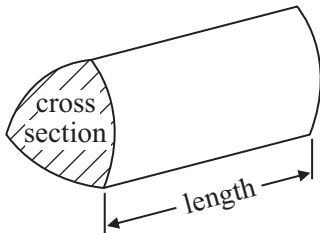


## GCSE Mathematics 1MA0

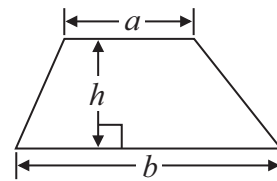
Formulae: Higher Tier

**You must not write on this formulae page.  
Anything you write on this formulae page will gain NO credit.**

**Volume of prism** = area of cross section  $\times$  length

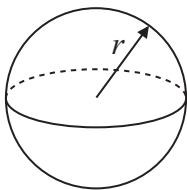


**Area of trapezium** =  $\frac{1}{2} (a + b)h$



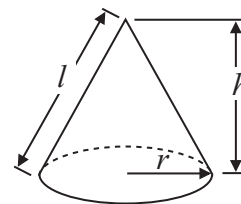
**Volume of sphere** =  $\frac{4}{3} \pi r^3$

**Surface area of sphere** =  $4\pi r^2$

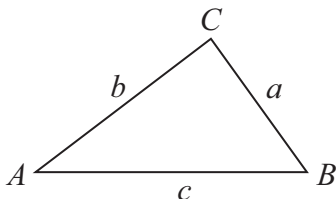


**Volume of cone** =  $\frac{1}{3} \pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**In any triangle ABC**



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$  where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2} ab \sin C$

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

**1** Here are the ingredients needed to make 16 gingerbread men.

Ingredients  
to make **16** gingerbread men

180 g flour  
40 g ginger  
110 g butter  
30 g sugar

Hamish wants to make 24 gingerbread men.

Work out how much of each of the ingredients he needs.

