Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
November 2021

Mathematics

StemUp Model Solution

Unit M6 Paper 1
(Non-Calculator)
Foundation Tier



[GMC61]

GMC61

THURSDAY 2 DECEMBER, 9.15am–10.15am

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page. **You are provided with Foundation Tier Additional Support Materials for use with this paper.**
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all fifteen** questions.
All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **must not** use a calculator for this paper.

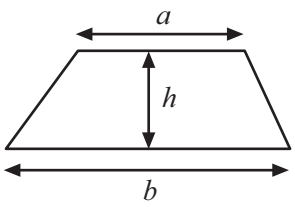
INFORMATION FOR CANDIDATES

The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

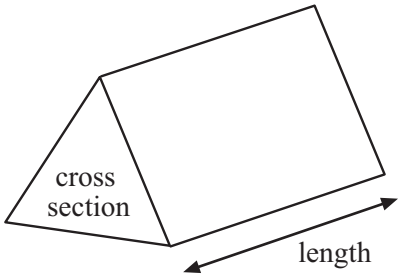
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Formula Sheet

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



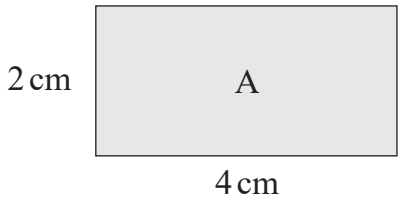
Volume of prism = area of cross section × length

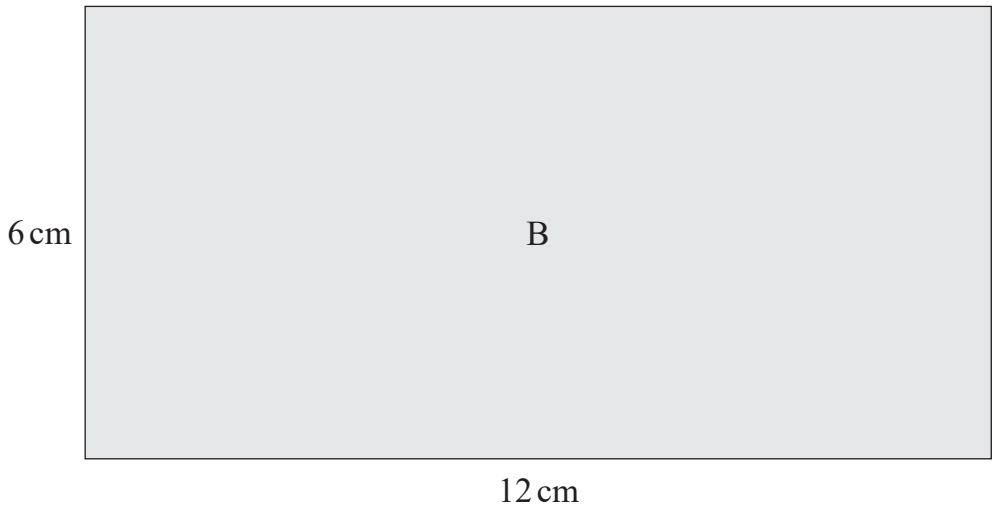


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1 Rectangle B is an enlargement of Rectangle A.

What is the scale factor?





4 cm → 12 cm: 12 ÷ 4 = 3

Answer 3 [1]

2 **(a)** Work out the missing number.

$$54 \times 4 \times \boxed{25} = 5400$$

$4 \times 25 = 100, \quad 54 \times 100 = 5400$

Answer 25 [1]

(b) Work out the missing number.

$$68 \times 40 + 68 \times \boxed{60} = 6800$$

$68 \times (40 + 60) = 68 \times 100 = 6800$

Answer 60 [1]

3 There are 45 000 people in the town of Arrondale.

(a) $\frac{2}{9}$ of the people are children.

How many are children?

45 000 ÷ 9 = 5000

5000 × 2 = 10 000

Answer 10 000 [2]

(b) 30% of the people in Arrondale are over 65

How many are over 65?

