Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2022

Mathematics

StemUp Model Solution

Unit M5 Paper 2
(With calculator)
Foundation Tier



[GMC52]

GMC52

MONDAY 13 JUNE, 10.45am–11.45am

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

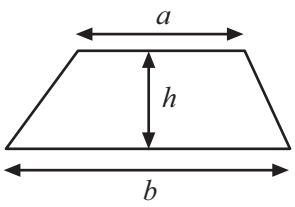
Write your Centre Number and Candidate Number in the spaces provided at the top of this page. **You are provided with Foundation Tier Additional Support Materials for use with this paper.**
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank 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

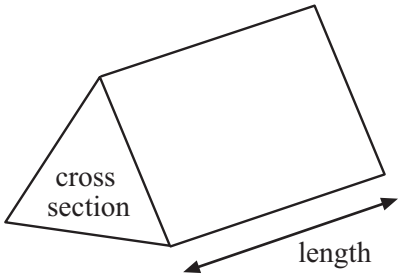
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

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



Volume of prism = area of cross section × length



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1

Impossible	Unlikely	Evens	Likely	Certain

Choose from the words above to describe the chance of each of the following.

(a) The day before Friday is Thursday.

Answer Certain [1]

(b) A child's birthday falls on 30th February.

Answer Impossible [1]

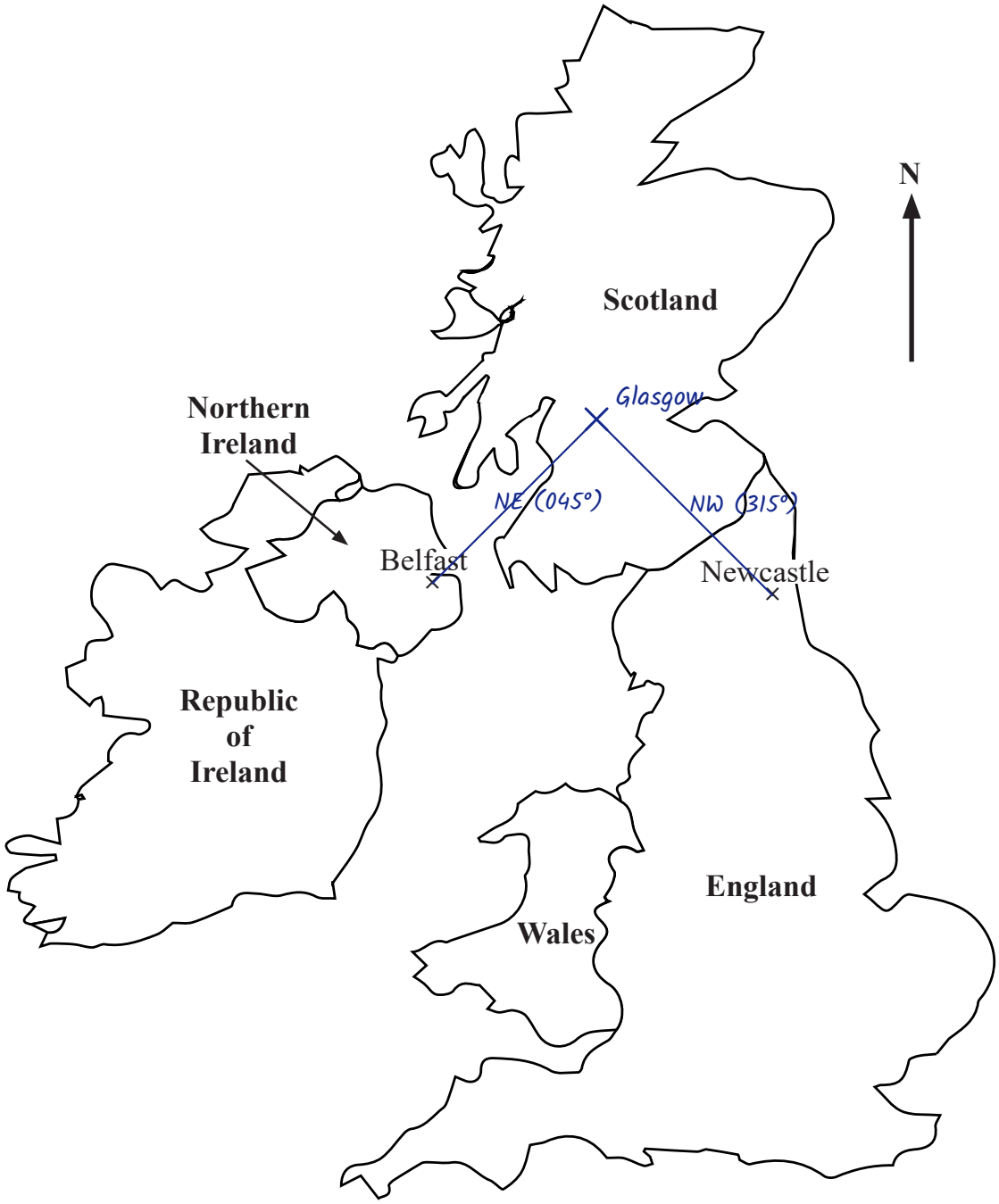
(c) A doctor will see at least one child patient on any work day.