.....g flour

.....g ginger

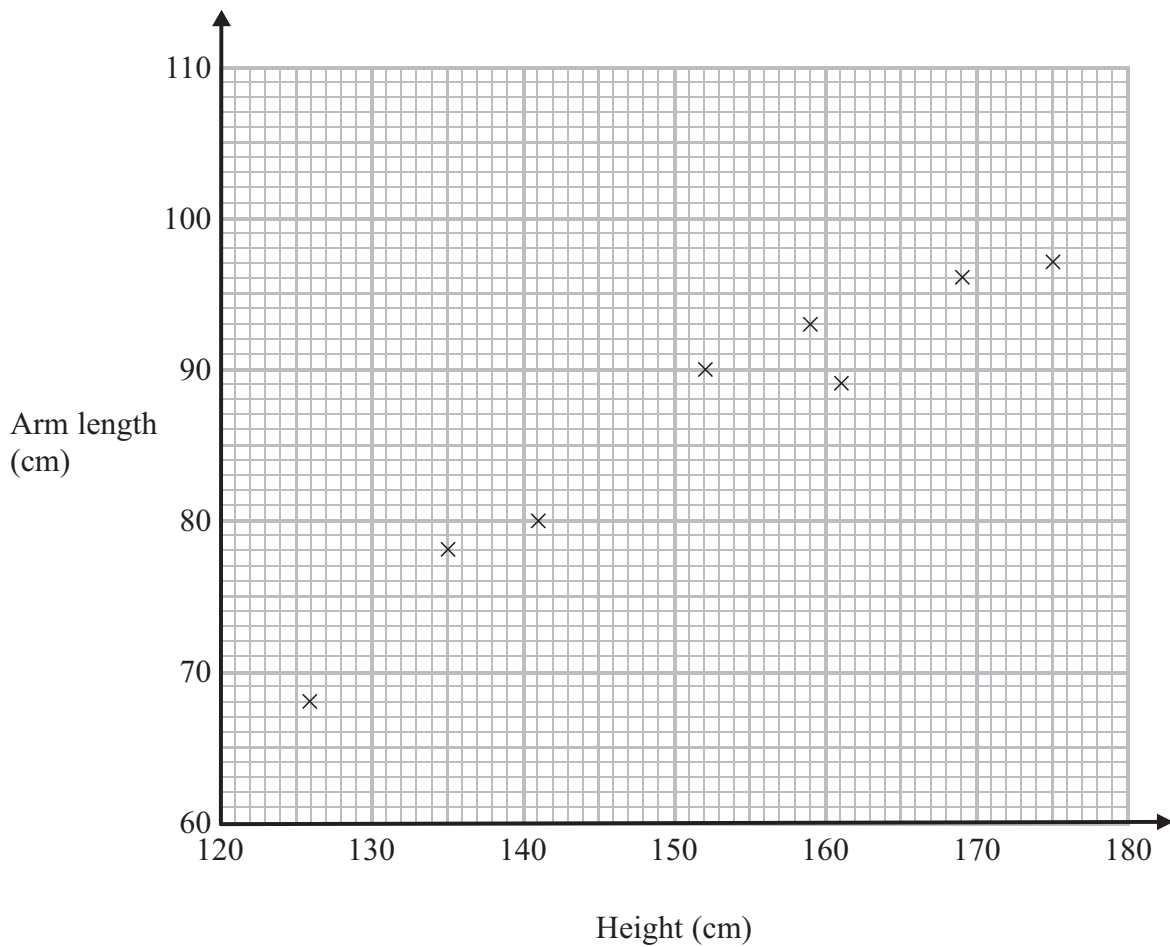
.....g butter

.....g sugar

**(Total for Question 1 is 3 marks)**

---

- 2 The scatter graph shows information about the height and the arm length of each of 8 students in Year 11



- (a) What type of correlation does this scatter graph show?

.....  
(1)

A different student in Year 11 has a height of 148 cm.

- (b) Estimate the arm length of this student.

.....cm  
(2)

**(Total for Question 2 is 3 marks)**

\*3 Here is part of Gary's electricity bill.

**Electricity bill**

New reading	7155 units
Old reading	7095 units

Price per unit 15p

Work out how much Gary has to pay for the units of electricity he used.

---

**(Total for Question 3 is 4 marks)**

- 4 Alison wants to find out how much time people spend reading books.  
She is going to use a questionnaire.

Design a suitable question for Alison to use in her questionnaire.

---

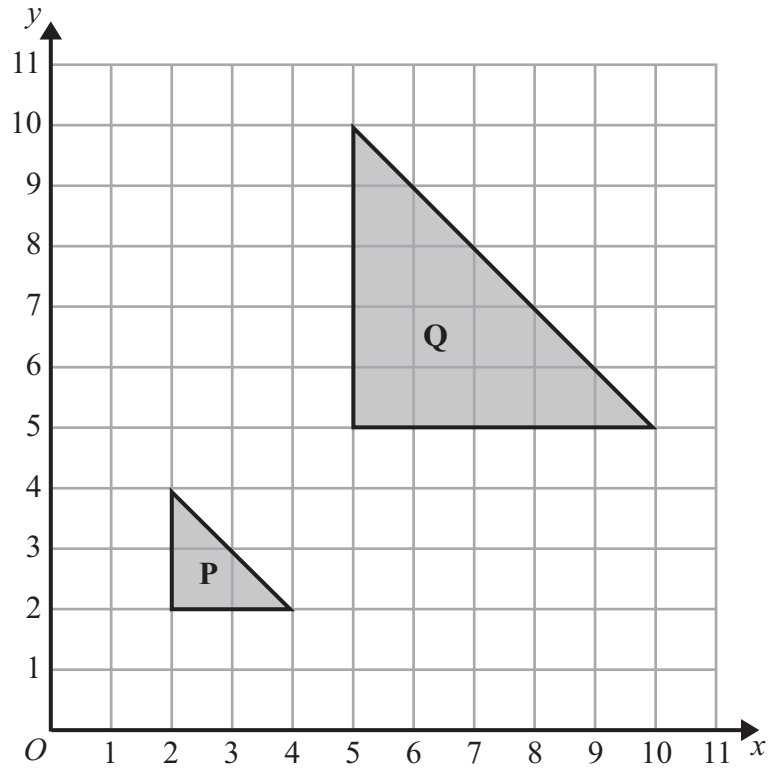
**(Total for Question 4 is 2 marks)**

- 5 Work out an estimate for  $\frac{31 \times 9.87}{0.509}$

.....  
**(Total for Question 5 is 3 marks)**

---

6



Describe fully the single transformation that maps shape P onto shape Q.

