Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2023

Mathematics

StemUp Model Solution

Unit M5 Paper 2
(With calculator)
Foundation Tier



[GMC52]

GMC52

WEDNESDAY 7 JUNE, 10.45 am–11.45 am

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 **may** use a calculator for this paper.

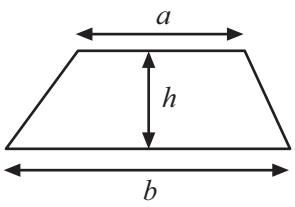
INFORMATION FOR CANDIDATES

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 calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

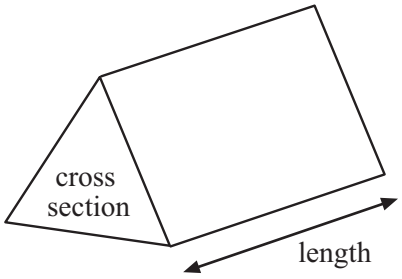
13343.07 **R**

Formula Sheet

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

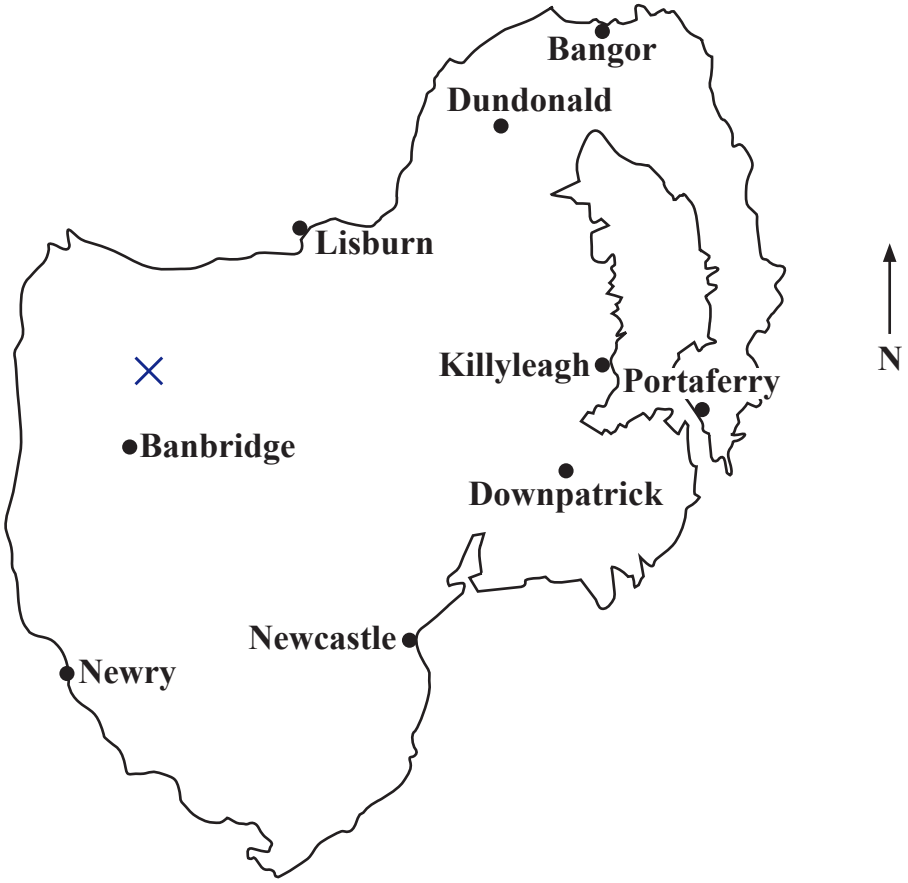


Volume of prism = area of cross section × length



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1 Some places are shown on the map.



(a) Which place is furthest west?

Answer Newry [1]

(b) Which place is both to the south and east of Killyleagh?

