Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
November 2024

Mathematics

StemUp Model Solution

Unit M6 Paper 1
(Non-Calculator)
Foundation Tier



[GMC61]

GMC61

THURSDAY 21 NOVEMBER, 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 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.**
Questions which require drawing or sketching should be completed using an HB pencil.
All working **must** be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **must not** use a calculator for this paper.
Answer **all sixteen** questions.

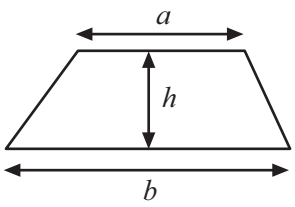
INFORMATION FOR CANDIDATES

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.

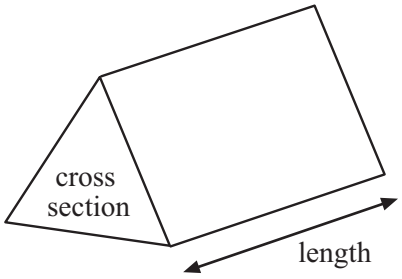
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Formula Sheet

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



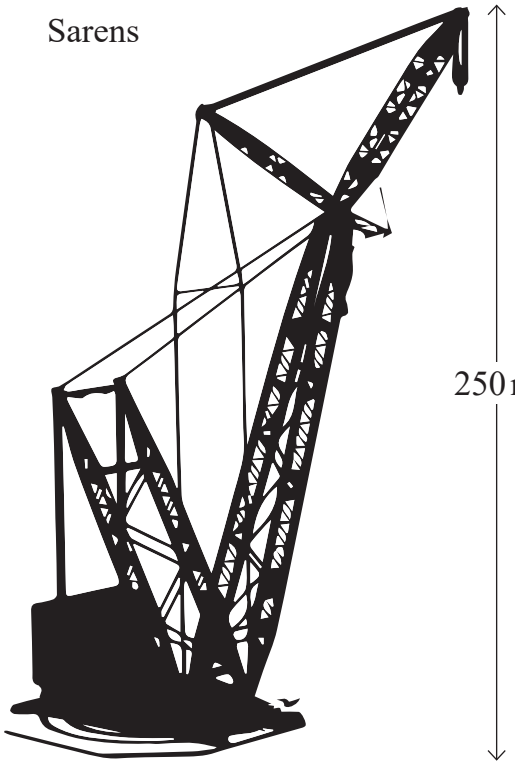
Volume of prism = area of cross section × length



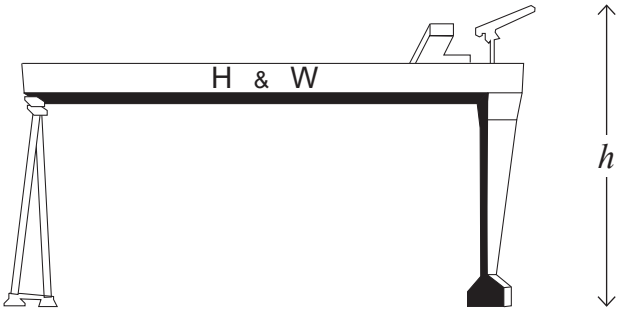
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1

Sarens



Samson



Two cranes, **drawn to scale**, are shown.

Sarens is 250 m tall.

What height, *h*, is Samson?

Show your working out clearly.

Sarens measures 10 cm, Samson measures 4 cm

10 cm represents 250 m

1 cm represents 250 ÷ 10 = 25 m

h = 4 × 25 = 100 m

Answer 100 m [4]

[Turn over

2 **(a)** A fair six-sided dice is rolled.

Write down the probability that it lands on a number **greater than 5**

Give your answer as a **fraction**.

Answer $\frac{1}{6}$ [1]

(b) An event is **certain** to happen.

Mark this probability on the probability scale below with an ✕.



[1]

(c) An event is **unlikely** to happen.

Mark this probability on the probability scale below with an ✕.



[1]

(d) Clay has a drawer of T-shirts.