.....

.....

**(Total for Question 6 is 3 marks)**

---

7 Here is a diagram of Jim's garden.

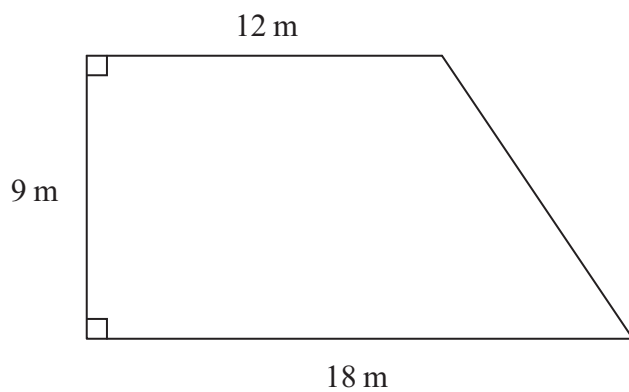


Diagram **NOT**  
accurately drawn

Jim wants to cover his garden with grass seed to make a lawn.

Grass seed is sold in bags.

There is enough grass seed in each bag to cover  $20 \text{ m}^2$  of garden.

Each bag of grass seed costs £4.99

Work out the least cost of putting grass seed on Jim's garden.

£.....

**(Total for Question 7 is 4 marks)**

8 There are only red counters, blue counters, white counters and black counters in a bag.

The table shows the probability that a counter taken at random from the bag will be red or blue.

<b>Colour</b>	red	blue	white	black
<b>Probability</b>	0.2	0.5		

The number of white counters in the bag is the same as the number of black counters in the bag.

Tania takes at random a counter from the bag.

(a) Work out the probability that Tania takes a white counter.

.....  
(2)

There are 240 counters in the bag.

(b) Work out the number of red counters in the bag.

.....  
(2)

