Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
November 2022

Mathematics

StemUp Model Solution

Unit M5 Paper 2
(With calculator)
Foundation Tier



[GMC52]

GMC52

THURSDAY 1 DECEMBER, 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 sixteen** 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.

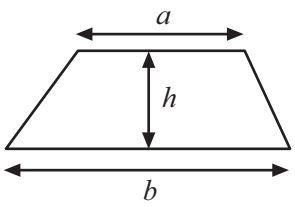
INFORMATION FOR CANDIDATES

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.

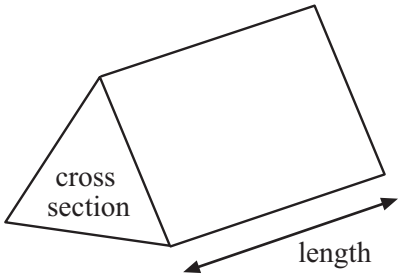
13330

Formula Sheet

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



Volume of prism = area of cross section × length



13330

1 **(a)** Andy needs 17 packs of tiles.

Each pack costs £18.95

Andy estimates the cost of these tiles as

$$\mathbf{20 \times 20 = 400}$$

Explain how this estimation shows the actual cost will be less than £400

Answer *Both 17 and 18.95 were rounded up to 20,*

so the estimate is more than the actual cost [1]

(b) Mary uses 420 units of electricity.

Each unit costs 12p

She estimates the cost to be

$$\mathbf{400 \times 12 = £4800}$$

What mistake does Mary make?

Answer *She used £12 for each unit instead of 12p*

(400 × 12 = 4800p = £48) [1]

(c) Jordan orders 75 identical chairs for his restaurant.

The total cost is £4575

Jordan estimates the cost of each chair as

$$\mathbf{4800 \div 80 = 60}$$

Why do you think that Jordan rounds 4575 to 4800?

Answer *4800 is divisible by 80 (48 ÷ 8 = 6), so it is*

easy to work out without a calculator [1]

[Turn over

2 The first four square numbers are

1 4 9 16

The first four triangular numbers are

1 3 6 10

(a) Write down the next triangular number.

1, 3, 6, 10 (add 2, 3, 4, then add 5)
10 + 5 = 15

Answer *15* [1]

(b) 1 is both a square number and a triangular number.

What is the next number that is both square and triangular?

square: 1, 4, 9, 16, 25, 36
triangular: 1, 3, 6, 10, 15, 21, 28, 36

Answer *36* [1]

3

certain		likely
unlikely	evens	impossible

Which word from the box best describes the likelihood of each of the following?

(a) There is snow on the highest mountain in the world on the coldest day.

Answer *Certain* [1]

(b) You will see a rainbow-coloured car on the way home.

Answer *Unlikely* [1]

(c) It will rain in Northern Ireland in the first week of March.

Answer *Likely* [1]

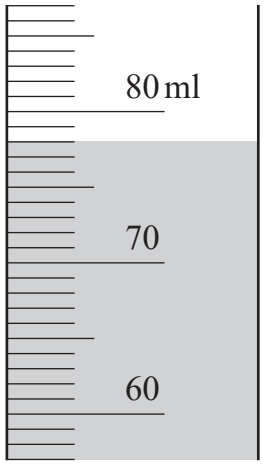
(d) Getting an odd number when throwing a fair dice.

Answer *Evens* [1]

[Turn over

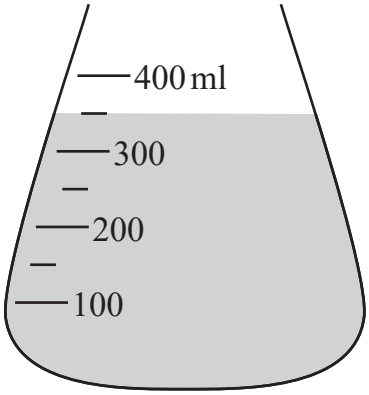
4 Write down the level of liquid in each of the following.

(a)



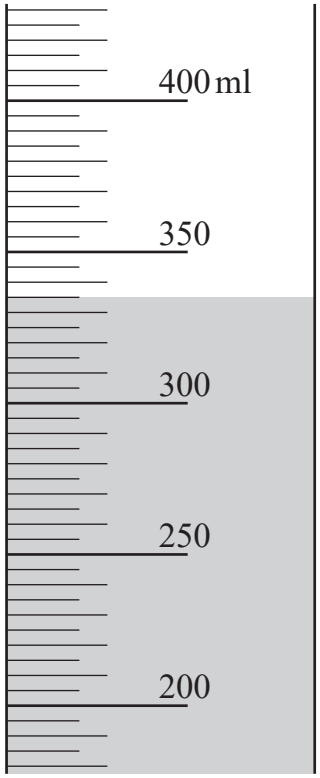
Answer 78 ml [1]

(b)



Answer 350 ml [1]

(c)



1 small division = 5 ml

Answer *335* ml [1]

[Turn over

5

SET A			SET B		
2	4	6	1	3	5

A card is taken at random from Set A.