10% of 45 000 = 4500

30% = 3 × 4500 = 13 500

Answer 13 500 [2]

[Turn over

4 Grace cannot divide a number by 36

Her friend Chloe says,

"That's easy. Divide first by 4 and then divide by 9 as $4 \times 9 = 36$"

Use Chloe's method to divide 5238 by 54

Show your work.

54 = 6 x 9

Divide by 6: 5238 ÷ 6 = 873

Then divide by 9: 873 ÷ 9 = 97

So 5238 ÷ 54 = 97

Answer 97 [2]

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5 800 students attend Clarendon College.

15% of them are in Year 11

10% of Year 11 students are in the Spanish class.

Of **all** the students in Clarendon College, how many **are not** in the Year 11 Spanish class?

10% of 800 = 80, 5% of 800 = 40

15% of 800 = 80 + 40 = 120 in Year 11

10% of 120 = 12 in the Spanish class

Not in the class: 800 − 12 = 788

Answer *788* [3]

[Turn over

6 Each new number in a sequence is found using the rule

multiply the previous number by 3 and then subtract 5

Find the next two numbers in this sequence.

2 , 1 , −2

$2 \times 3 - 5 = 6 - 5 = 1$

$1 \times 3 - 5 = 3 - 5 = -2$

[2]

7 A bag contains five counters, each one a different colour.

The colours are red (R), green (G), blue (B), white (W) and yellow (Y).

Daniel takes a counter at random from the bag.

Daniel now tosses a fair coin.

One possible outcome is (red, heads), which can be written as (R, H).

(a) List all the possible outcomes for this experiment in this way in the two-way table below.

One has already been done for you.

		Counter (colour)				
		R	**G**	**B**	**W**	**Y**
Coin	**H**	(R, H)	(G, H)	(B, H)	(W, H)	(Y, H)
	T	(R, T)	(G, T)	(B, T)	(W, T)	(Y, T)

[2]

(b) What is the probability that the outcome is (B, H)?

10 outcomes, 1 of them is (B, H)

Answer $\frac{1}{10}$ [1]

(c) What is the probability that the outcome of this experiment contains a green (G) or a tail (T) or both of these?

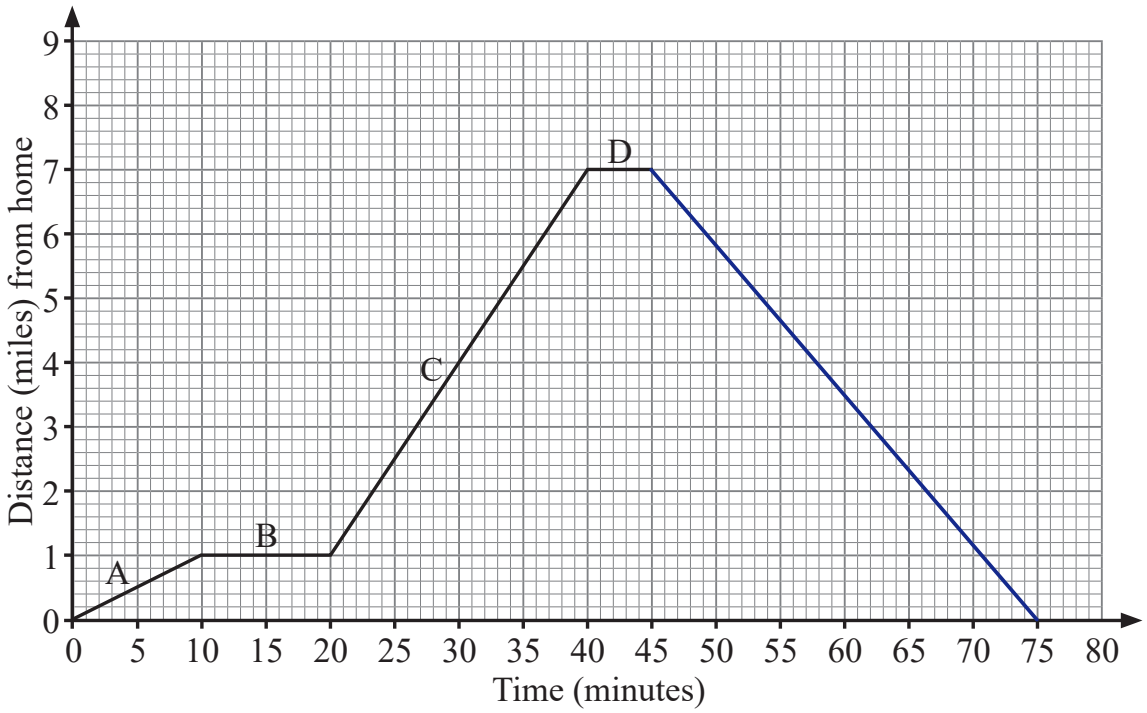
(G, H), (R, T), (G, T), (B, T), (W, T), (Y, T) = 6 outcomes