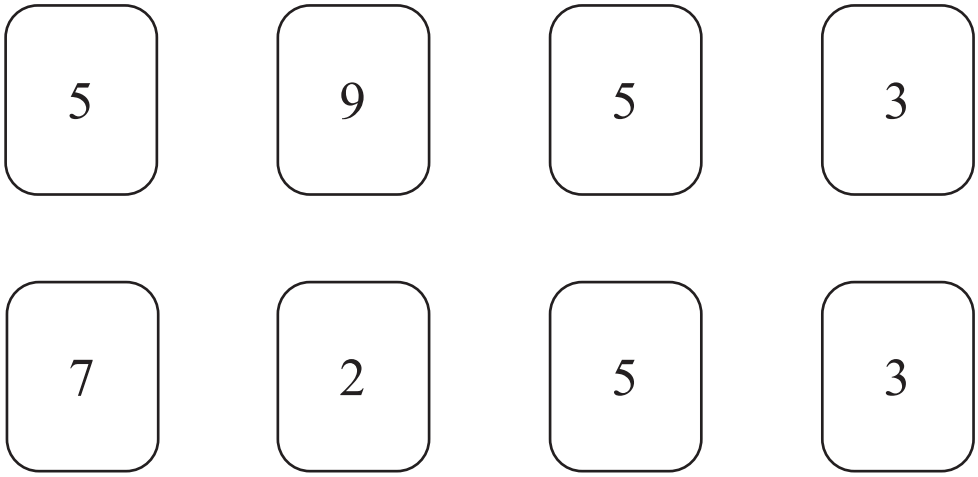
Answer Portaferry [1]

(c) John lives north of Banbridge and southwest of Lisburn.

Mark with an X, on the map, where he could live. [1]

[Turn over

2 Harry has the following cards.



He chooses one card at random.

(a) Is Harry more likely to choose an odd number or an even number?

odd: 5, 9, 5, 3, 7, 5, 3 = 7 cards even: 2 = 1 card

Answer *odd* [1]

(b) Which number has the greatest chance of being chosen?

three 5s (most cards)

Answer *5* [1]

(c) Which numbers have the same chance of being chosen as the 9?

9 appears once; 7 and 2 also appear once

Answer *7, 2* [1]

3

certain	likely	fair
unlikely	evens	impossible

Choose words from the box to fill in the blanks.

(a) A coin is tossed.

The coin is _____*fair*_____ if there is the same chance of it landing on a head as landing on a tail. [1]

(b) A day of the week is chosen at random.

It is _____*unlikely*_____ that the day chosen is Saturday. [1]

(c) Rhys takes a train every day.

Most days the train is late.

It is _____*likely*_____ that the train Rhys takes tomorrow will be late. [1]

[Turn over

4 **(a)** Write the next term in each sequence.

(i) 64 32 16 8 4 [1]

(ii) 4 11 18 25 32 [1]

(iii) 1 4 9 16 25 36 [1]

(iv) 1 3 6 10 15 21 [1]

(b) What is the smallest term in sequence **(ii)** which is half of one of the terms in sequence **(iv)** when sequence **(iv)** is continued?

(iv): 21, 28, 36 36 ÷ 2 = 18

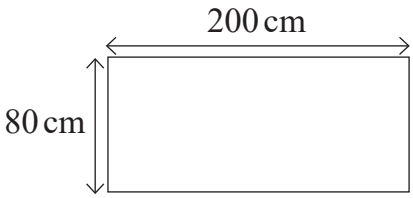
(ii): 4, 11, 18

Answer 18 [1]

5 A wall is being tiled.

The wall measures 200 cm × 80 cm.

The tiles are square of side length 20 cm.



Calculate the number of tiles needed.

200 ÷ 20 = 10 tiles along

80 ÷ 20 = 4 tiles up

10 × 4 = 40

Answer 40 [2]

6 An airline allows each passenger to carry a bag on board its planes.

The maximum dimensions of bags allowed on board are shown.