Answer Likely [1]

[Turn over

2 Glasgow is North East of Belfast and North West of Newcastle.

Mark with an × the position of Glasgow on this map.



[2]

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3 **(a)** The first four square numbers are

1 4 9 16

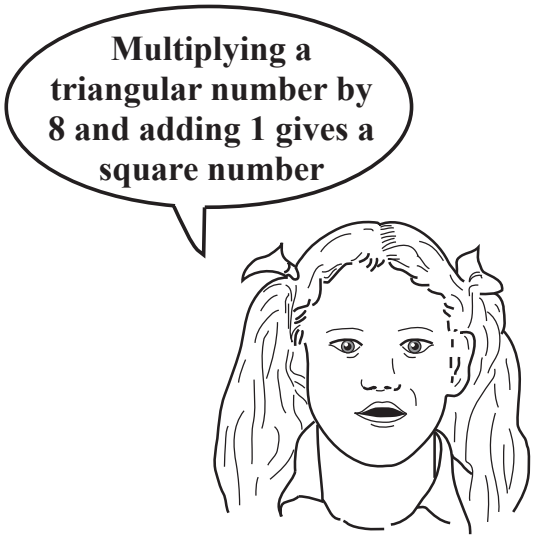
Write down all the square numbers between 20 and 70

$5^2 = 25$, $6^2 = 36$, $7^2 = 49$, $8^2 = 64$

Answer 25, 36, 49, 64 [2]

(b) Fifteen is a triangular number.

Martha says



Show that Martha is correct for this triangular number.

$15 \times 8 = 120$

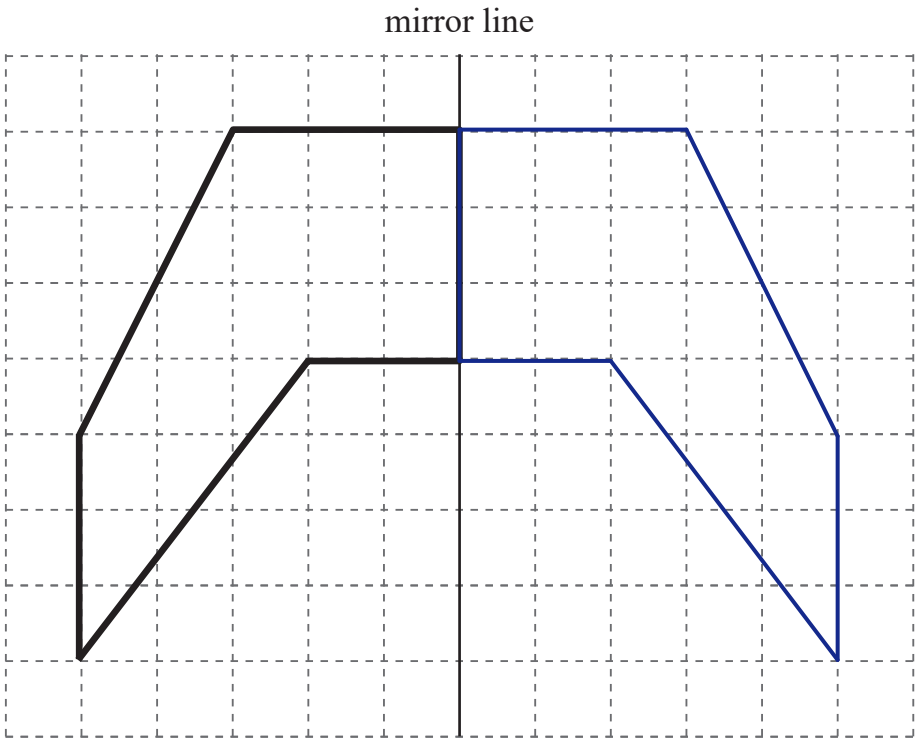
$120 + 1 = 121$

$121 = 11 \times 11 = 11^2$, which is a square number

[2]