**(Total for Question 8 is 4 marks)**

---



9 The diagram shows a prism.

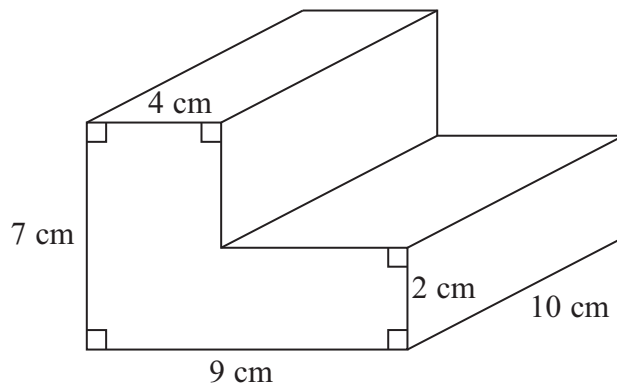


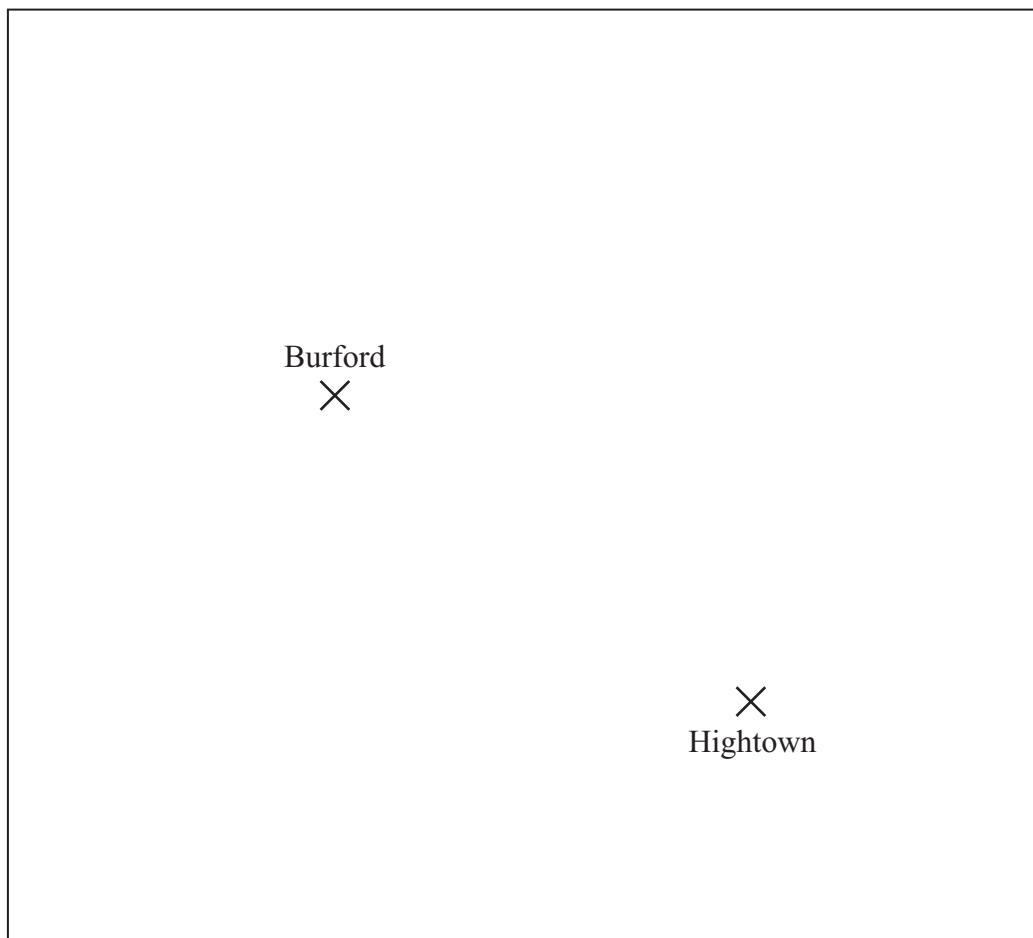
Diagram **NOT** accurately drawn

Work out the volume of the prism.

.....cm<sup>3</sup>

**(Total for Question 9 is 3 marks)**

- 10** Here is a map.  
The map shows two towns, Burford and Hightown.



Scale: 1 cm represents 10 km

A company is going to build a warehouse.

The warehouse will be less than 30 km from Burford **and** less than 50 km from Hightown.

Shade the region on the map where the company can build the warehouse.

**(Total for Question 10 is 3 marks)**

---

11 (a) Expand  $4(3x + 5)$

.....  
(1)

(b) Expand and simplify  $2(x - 4) + 3(x + 5)$

.....  
(2)

(c) Expand and simplify  $(x + 4)(x + 6)$

.....  
(2)

---

**(Total for Question 11 is 5 marks)**

**\*12** Talil is going to make some concrete mix.  
He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.

Talil wants to make 180 kg of concrete mix.

Talil has

15 kg of cement  
85 kg of sand  
100 kg of gravel

Does Talil have enough cement, sand and gravel to make the concrete mix?

---

**(Total for Question 12 is 4 marks)**

**13** The bearing of a ship from a lighthouse is  $050^\circ$

Work out the bearing of the lighthouse from the ship.

o

.....  
**(Total for Question 13 is 2 marks)**

---

**14** (a) Simplify  $m^5 \div m^3$

.....  
**(1)**

(b) Simplify  $5x^4y^3 \times x^2y$

.....  
**(2)**

**(Total for Question 14 is 3 marks)**

---

16 The diagram shows a triangle.

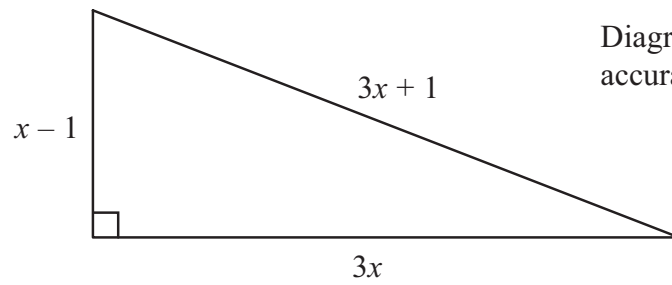


Diagram **NOT**  
accurately drawn

In the diagram, all the measurements are in metres.