CARRY-ON

56 cm × 45 cm × 25 cm



1 inch = 2.54 cm

Toran has a bag with dimensions 22 inches × 17 inches × 9 inches.

Will he be allowed to carry his bag on board?

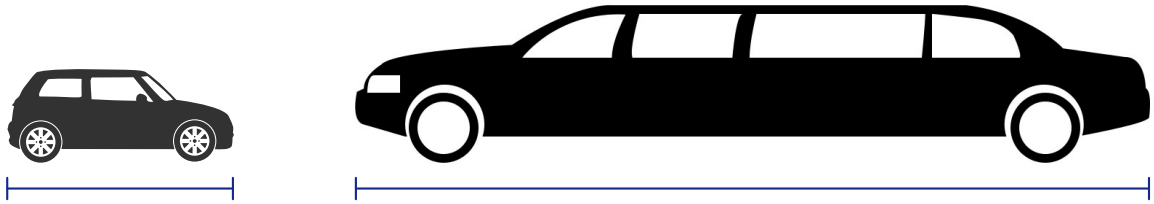
Show all of your working.

22 × 2.54 = 55.88 cm (less than 56 cm)
17 × 2.54 = 43.18 cm (less than 45 cm)
9 × 2.54 = 22.86 cm (less than 25 cm)
All three are smaller, so yes

Answer Yes [3]

[Turn over

7 Here is a scale drawing of a small car and a stretch limo



The small car is 12 feet long.

Work out the length of the stretch limo.

car = 3 cm, limo = 10.5 cm
10.5 ÷ 3 = 3.5
3.5 × 12 = 42

Answer 42 feet [3]

8 A meal deal consists of a main and a snack.

Mains	Snacks
Sandwich (S)	Fruit (F)
Wrap (W)	Cheese (C)
Bagel (B)	Yoghurt (Y)

Write down all the possible combinations for a meal deal.

SF SC SY

WF WC WY

BF BC BY

[2]

9 A game cost €22.99

The exchange rate was £1 = €1.10

What was the cost in £?

22.99 ÷ 1.10 = 20.9

Answer £ 20.90 [2]

[Turn over

10 Albert wants to buy a gold chain.



Gold chains are priced by the length of the chain.

An 18-inch chain costs £264

What will Albert have to pay for a 21-inch chain?

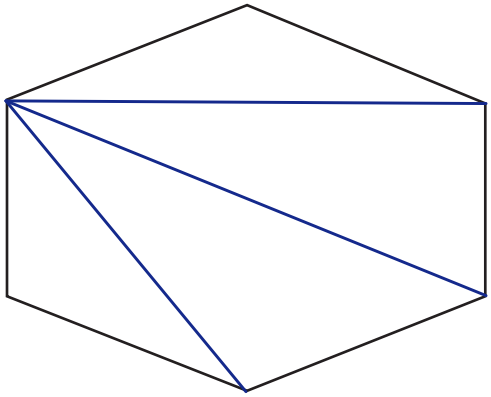
264 ÷ 18 = 14.666... per inch
14.666... × 21 = 308

Answer £ 308 [2]

11 Ellie and Tanisha are working out the sum of the angles in polygons.

Ellie decides to split the hexagon below into triangles.

(a) Show how this can be done.



[1]

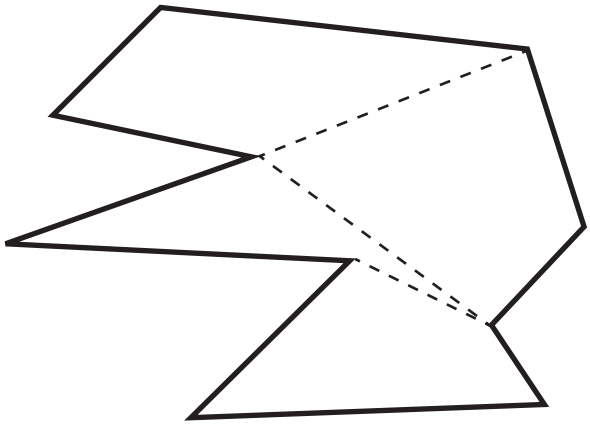
(b) What is the sum of the angles in the hexagon?