He has 5 red T-shirts.

The probability that he picks a red T-shirt at random is $\frac{1}{4}$

How many T-shirts has Clay altogether?

Total = 5 × 4 = 20

Answer 20 T-shirts [1]

3



Source: © Getty Images

14 out of 20 people who had dinner in a restaurant ordered dessert.

(a) What is the **ratio** of the number of people who ordered dessert to the number of people who didn't order dessert?

Give your answer in its simplest form.

did not order dessert = 20 − 14 = 6

14 : 6 = 7 : 3 (÷ 2)

Answer 7 : 3 [2]

3 of these 20 people in the restaurant changed their mind and ordered dessert.

(b) Write down the new ratio for the number of people who ordered dessert to the number of people who didn't order dessert.

ordered dessert = 14 + 3 = 17

did not order = 20 − 17 = 3

Answer 17 : 3 [2]

[Turn over

4 Luke is going to choose two different pizza toppings.

He can choose from

Ham (H) Chilli (C) Mushrooms (M) Olives (O)

Write down all the topping combinations Luke can choose.

HC HM HO

CM CO

MO

6 combinations

[2]

5 Max is playing a game with cards.

There are four blue cards numbered 1, 2, 3 and 4

There are three yellow cards numbered 2, 3 and 4

The cards are placed with the numbers facing downwards.

He takes one blue card at random and one yellow card at random.

He **multiplies** the two numbers together to get his score.

(a) Complete the table to show the possible scores.

		Blue			
	×	**1**	**2**	**3**	**4**
Yellow	**2**	2	4	6	8
	3	3	6	9	12
	4	4	8	12	16

[2]

(b) What is the probability that he gets a score which is

(i) an even number, Answer $\frac{10}{12}$ [1]

(ii) a number greater than 4, Answer $\frac{8}{12}$ [1]

(iii) a prime number? Answer $\frac{2}{12}$ [1]

[Turn over

6 Write down the next two terms in the sequence below

39 37 33 27 19 ___9___ ___-3___ [2]

-2 -4 -6 -8 -10 -12

7 Laura deposits £7 200 in a bank for one year.

The interest rate is 2% per year.

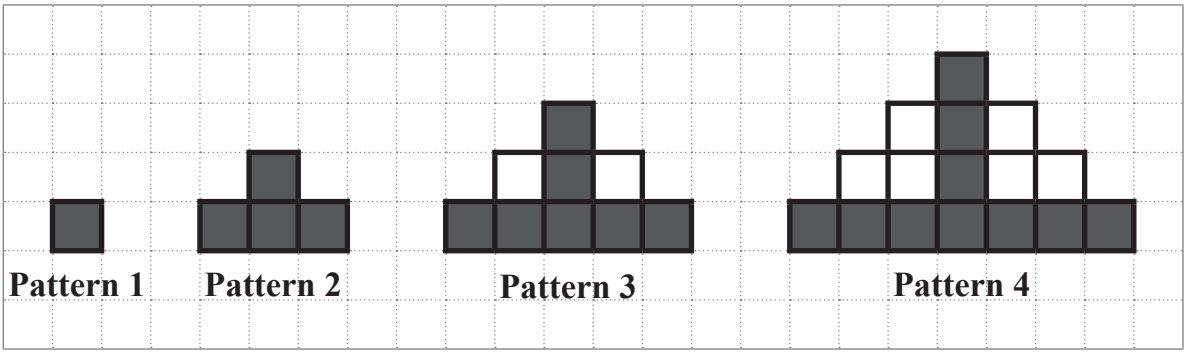
How much **interest** does Laura receive at the end of the year?

1% = 7200 ÷ 100 = £72

2% = 72 × 2 = £144

Answer £ ___144___ [2]

8 The first four patterns in a sequence are shown below.



(a) Write down the **total** number of squares for each of the patterns shown.

