

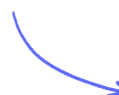
Non-Calculator Questions

Simultaneous Equations

Linear Simultaneous Equations / Quadratic Simultaneous Equations

Medium (5 questions)	/15
Hard (3 questions)	/14
Very Hard (6 questions)	/30
Total Marks	/59

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Medium Questions

- 1 Solve the simultaneous equations.

$$2x + y = 7$$

$$3x - y = 8$$

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

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

(2 marks)

- 2 Solve the simultaneous equations.

You must show all your working.

$$3x - 8y = 22$$

$$x + 4y = 4$$

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

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

(3 marks)

- 3 Solve the simultaneous equations.

You must show all your working.

$$5x + 8y = 4$$

$$\frac{1}{2}x + 3y = 7$$

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

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

(3 marks)

- 4** Solve the simultaneous equations.
You must show all your working.

$$2x + \frac{1}{2}y = 13$$

$$3x + 2y = 17$$

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

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

(3 marks)

- 5** Abdallah buys 3 cucumbers and 5 tomatoes for £14.50.

Emerson buys 5 cucumbers and 4 tomatoes for £15.50.

Work out the cost of a cucumber and the cost of a tomato.

(4 marks)

Hard Questions

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

$$y = 5x^2 + 4x - 19$$
$$y = 4x + 1$$

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

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

(5 marks)

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

$$6x + 5y = 27$$
$$5x - 3y = 44$$

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

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

(4 marks)

3 Solve algebraically the simultaneous equations

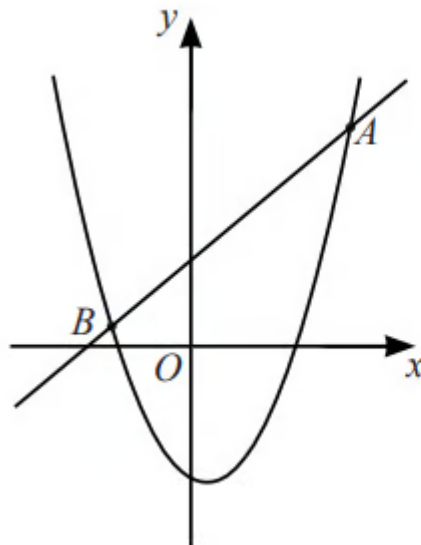
$$x^2 + y^2 = 25$$

$$y - 2x = 5$$

(5 marks)

Very Hard Questions

1



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SCALE

The diagram shows a curve with equation $y = 2x^2 - 2x - 7$.

The straight line with equation $y = 3x + 5$ intersects the curve at the points A and B .

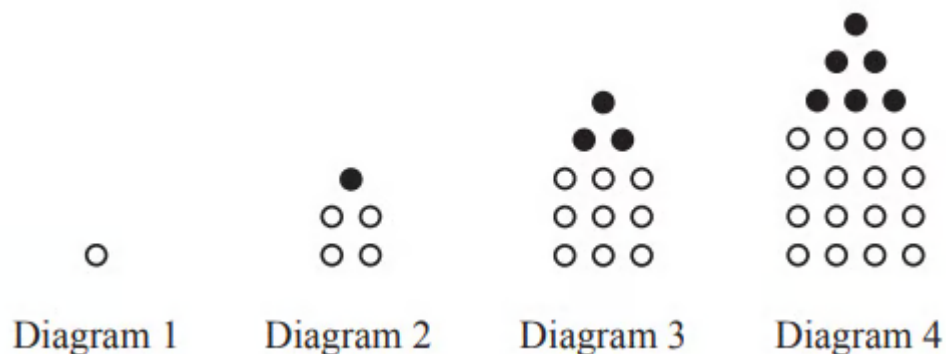
Find the coordinates of the points A and B .

A (..... ,)

B (..... ,)

(5 marks)

2



These are the first four diagrams of a sequence.

The diagrams are made from white dots and black dots.

T is the total number of dots used to make **all** of the first n diagrams.

$$T = an^3 + bn^2$$

Find the value of a and the value of b .

You must show all your working.

$a =$

$b =$

(5 marks)

3 There are only r red counters and g green counters in a bag.

A counter is taken at random from the bag.

The probability that the counter is green is $\frac{3}{7}$

The counter is put back in the bag.

2 more red counters and 3 more green counters are put in the bag.

A counter is taken at random from the bag. The probability that the counter is green is

$$\frac{6}{13}$$

Find the number of red counters and the number of green counters that were in the bag originally.

(5 marks)

4 $x : y = 7 : 4$

$$x + y = 88$$

Work out the value of $x - y$

(3 marks)

5 The prices of two phones are in the ratio $x : y$.

When the prices are both increased by £20, the ratio becomes $5 : 2$.

When the prices are both reduced by £5, the ratio becomes $5 : 1$.

Express the ratio $x : y$ in its lowest terms.

(6 marks)

6 Solve these simultaneous equations algebraically.

$$y = 2x^2 - 7x + 4$$

$$y = 4x - 1$$

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

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

(6 marks)