[Turn over

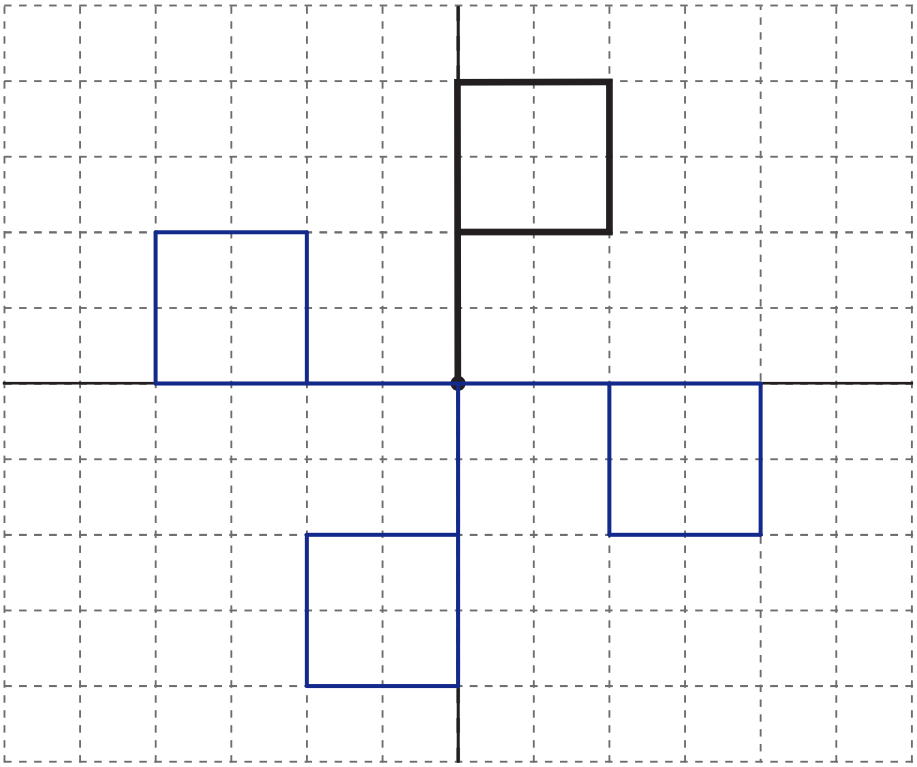
4 **(a)** Draw the reflection of this shape in the mirror line.



[2]

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(b) Complete the shape so that it has rotational symmetry of order 4

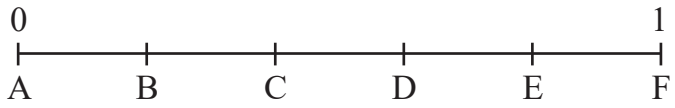


[2]

[Turn over

5 There are 2 ham sandwiches, 3 chicken sandwiches, 4 cheese sandwiches and 1 egg sandwich on a plate.

Benny takes a sandwich at random from the plate.



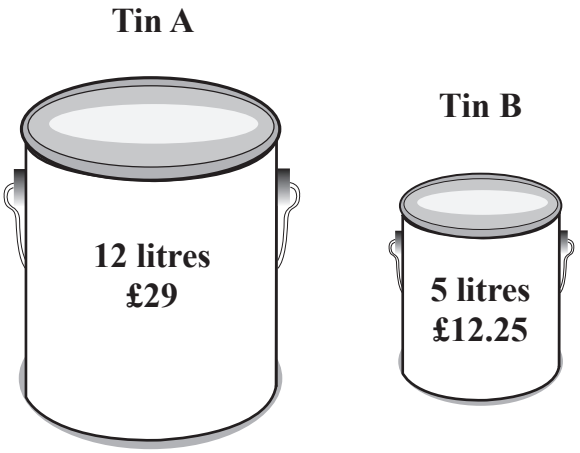
Which point (A, B, C, D, E or F) on the probability scale best matches the probability of Benny taking

(a) a prawn sandwich, Answer A [1]

(b) a cheese sandwich? Answer C [1]

prawn: 0 out of 10, impossible = 0 (A)
cheese: 4 out of 10 = 0.4 (C)

6 Paint is sold in two sizes of tins.



(a) Which size of tin is better value?