Answer $\frac{6}{10}$ [2]

[Turn over

8 Mike is out for a bicycle ride. He starts from home.

The graph shows four stages of his ride labelled A, B, C and D.



(a) Which stage of the graph shows Mike repairing an **early** puncture?

Answer B [1]

(b) What is Mike's average speed during stage C?

Stage C: 7 − 1 = 6 miles in 20 min

6 × 3 = 18 mph

Answer 18 mph [1]

(c) Mike travels home at an average speed of 14 mph.

Complete the final stage of Mike's bicycle ride on the graph. [2]

7 miles at 14 mph: 7 ÷ 14 = ½ hour = 30 minutes

Leaves at 45 min, home at 45 + 30 = 75 min

9

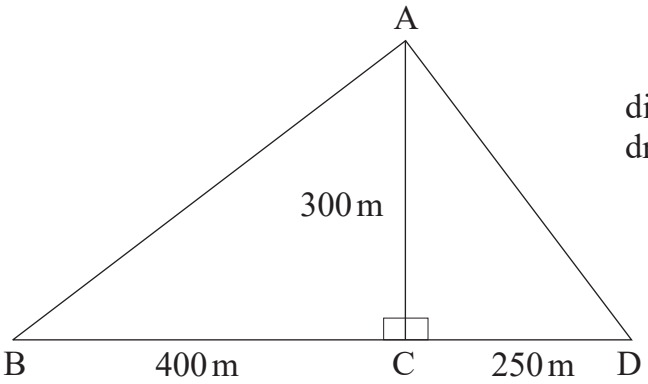
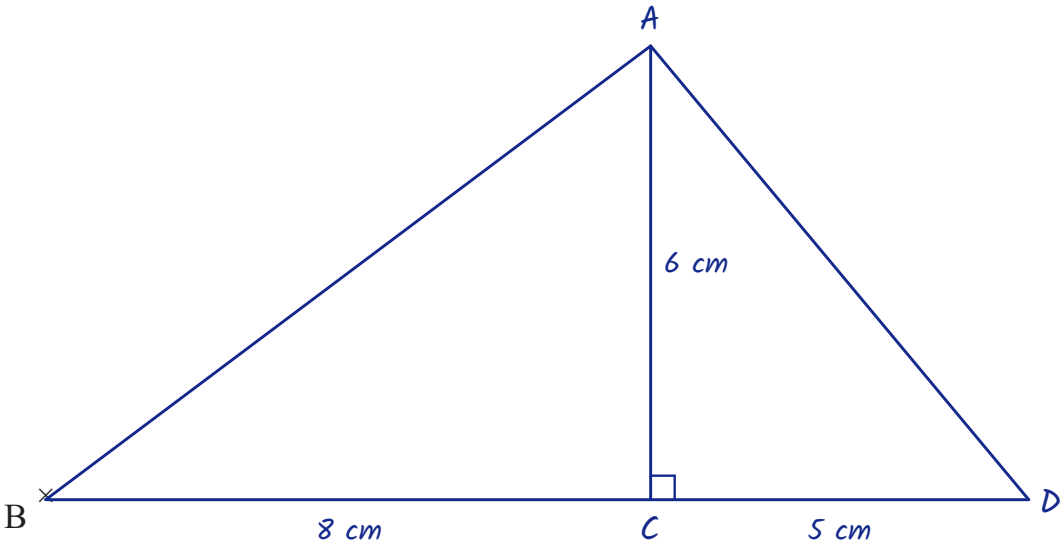