Pattern 1 = 1 Pattern 2 = 4 Pattern 3 = 9 Pattern 4 = 16

[1]

(b) Use your answer in part **(a)** to help calculate the **total** number of squares in Pattern 7

square numbers 1^2, 2^2, 3^2, 4^2, ... Pattern 7 = 7^2 = 49

Answer 49 squares [1]

The number of **black** squares also follows a sequence.

(c) Use this sequence to help calculate the number of **white** squares in Pattern 7

Black: 1, 4, 7, 10, ... (add 3)

1, 4, 7, 10, 13, 16, 19 so Pattern 7 has 19 black

White = 49 − 19 = 30

Answer 30 white squares [3]

[Turn over

9 A school canteen supervisor asked a sample of students what drink they bought in the canteen.

The table shows the results.

Drink	Frequency
Tea	6
Coffee	10
Orange juice	4
Hot chocolate	3
Water	7

On a later day, 300 students buy a drink in the canteen.

How many students do you expect to buy tea?

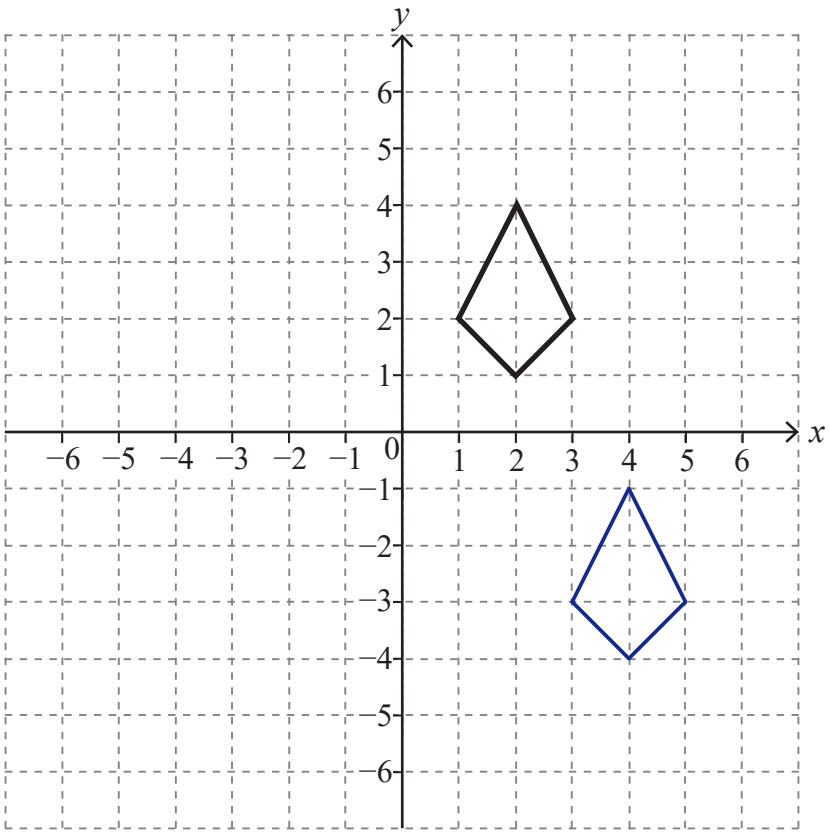
Total = 6 + 10 + 4 + 3 + 7 = 30

$P(\text{tea}) = \frac{6}{30} = \frac{1}{5}$

$\frac{1}{5} \times 300 = 60$

Answer 60 students [2]