Show your working.

Tin B: 12.25 ÷ 5 = £2.45 per litre
Tin A: 29 ÷ 12 = £2.4166... per litre
£2.42 < £2.45 so Tin A

Answer 12 litres [3]

(b) Why might a customer choose not to buy the size that is best value for money?

Answer They may not need more than 5 litres of paint [1]

(c) A painter is paid £84 for 6 hours' work.

How much would he be paid for 9 hours' work?

84 ÷ 6 = £14 per hour
14 × 9 = £126

Answer £ 126 [1]

[Turn over

7 Tallia goes pony riding.



She has been told that the pony she will ride is any age from 2 to 15 years old, inclusive.

There is only one pony of each age.

Tallia picks a pony at random.

What is the probability that the pony's age is less than 5?

Ages 2 to 15 is 14 ponies

Less than 5: ages 2, 3, 4 so 3 ponies

Answer $\frac{3}{14}$ [2]

8 **(a)** Winter 2018–19 was the wettest on record in the United States.



The average rainfall was 9.01 inches.

How many centimetres was this to the nearest centimetre?

1 inch = 2.54 cm

9.01 × 2.54 = 22.8854
= 23 cm (nearest cm)

Answer 23 cm [3]

(b) A bag of potatoes weighs 5 kg.

How many pounds is this?

1 kg = 2.2 pounds
5 × 2.2 = 11

Answer 11 pounds [2]

[Turn over

9 Kendra flips a coin and rolls a dice.

(a) List all the possible outcomes in the table below.

Two have already been filled in for you.

Dice

Coin		**1**	**2**	**3**	**4**	**5**	**6**
	Heads (H)	H1	H2	H3	H4	H5	H6
	Tails (T)	T1	T2	T3	T4	T5	T6

[2]

Given that each outcome is equally likely, find the probability that

(b) Kendra gets a 5,

H5, T5: 2 out of 12

Answer $\frac{2}{12} = \frac{1}{6}$ [1]

(c) Kendra gets a Tail and an odd number.

T1, T3, T5: 3 out of 12

Answer $\frac{3}{12} = \frac{1}{4}$ [1]

10 **(a)** Describe, in words, the rule for continuing the sequence

71, 66, 61, 56, 51 …

Answer Subtract 5 each time [1]

(b) Write down the next two terms in the sequence below.

1, 8, 27, 64, 125, 216 [2]

1^3, 2^3, 3^3, 4^3, so $5^3 = 125$, $6^3 = 216$

11 A concrete mixture contains cement, sand and gravel in the ratio 1 : 2 : 3

(a) What weight of concrete contains 36 kg of gravel?

gravel: 3 parts = 36 kg, so 1 part = 12 kg
12 + 24 + 36 = 72 kg

Answer 72 kg [2]

(b) Work out the weight of sand contained in 198 kg of concrete.

1 + 2 + 3 = 6 parts
198 ÷ 6 = 33 kg
sand = 2 × 33 = 66 kg

Answer 66 kg [2]

12 Phil changed 230 euro into £ and Gerry changed 168 euro into £.

The exchange rate is £1 = 1.09 euro.