diagram not drawn accurately

(a) In the space below, make a scale drawing of the diagram ABCD shown above.

Use a scale of 1 cm to 50 m.

400 ÷ 50 = 8 cm, 300 ÷ 50 = 6 cm, 250 ÷ 50 = 5 cm



[3]

(b) Use your scale drawing to calculate the actual length of AB.

AB = 10 cm, 10 × 50 = 500 m

Answer AB = 500 m [1]

[Turn over

10 This recipe makes 16 scones with the following ingredients.

Ingredients

- 250 g flour
- 1 tsp baking powder
- 40 g butter
- 25 g sugar
- 1 large egg
- about 100 ml milk



Source: © Getty Images

(a) Paul wants to make 20 scones.

How much butter will he need?

40 ÷ 4 = 10 g for 4 scones

10 × 5 = 50 g for 20 scones

Answer 50 g [2]

(b) Paul has 300 g of flour.

Has he enough flour to make 20 scones?

Show all your working.

4 scones: 250 ÷ 4 = 62.5 g

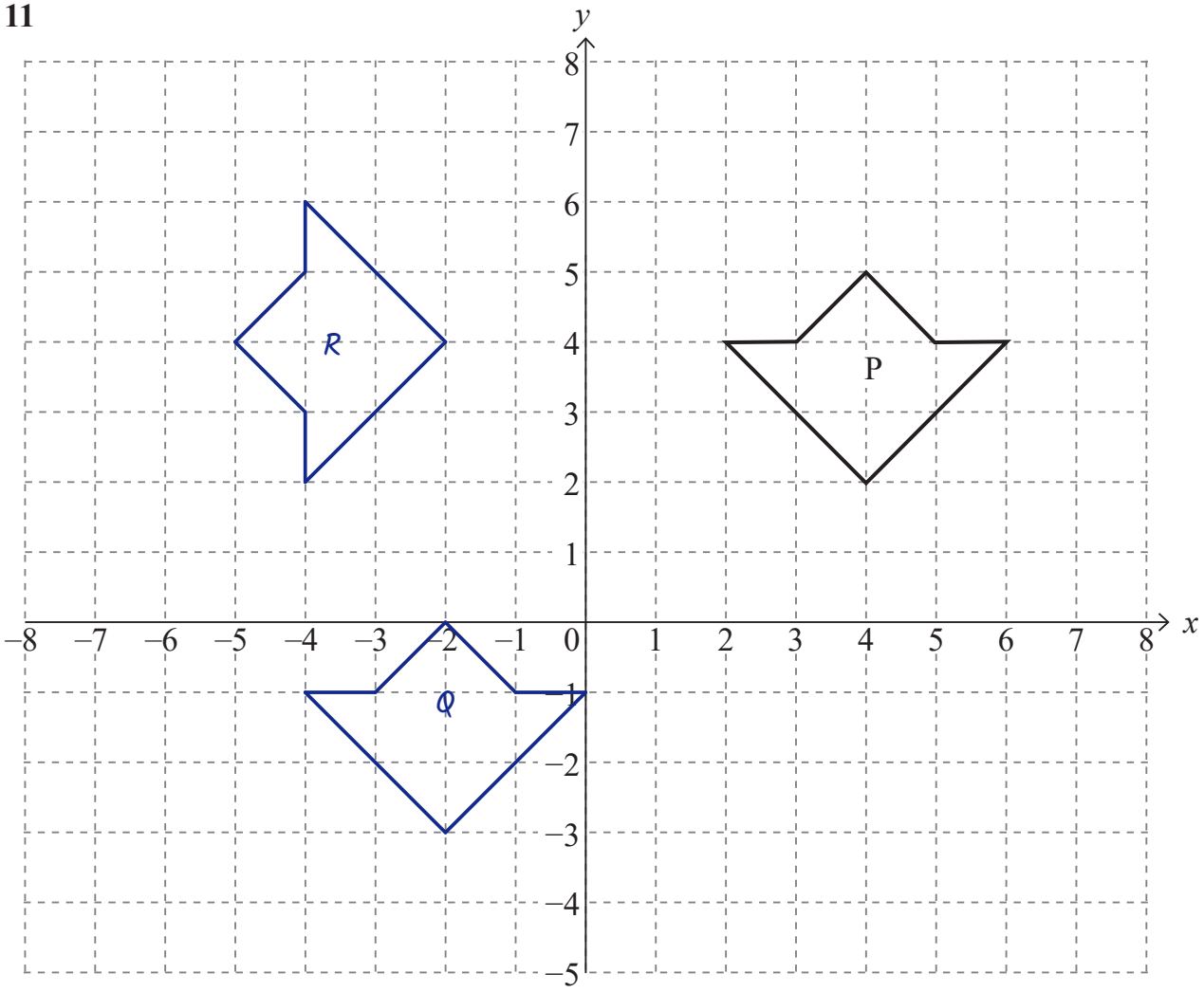
20 scones: 62.5 × 5 = 312.5 g of flour needed