4 triangles: 4 × 180 = 720

Answer 720 ° [1]

Tanisha splits the decagon below into quadrilaterals as shown.

(c) What is the sum of the angles in the decagon?

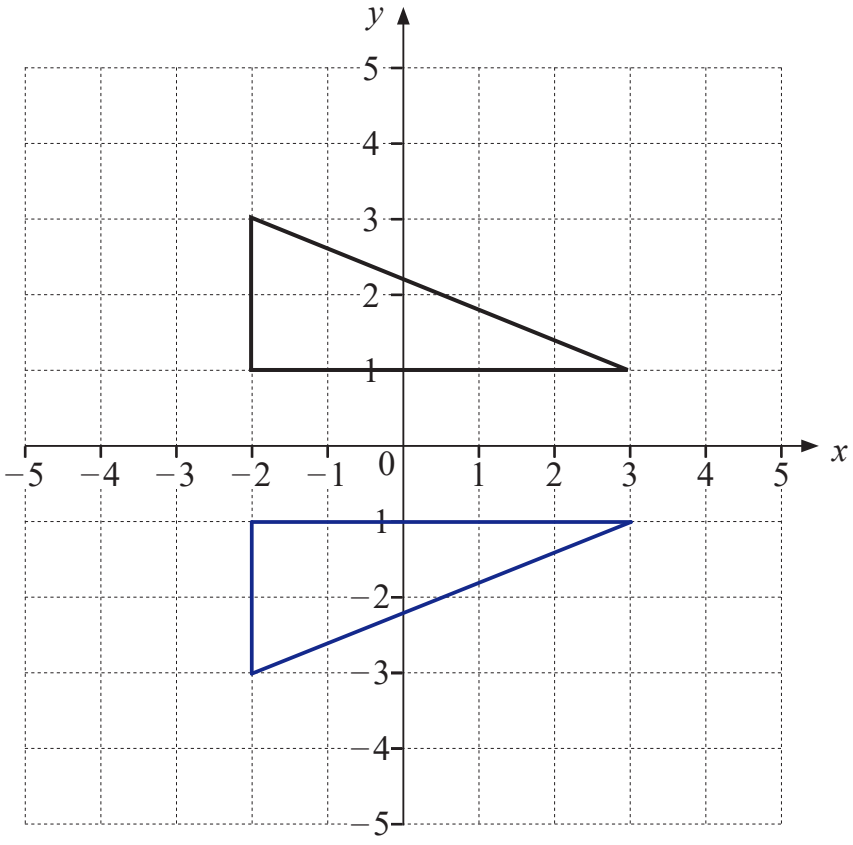


4 × 360 = 1440

Answer 1440 ° [1]

[Turn over

12 **(a)** Reflect the triangle in the x-axis.



[1]

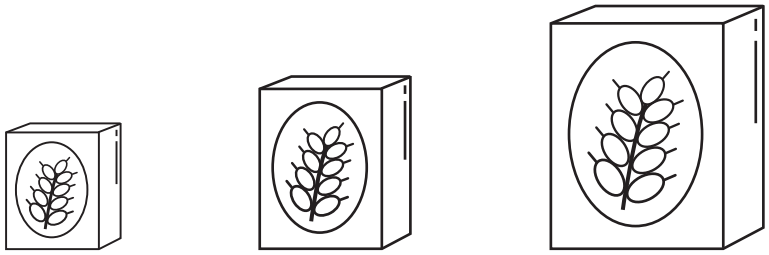
(b) A rectangle of length 5 cm and width 8 cm is enlarged by a scale factor of 4

What are the dimensions of the enlarged rectangle?

5 × 4 = 20
8 × 4 = 32

Answer length 20 cm, width 32 cm [2]

13 A breakfast cereal is sold in three different sized boxes.



500 g 750 g 1 kg

(a) Write the ratio of the weights of the boxes in simplest form.