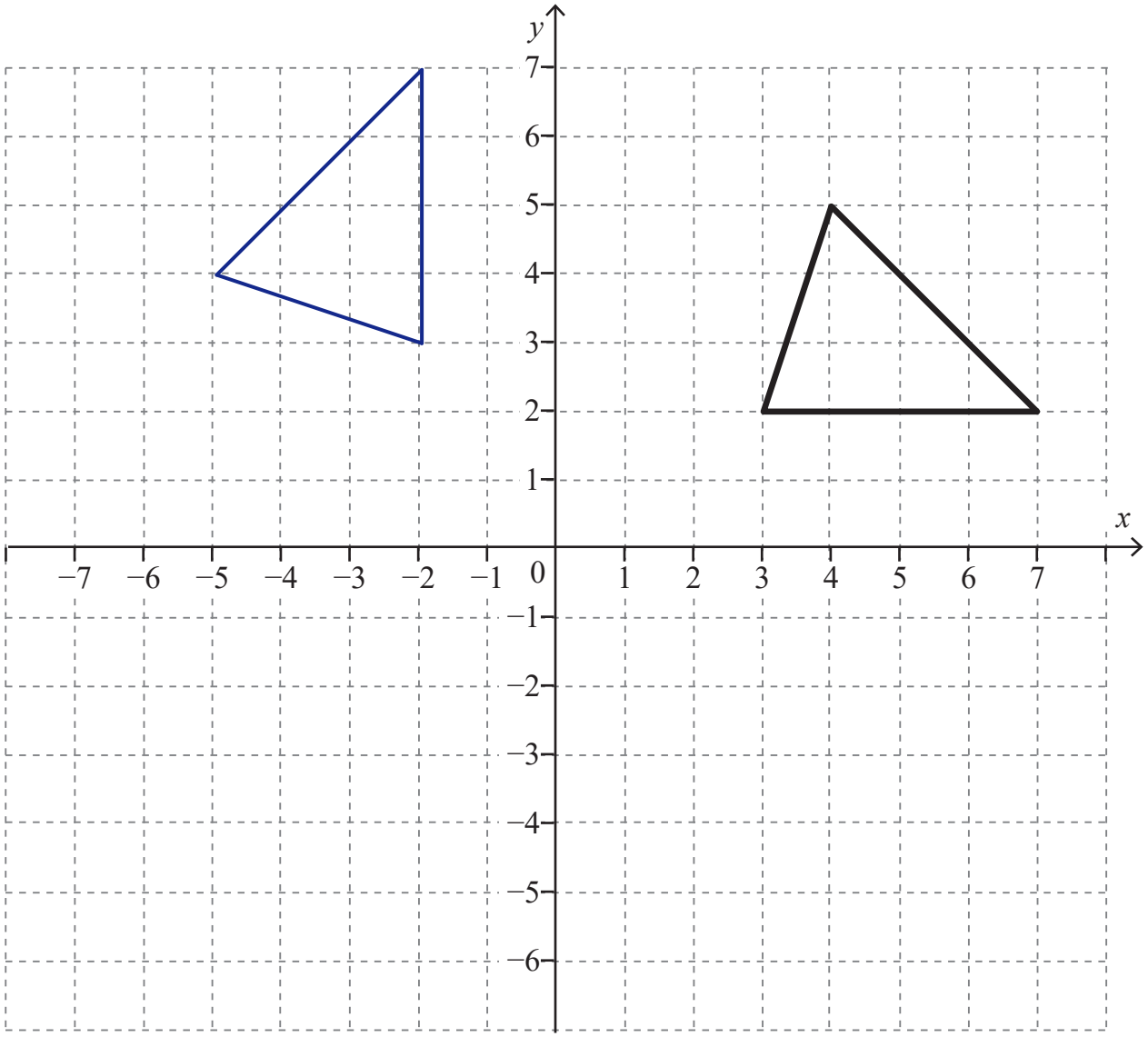
How much more did Phil receive in £?

230 − 168 = 62 euro
62 ÷ 1.09 = 56.880733...
= £56.88

Answer £ 56.88 [3]

[Turn over

13 Rotate the triangle 90° anticlockwise about the origin (0, 0)



[3]

(3, 2) → (−2, 3), (7, 2) → (−2, 7), (4, 5) → (−5, 4)

14 Marie has a recipe for Spaghetti Carbonara which requires the following ingredients.

Spaghetti	500 g
Bacon	200 g
Eggs	8
Cream	76 ml
Parmesan	48 g

Marie only has 150 g of bacon.

Work out how much of the other ingredients she should use.

scale factor = 150 ÷ 200 = 0.75

500 × 0.75 = 375 g 8 × 0.75 = 6

76 × 0.75 = 57 ml 48 × 0.75 = 36 g

Answer

Spaghetti	375	g
Eggs	6	
Cream	57	ml
Parmesan	36	g

[3]