300 g < 312.5 g

Answer No because he needs 312.5 g, which is 12.5 g more [2]

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(a) On the grid above translate the shape P 6 units left and 5 units down.

Label the new shape Q. [1]

(b) On the same grid, rotate the shape P 90° anticlockwise about the origin.

Label the new shape R. [3]

[Turn over

12 A 6-sided dice is biased.

The table below gives the probabilities of getting a 1, 2, 3, 4 and 5 when this dice is rolled.

Outcome	1	2	3	4	5	6
Probability	0.13	0.17	0.2	0.11	0.14	0.25

Work out the probability of getting a 6 when this dice is rolled.

$0.13 + 0.17 + 0.2 + 0.11 + 0.14 = 0.75$

$1 - 0.75 = 0.25$

Answer 0.25 [2]

13 **(a)** Solve $2x - 1 \leq -5$

$2x - 1 \leq -5$

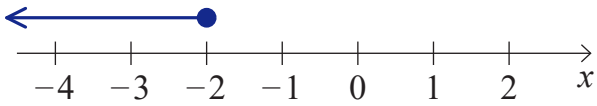
$2x \leq -5 + 1$

$2x \leq -4$

$x \leq -2$

Answer $x \leq -2$ [2]

(b) Show your solution on the number line.

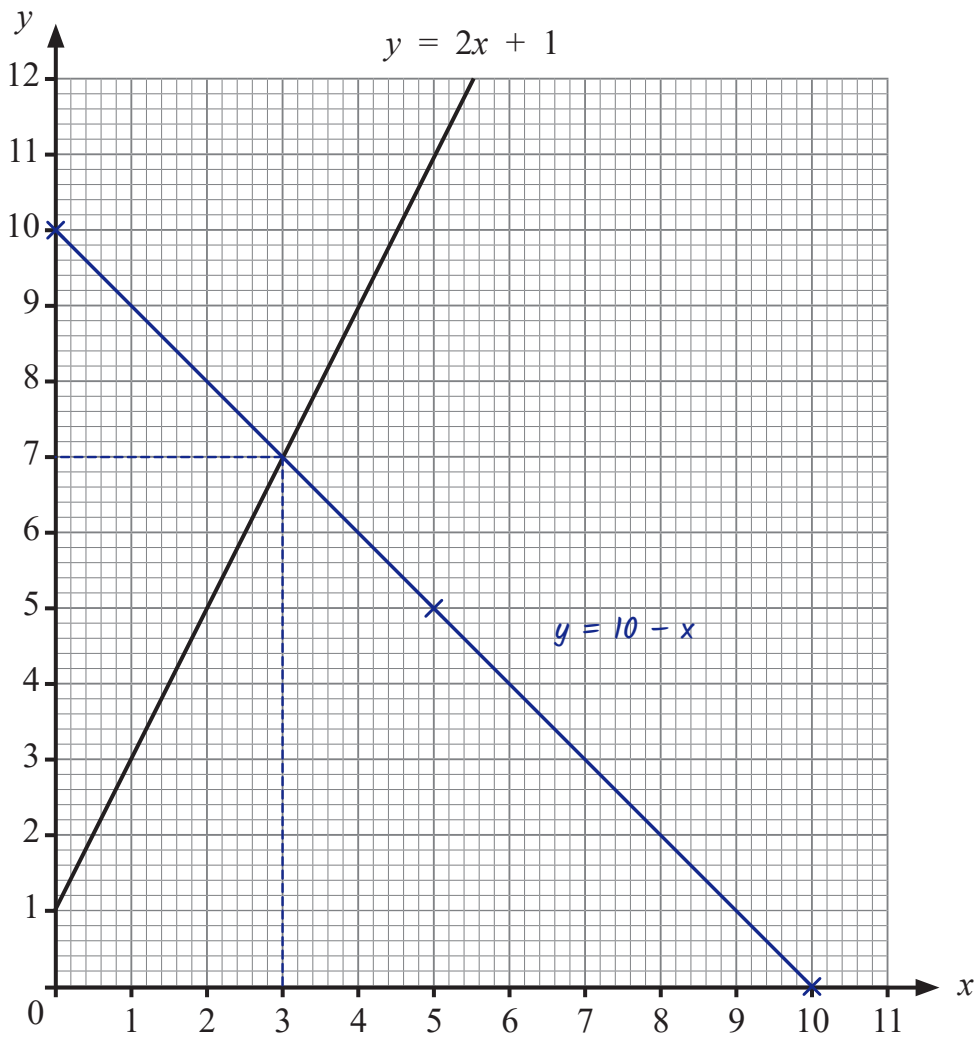


[1]

14 Use graphs to solve the simultaneous equations

$$y = 2x + 1 \quad \text{and} \quad y = 10 - x$$

The graph of $y = 2x + 1$ has already been drawn for you.



$y = 10 - x$: $x = 0, y = 10$; $x = 5, y = 5$; $x = 10, y = 0$