500 : 750 : 1000
= 2 : 3 : 4 (÷ 250)

Answer 2 : 3 : 4 [2]

(b) A new size of box will be made.

It will have 20% more cereal than the 500 g box.

It will cost £1.56, which is 20p more than the 500 g box.

Will the customer who normally buys the 500 g box get a better or worse deal in buying this new size of box?
Show all working clearly.

500 g box costs 1.56 − 0.20 = £1.36
new box: 500 × 1.2 = 600 g
500 g: 136p ÷ 5 = 27.2p per 100 g
600 g: 156p ÷ 6 = 26p per 100 g
26p < 27.2p, so the new 600 g box is better value

They will get a better deal. [4]

[Turn over

14 Visitors to Northern Ireland were asked to name their favourite tourist attraction.

The table of probabilities is based on their responses.

Tourist attraction	Giant's Causeway	Ulster Museum	Titanic Belfast	Mussenden Temple	Derry City Walls	Other
Probability	0.3	0.1	0.14	0.13	0.13	0.2

The probability of Mussenden Temple is the same as the probability of Derry City Walls.

(a) Complete the table. [3]

(b) What is the probability a visitor named Ulster Museum or Titanic Belfast?

0.1 + 0.14 = 0.24

Answer 0.24 [1]

(c) Last week 1800 visitors were asked to name their favourite tourist attraction.

Estimate how many named Giant's Causeway.

0.3 × 1800 = 540

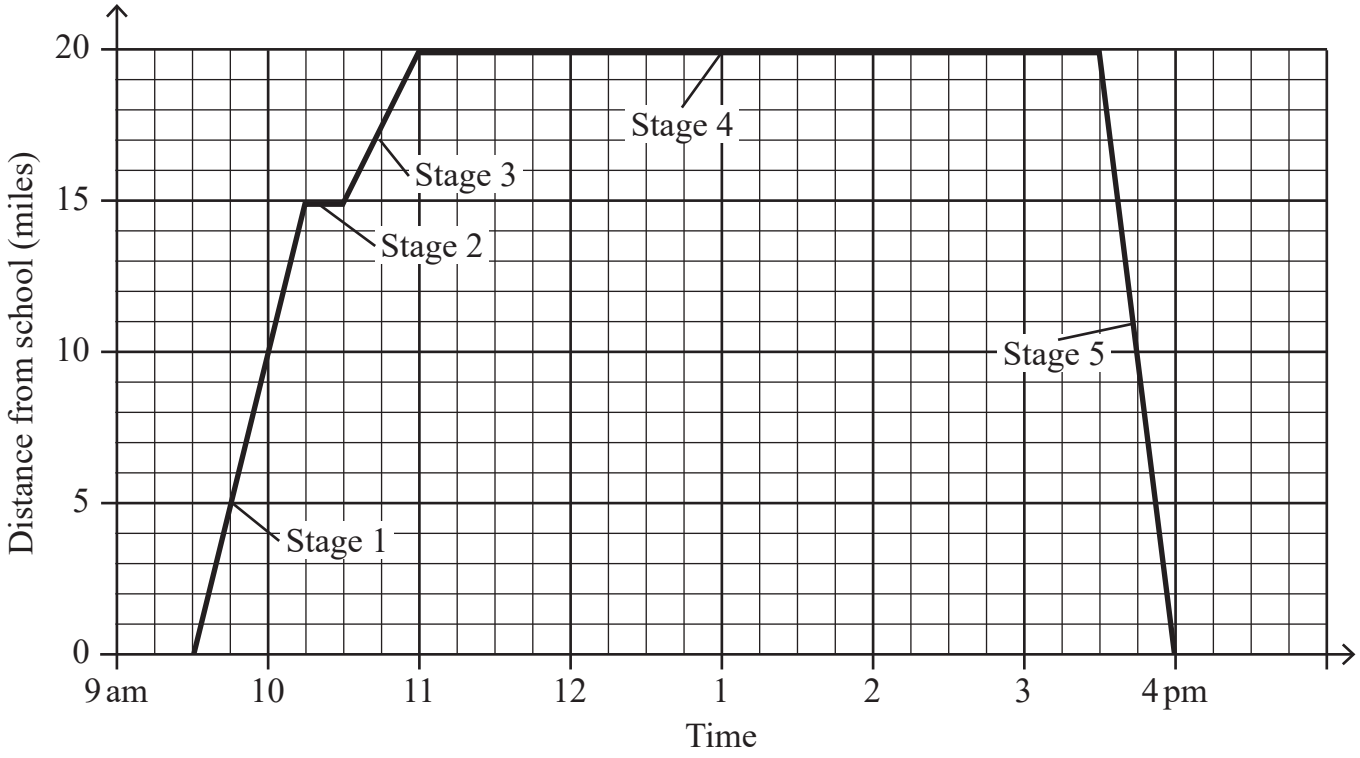
Answer 540 [2]