[Turn over

15 Calculate the size of the angle a.

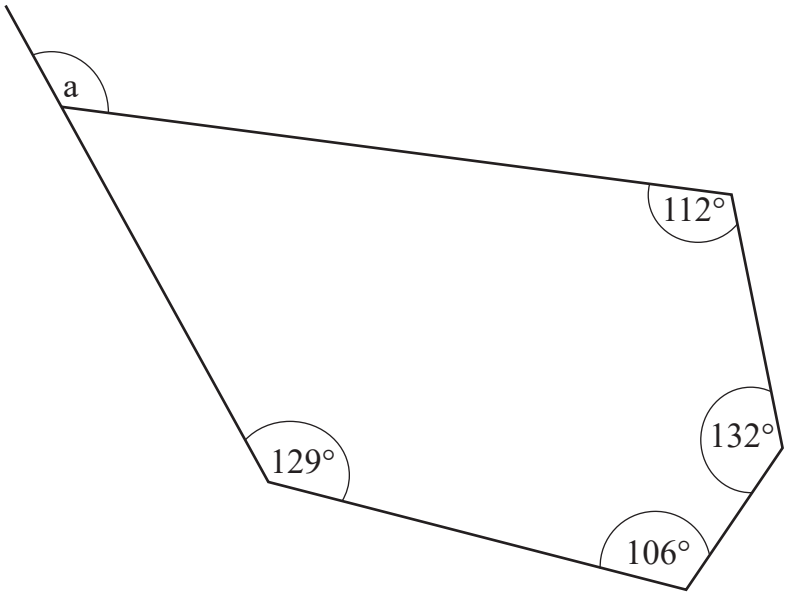


diagram not drawn accurately

Sum of interior angles = 180 × (5 − 2) = 540°
112 + 132 + 106 + 129 = 479°
interior angle next to a = 540 − 479 = 61°
a = 180 − 61 = 119° (angles on a straight line)

Answer Angle a = 119 ° [3]

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Total Marks	

Examiner Number

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General Certificate of Secondary Education
Summer 2022

GCSE Mathematics

FOUNDATION TIER
ADDITIONAL SUPPORT MATERIALS
(For use in Summer 2022)

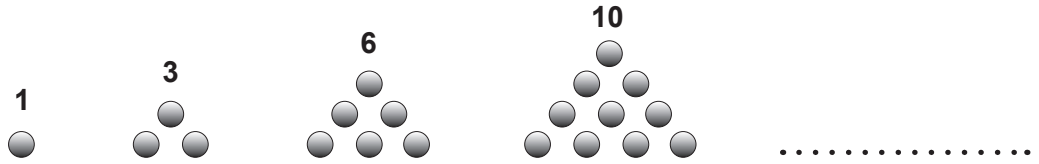
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FOUNDATION TIER ADDITIONAL SUPPORT MATERIALS (Summer 2022)

Numbers

Lowest common multiple (LCM): The lowest common multiple is the lowest multiple shared by 2 or more numbers.

Triangular numbers – are a pattern of numbers which form triangles. Each number in the sequence adds a new row of dots to the triangle.



Trial and Improvement

This is a method of trying different values in an equation until you get a suitable solution (e.g to 1 decimal place).

Measures

Conversion from metric to imperial units

1 kg = 2.2 pounds (lb)

Metric units

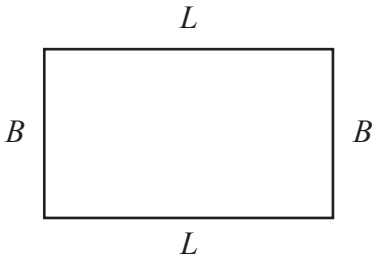
1 ml = 1 cm^3

Compound Measures

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

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

Perimeter and Volume



The perimeter of a rectangle is the distance around the outside of the rectangle. It is found by adding the lengths of the 4 sides of the rectangle.

$P = 2L + 2B$ where P is perimeter, 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 circumference (perimeter) of a circle is $C = 2\pi r$ where r is the radius of the circle. An alternative formula is $C = \pi d$ where d is the diameter of the circle.

Geometry and Angles

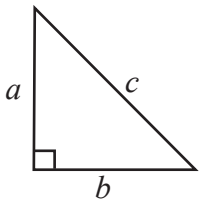
There are 180° on a straight line.
There are 180° inside a triangle.
An isosceles triangle is a triangle with 2 equal sides and 2 equal angles.
The sum of all the angles inside a polygon is given by $180(n - 2)$ where n is the number of sides in the polygon.

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Pythagoras' Theorem

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

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



Range

The range of a set of data is the difference between the largest value and the smallest value in the data set.

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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