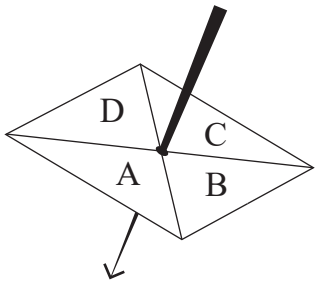
Lines cross at (3, 7)

Answer $x =$ 3 and $y =$ 7 [4]

[Turn over

15 A spinner has sections labelled A, B, C and D.

The spinner is spun, and the relative frequency of landing on D is recorded after every 10 spins.



Some of the results are recorded in the table below.

Number of spins	Relative frequency of D
10	0.5
20	0.3
30	0.4
40	0.35
50	0.38
60	0.45

19 ÷ 50 = 0.38

(a) After 50 spins the spinner had landed on D 19 times.

Fill in the missing relative frequency in the table above. [1]

(b) How many times had the spinner landed on D after 60 spins?

0.45 × 60 = 27

Answer 27 [1]

(c) Do you think that the spinner is biased? Give a reason for your answer.

Answer Yes because if fair, P(D) = 0.25, so expect D about

15 times in 60 spins, but it landed on D 27 times (0.45) [2]

(d) If the spinner is spun 400 times how many times would you expect it to land on D?

400 × 0.45 = 180

Answer 180 [2]

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Question Number	**Marks**
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Examiner Number

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