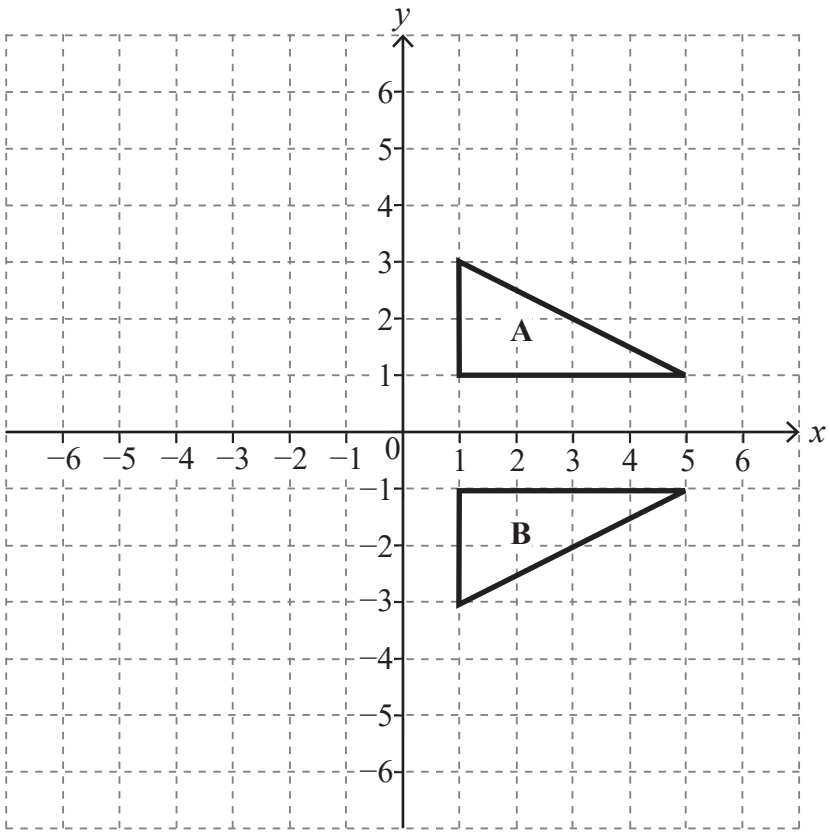
10 Translate the shape 2 to the right and 5 down.



[2]

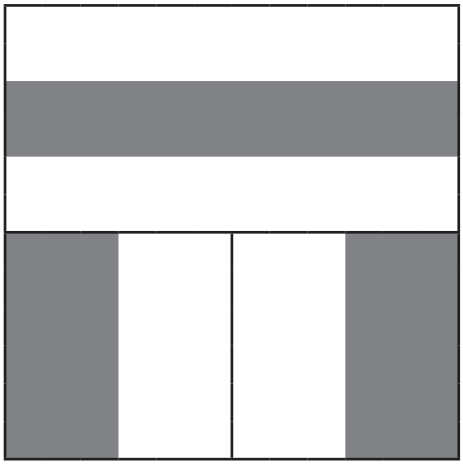
[Turn over

11 Describe fully the single transformation that maps **A** to **B**.



Answer Reflection in the x-axis [2]

12



A square is divided into two halves.

The top half is divided into 3 equal parts.

The bottom half is divided into 4 equal parts.

What fraction of the whole square is shaded?

top: $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$

bottom: $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ each shaded part

$\frac{1}{6} + 2 \times \frac{1}{8} = \frac{1}{6} + \frac{1}{4} = \frac{2}{12} + \frac{3}{12} = \frac{5}{12}$

Answer $\frac{5}{12}$ [3]

[Turn over

13

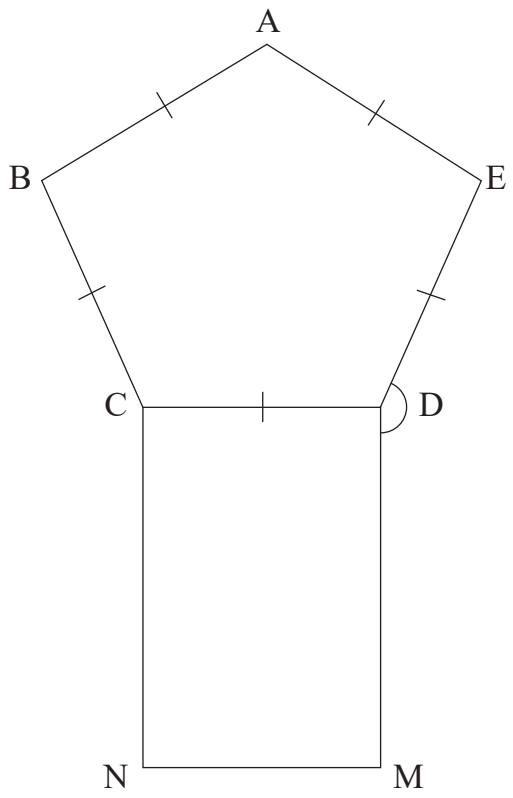


diagram not drawn accurately

ABCDE is a regular pentagon.