The perimeter of the triangle is 56 m.

The area of the triangle is  $A \text{ m}^2$ .

Work out the value of  $A$ .

---

(Total for Question 16 is 4 marks)

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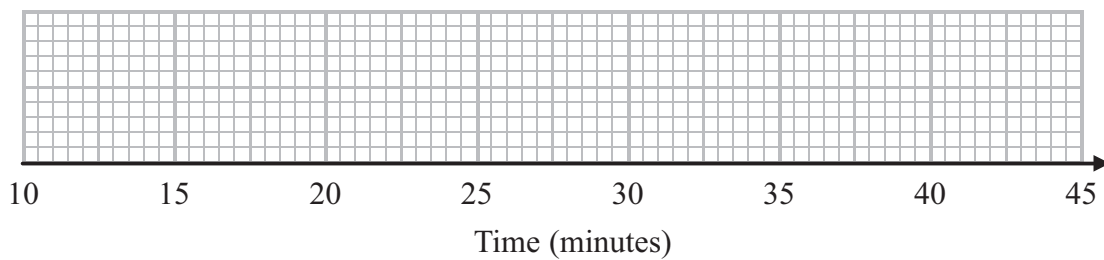
17

Sameena recorded the times, in minutes, some girls took to do a jigsaw puzzle.

Sameena used her results to work out the information in this table.

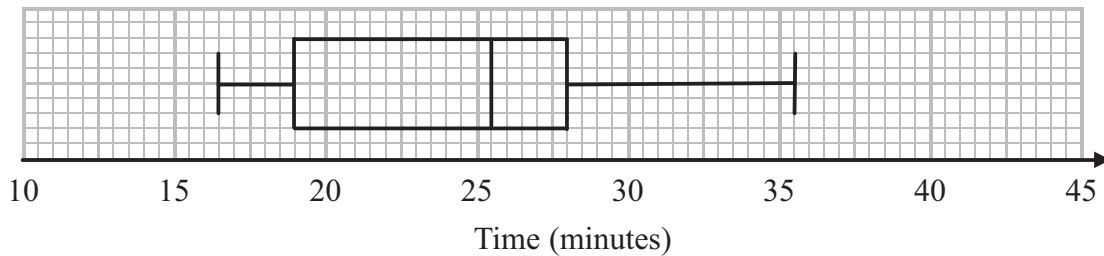
	Minutes
Shortest time	18
Lower quartile	25
Median	29
Upper quartile	33
Longest time	44

(a) On the grid, draw a box plot to show the information in the table.



(2)

The box plot below shows information about the times, in minutes, some boys took to do the same jigsaw puzzle.



(b) Compare the distributions of the girls' times and the boys' times.

.....

.....

.....

.....

(2)

(Total for Question 17 is 4 marks)

**18** Write the following numbers in order of size.  
Start with the smallest number.

$$0.038 \times 10^2 \quad 3800 \times 10^{-4} \quad 380 \quad 0.38 \times 10^{-1}$$

---

**(Total for Question 18 is 2 marks)**

**19** The table shows information about the speeds of 100 lorries.

**Speed ( $s$ ) in km/h**

	<b>Frequency</b>
$0 < s \leq 20$	2
$20 < s \leq 40$	9
$40 < s \leq 60$	23
$60 < s \leq 80$	31
$80 < s \leq 100$	27
$100 < s \leq 120$	8

(a) Complete the cumulative frequency table for this information.

