

Surname	
Other Names	
Candidate's Signature	

## GCSE 9 - 1 Questions

### Simultaneous Equations 3

**Calculator Allowed**

#### INSTRUCTIONS TO CANDIDATES

- Write your name in the space provided.
- Write your answers in the spaces provided in this question paper.
- Answer ALL questions.
- Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
- You should have a ruler, compass and protractor where required.

**Total Marks :**

1) Solve the simultaneous equations below.

$$3x + 10y = 7$$

$$x - 4y = 6$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(5)

2) Solve the two simultaneous equations:

$$2x + 2y = 40$$

$$2y = 3x$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**(Total: 3 marks)**

3) Solve the simultaneous equations:

$$4x + 9y = 3$$

$$5x - 3y = 18$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**4 marks**

4) Solve the simultaneous equation

$$y = 0.75x + 3$$

$$y = -0.5x + 8$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**(3)**

5) Let  $x$  and  $y$  be two numbers.

The difference between these two numbers is 8.

The sum of three times the larger one and twice the smaller one is 59.

(a) Use the given information to form two equations in  $x$  and  $y$ .

..... and ..... (2)

(b) Solve your equations to find the values of  $x$  and  $y$ .

$x =$  .....  $y =$  ..... (3)

**(Total: 5 marks)**

6) Pedro was adding two numbers. By mistake he added a zero at the end of one number. His sum turned out to be 17852 instead of 5468. Work out the value of the two numbers that Pedro had to add.

$x =$  .....  $y =$  ..... [4]

7)  $x$  and  $y$  represent two numbers,  $x$  being larger than  $y$ . Write down two **equations** to represent the following statements.

- (a) The sum of  $y$  and double  $x$  is 4.  
 (b) The difference between the two numbers is 5.

\_\_\_\_\_

\_\_\_\_\_

(c) Hence **solve** the two equations.

$$x = \underline{\hspace{2cm}}$$

$$y = \underline{\hspace{2cm}}$$

(6 marks)

8) 420 tickets were sold at a concert. Some of the tickets cost €10 and the others cost €15. The total amount collected from the sale of the tickets was €5400.

Let  $p$  represent the number of €10 tickets and  $q$  be the number of €15 tickets.

(a) Write down two equations in  $p$  and  $q$ .

\_\_\_\_\_

(b) **Solve** these two equations to find the number of **cheaper tickets** sold.

Number of cheaper tickets = \_\_\_\_\_

6 marks

9) An ironmonger sells two brands of paint brushes; those that are made from natural bristles and those made from synthetic fibres. The natural bristle brush is more expensive than the synthetic brush.

Let  $x$  denote the price of each expensive brush and let  $y$  denote the price of the cheaper brush.

(i) If the difference in price of the two kinds of brushes is €3.00, write down an equation involving  $x$  and  $y$ .

..... **1 mark**

(ii) The total cost of 12 brushes with natural bristles and 9 brushes with synthetic fibres is €61.20. Construct another equation to show the given information.

..... **2 marks**

(iii) Solve the two equations to find the cost of each type of paint brush.

Cost of natural = .....

Cost of fibre = .....

**5 marks**

10) Gary sells two kinds of books, hardbacks and paperbacks. The income from selling 15 hardbacks and 28 paperbacks is €779. When he sells 9 hardbacks and 16 paperbacks his income is €455.

(i) Let  $h$  represent the price of a hardback and let  $p$  represent the price of a paperback. Write down two equations to show the given data.

..... and .....

(ii) Solve the two simultaneous equations to find the price of each kind of book.

Paperback = ..... Hardback = .....

(7 marks)

- 11) Khalid and his friend Abdulaziz are buying some boxes of chocolates to give away as gifts. Khalid buys one small box and 3 large boxes and spends \$13.10. Abdulaziz spends \$11.70 buying 4 small boxes and one large box. What is the cost of each size box?

Large box \$..... Small Box \$ ..... (5)



12)  $x$  and  $y$  represent two numbers,  $x$  being larger than  $y$ .

(a) Write down two equations to represent the following statements.

(i) Twice the number  $x$  added to three times  $y$  is equal to 21.

Ans: \_\_\_\_\_

(ii) The difference between the two numbers is 3.

Ans: \_\_\_\_\_

(b) Hence solve the two equations.

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(6)

13) Eric has 2 separate simultaneous equations.

a) Solve the first one for Eric.

$$3x + 4y = 5$$

$$5x + 4y = 3$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

b) Now solve the other one for Eric

$$10x + 11y = 12$$

$$7x + 6y = 5$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

Eric notices that

- i. The answers are the same
- ii. The top row of each simultaneous equation has consecutive increasing coefficients.
- iii. The bottom row of each simultaneous equation has consecutive decreasing coefficients.

He wonders if other pairs of simultaneous equations that fit this pattern also have the same solution.

- c) Form and solve another pair of simultaneous equations that fit this pattern, and see if he is correct. You **must** write down the pair of simultaneous equations that you use and show all your steps.

d) Eric thinks there must be a general rule. He comes up with

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

$$bx + (b - 1)y = b - 2$$

Show that Eric's rule works in all cases.

x = ..... y = .....

Answer.....