CDMN is a rectangle.

Work out the size of the obtuse angle EDM.

Sum of interior angles = (5 − 2) × 180 = 540°

Each interior angle = 540 ÷ 5 = 108°

Angle CDM = 90° (rectangle)

Angle EDM = 360 − (90 + 108) = 162°

Answer 162 ° [4]

14 Kevin tosses a coin.

He knows it is biased.

It lands 60 times on Heads.

Kevin uses his experiment to work out that the relative frequency of his coin landing on Heads is $\frac{2}{3}$

How many times did Kevin toss the coin?

$\frac{2}{3}$ of tosses = 60

$\frac{1}{3}$ of tosses = 60 ÷ 2 = 30

tosses = $\frac{3}{3}$ = 30 × 3 = 90

Answer 90 [2]

[Turn over

15 Katie used flour to make muffins.

She used an equal amount of flour for each muffin.

To begin, she made three muffins and had $\frac{3}{4}$ of her flour left.

(a) What fraction of her flour did Katie **use** for **each** muffin?

3 muffins use $1 - \frac{3}{4} = \frac{1}{4}$

$\frac{1}{4} \div 3 = \frac{1}{12}$

Answer $\frac{1}{12}$ [1]

Katie then made **another** seven muffins, giving a total of 10 muffins, and had 50 g of flour left.

(b) How many grams of flour did Katie use for **each** muffin?

10 muffins use $\frac{10}{12}$, so $\frac{2}{12} = \frac{1}{6}$ is left

$\frac{1}{6} = 50$ g

1 muffin $= \frac{1}{12} = 50 \div 2 = 25$ g

Answer 25 g [2]

16 A rectangle is divided into four triangles.

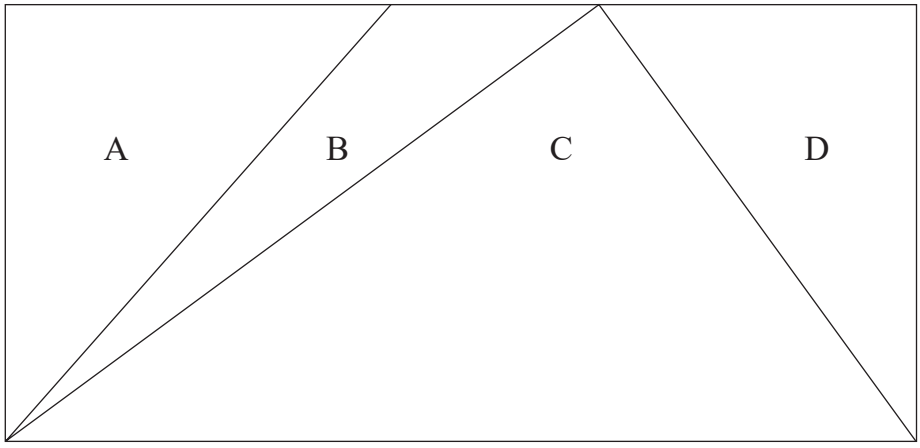


diagram not drawn accurately

The area of triangle C is 120 cm^2 and is **half** of the area of the rectangle.

The ratio of the area of triangle A to the area of the rectangle is 1 : 4

The ratio of the area of triangle D to the area of the rectangle is 1 : 6

What is the area of triangle B?

Area of rectangle = 120 × 2 = 240

Area of A = 240 ÷ 4 = 60

Area of D = 240 ÷ 6 = 40

Area of B = 240 − (120 + 60 + 40)

= 20

Answer 20 cm^2 [4]

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