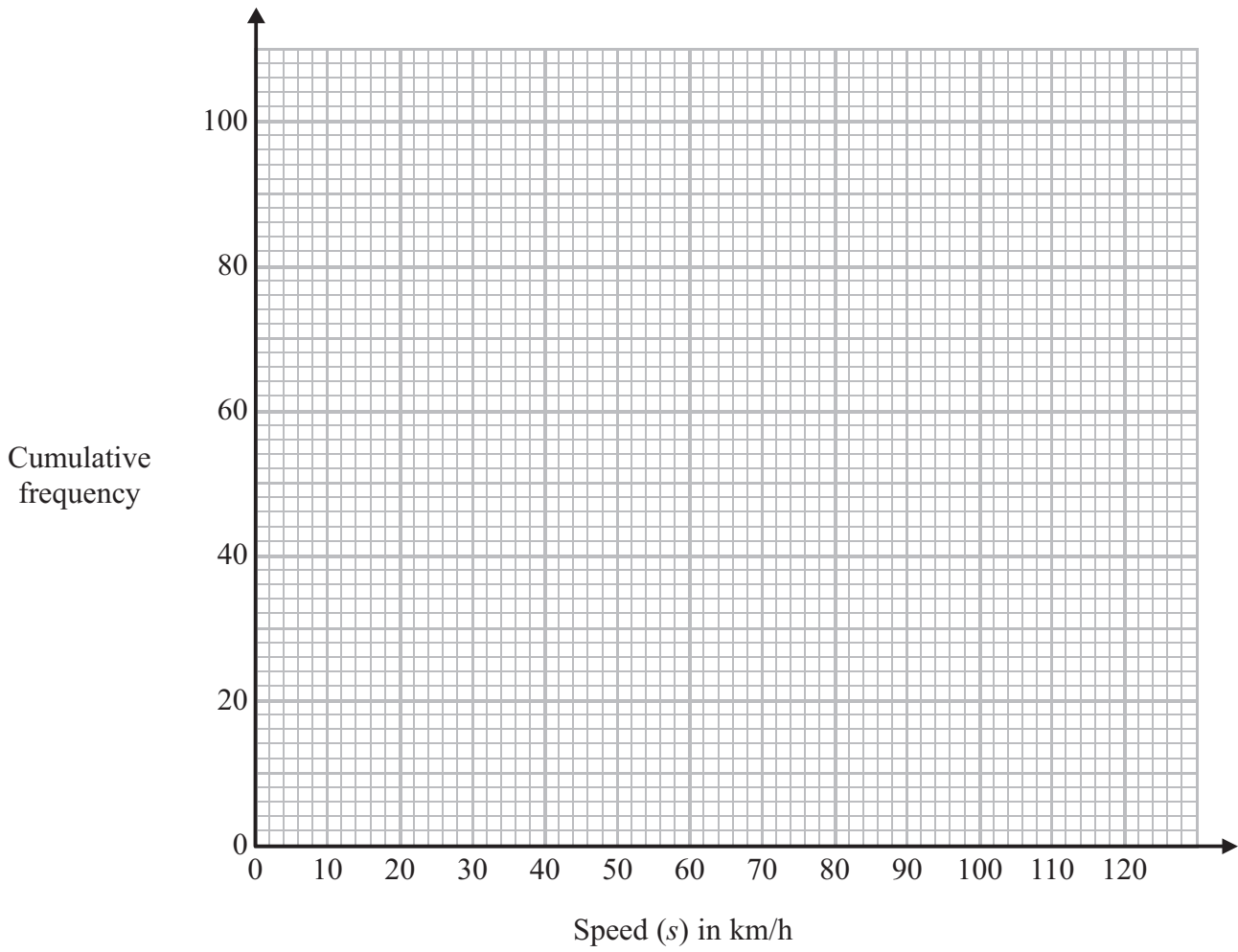
<b>Speed (<math>s</math>) in km/h</b>	<b>Cumulative frequency</b>
$0 < s \leq 20$	2
$0 < s \leq 40$	
$0 < s \leq 60$	
$0 < s \leq 80$	
$0 < s \leq 100$	
$0 < s \leq 120$	

(1)



(b) On the grid, draw a cumulative frequency graph for your table.

(2)



(c) Find an estimate for the number of lorries with a speed of more than 90 km/h.

.....  
(2)

**(Total for Question 19 is 5 marks)**

**20** Solve the simultaneous equations

$$3x + 2y = 4$$

$$4x + 5y = 17$$

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

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

---

**(Total for Question 20 is 4 marks)**