1 is 3 marks)

2 Solve the simultaneous equations

$$x - 3y = -23 \qquad \times 5$$
$$5x + 2y = 4$$

$$5x - 15y = -115$$
$$5x + 2y = 4$$

$$-17y = -119$$
$$y = \frac{119}{17}$$
$$= 7$$

$$5x + 2(7) = 4$$
$$5x + 14 = 4$$
$$5x = -10$$
$$x = -2$$

$x = $ .... -2

$y = $ 7

(Total for question 2 is 3 marks)

3 Solve the simultaneous equations

$$2x + 5y = -10$$
$$2x - y = 8$$

$$6y = -18$$
$$y = -3$$

$$2x + 5(-3) = -10$$
$$2x - 15 = -10$$
$$2x = 5$$
$$x = \frac{5}{2}$$

$x = $ .... $\frac{5}{2}$ ....

$y = $ .... -3 ....

(Total for question 3 is 3 marks)

4 Solve the simultaneous equations

$$4x + 2y = 10 \quad \times 5$$
$$5x + 3y = 12 \quad \times 4$$

$$20x + 10y = 50$$
$$20x + 12y = 48$$

$$-2y = 2$$
$$y = -1$$

$$4x + 2(-1) = 10$$
$$4x - 2 = 10$$
$$4x = 12$$
$$x = 3$$

$x = $ .... 3 ....

$y = $ .... -1 ....

(Total for question 4 is 3 marks)

5 Solve the simultaneous equations

$$2x + 5y = 4$$
$$7x - 5y = -1$$

$$9x = 3$$

$$x = \frac{3}{9} = \frac{1}{3}$$

$$2\left(\frac{1}{3}\right) + 5y = 4$$

$$\frac{2}{3} + 5y = 4$$

$$\frac{2}{3} + 5y = \frac{12}{3}$$

$$5y = \frac{10}{3}$$

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

$x =$ .... $\frac{1}{3}$ ....

$y =$ .... $\frac{2}{3}$ ....

(Total for question 5 is 3 marks)

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6 Solve the simultaneous equations

$$3x - 2y = 7$$
$$7x + 2y = 13$$

$$10x = 20$$

$$x = 2$$

$$7(2) + 2y = 13$$

$$14 + 2y = 13$$

$$2y = -1$$

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

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

(Total for question 6 is 3 marks)

7 Solve the simultaneous equations

$$2x - 3y = 4 \qquad \times 2$$
$$4x - y = 13$$

$$4x - 6y = 8$$
$$4x - y = 13$$

$$-5y = -5$$
$$y = 1$$

$$4x - 1 = 13$$
$$4x = 14$$
$$x = \frac{14}{4} = \frac{7}{2}$$

$$x = \dfrac{7}{2}$$

$$y = 1$$

(Total for question 8 is 3 marks)

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8 Solve the simultaneous equations

$$3x + y = 15 \qquad \times 2$$
$$5x + 2y = 24$$

$$6x + 2y = 30$$
$$5x + 2y = 24$$

$$x = 6$$

$$3(6) + y = 15$$
$$18 + y = 15$$
$$y = -3$$

$$x = 6 \qquad y = -3$$

(Total for question 8 is 3 marks)

9 Solve the simultaneous equations

$$3x - y = -4 \qquad \times 2$$
$$2x - 3y = 9 \qquad \times 3$$

$$6x - 2y = -8$$
$$6x - 9y = 27$$

$$7y = -35$$
$$y = -5$$

$$3x - (-5) = -4$$
$$3x + 5 = -4$$
$$3x = -9$$
$$x = -3$$

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

$y = \underline{\quad -5 \quad}$

(Total for question 9 is 3 marks)

10 Solve the simultaneous equations

$$6x + 5y = 4.5$$
$$3x - 2y = 9 \qquad \times 2$$

$$6x - 4y = 18$$
$$6x + 5y = 4.5$$

$$-9y = 13.5$$
$$y = -\frac{13.5}{9} = \frac{-27}{18} = -\frac{3}{2}$$

$$3x - 2\left(\frac{-3}{2}\right) = 9$$
$$3x + 3 = 9$$
$$3x = \cancel{12}\,6$$
$$x = \cancel{4}\,2$$

$x = \underline{\quad \cancel{4}\,2 \quad}$

$y = \underline{\quad -\frac{3}{2} \quad}$

(Total for question 10 is 3 marks)

11 Solve the simultaneous equations
$$3x = 9 + y$$
$$x + 5y = 5$$

$$3x - y = 9$$
$$x + 5y = 5 \qquad \times 3$$

$$3x - y = 9$$
$$3x + 15y = 15$$

$$-16y = -6$$
$$y = \frac{6}{16} = \frac{3}{8}$$

$$x + 5\left(\frac{3}{8}\right) = 5$$

$$x + \frac{15}{8} = 5$$

$$x = \frac{40}{8} - \frac{15}{8} = \frac{25}{8}$$

$$x = \frac{25}{8}$$

$$y = \frac{3}{8}$$

(Total for question 11 is 3 marks)

12 Solve the simultaneous equations
$$3y + 11 = 4x$$
$$10x + 2y + 1 = 0$$

$$11 = 4x - 3y$$

$$4x - 3y = 11 \quad \textcircled{1} \qquad \times 5$$

$$10x + 2y = -1 \quad \textcircled{2} \qquad \times 2$$

$$20x - 15y = 55$$
$$20x + 4y = -2$$

$$-19y = 57$$

$$y = -3$$

$$4x - 3(-3) = 11$$
$$4x + 9 = 11$$
$$4x = 2$$
$$x = \frac{1}{2}$$

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

$$y = -3$$

(Total for question 12 is 3 marks)

13 In a shop 2 coffees and 3 cakes cost £9.95

In the same shop 1 coffee and 4 cakes cost £10.35.

x　　　y

Work out the price for one coffee and the price for one cake.

$$2x + 3y = 9.95$$
$$x + 4y = 10.35 \quad \times 2$$

$$2x + 8y = 20.70$$
$$2x + 3y = 9.95$$

$$5y = 10.75$$
$$y = 2.15$$

$$x + 4(2.15) = 10.35$$
$$x + 8.60 = 10.35$$
$$x = 1.75$$

Coffee £......1.75......

Cake £......2.15......

(Total for question 13 is 3 marks)

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14 Sweets are sold in small packs and in big packs.

There is a total of 175 sweets in 4 small packs and 3 big packs.

There is a total of 154 sweets in 5 small packs and 2 big packs.

Work out the number of sweets in each small pack and in each big pack.

$$4s + 3b = 175 \quad \times 2$$
$$5s + 2b = 154 \quad \times 3$$

$$8s + 6b = 350$$
$$15s + 6b = 462$$

$$-7s = -112$$
$$s = 16$$

$$5(16) + 2b = 154$$
$$80 + 2b = 154$$
$$2b = 74$$
$$b = 37$$

Small Pack ......16......

Big Pack ......37......

(Total for question 14 is 3 marks)