(a) 0.3 + 0.1 + 0.14 + 0.2 = 0.74
1 − 0.74 = 0.26
0.26 ÷ 2 = 0.13 each

15 A group of students visit a theme park on a school trip.

The graph below shows their journey.

They leave school at 9.30 am and arrive back at 4 pm.



(a) Which was the fastest stage on the journey **to** the theme park?

steepest line

Answer Stage 1 [1]

(b) How long did the students stay in the theme park?

11 am to 3.30 pm

Answer 4½ hours [1]

(c) Calculate the average speed of the journey back to school.

20 miles in ½ hour (3.30 pm to 4 pm)
20 ÷ 0.5 = 40

Answer 40 mph [2]

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THIS IS THE END OF THE QUESTION PAPER

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Question Number	**Marks**
1	
2	
3	
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15	
Total Marks	

Examiner Number

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Summer 2023

GCSE Mathematics

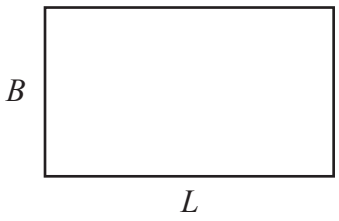
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(For use in Summer 2023)

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$$\text{Average Speed} = \frac{\text{Distance}}{\text{Time}}$$

Perimeter, Area and Volume

The perimeter of a polygon is the distance around the outside of the polygon.



The area of a rectangle is found by multiplying the length of the rectangle by the breadth.

$A = L \times B$, where A is the area, L is length and B is breadth.

The volume of a cuboid is found by multiplying the length by the breadth by the height of the cuboid.

$V = L \times B \times H$ where V is volume, L is length, B is breadth and H is height.

The area of a circle is $A = \pi r^2$ where r is the radius of the circle.

Gradient of Line

$$\text{Gradient of line} = \frac{\text{increase in vertical distance}}{\text{increase in horizontal distance}}$$

Geometry and Angles

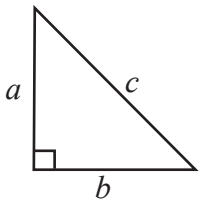
There are 180° on a straight line.
There are 180° inside a triangle.
An isosceles triangle is a triangle with 2 equal sides and 2 equal angles.
The sum of all the angles inside a polygon is given by $180(n - 2)$ where n is the number of sides in the polygon.

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Pythagoras' Theorem

If a, b and c are the sides of a right angled triangle shown below, then

$$a^2 + b^2 = c^2$$



Mean

The mean of a set of data is the sum of all the data values divided by the number of data values.

Estimate for the mean of a grouped frequency distribution

Estimated mean = sum of (mid interval values multiplied by their frequency) divided by the sum of all the frequencies.

Pie Chart

In a pie chart, the total angle that corresponds to the entire data set is 360°

Probability

The sum of the probabilities of all outcomes equals 1

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