A card is then taken at random from Set B.

The cards are used to make a two-digit number in the order AB.

(a) Write down the 9 possible two-digit numbers.

21 , 23 , 25 , 41 , 43 , 45 , 61 , 63 , 65

[2]

(b) What is the probability that the two-digit number

(i) is even,

Set B is all odd, so AB is always odd
none of the 9 are even

Answer 0 [1]

(ii) is a multiple of 3?

multiples of 3: 21, 45, 63
3 out of 9

Answer $\frac{3}{9} = \frac{1}{3}$ [1]

6 **(a)** Complete

1 kg is approximately equal to _____2.2_____ lbs

[1]

(b) An airline has a strict carry-on case weight limit of 23 lbs.



Sonya's case weighs 12 kg.

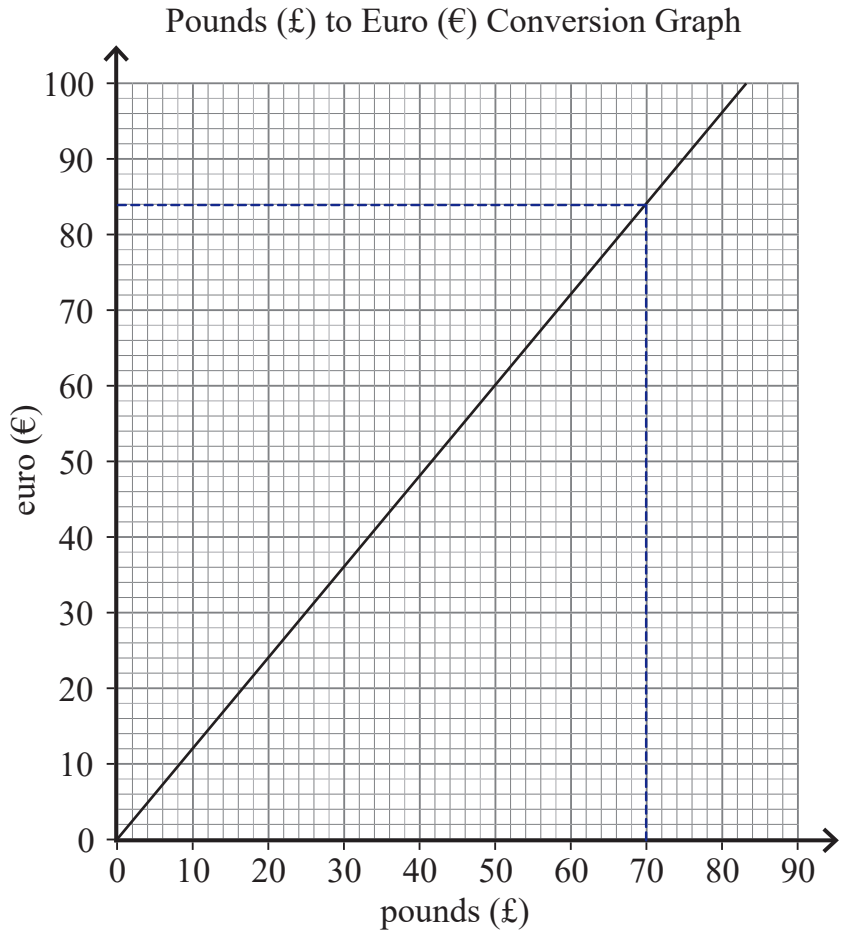
Will she be allowed to carry it on board? Give a reason.

Show your working clearly.

12 kg = 12 × 2.2
= 26.4 lbs
26.4 lbs > 23 lbs

Answer ____No____ because ____26.4 lbs is more than 23 lbs____ [2]

7 You can use the graph below to change between pounds (£) and euro (€).



(a) Change £70 into euro (€).

Answer € 84 [1]

(b) Bev buys a laptop for €420

How much is this in pounds (£)?

Show your method clearly.

From the graph: £50 = €60
420 ÷ 60 = 7
7 × £50 = £350

Answer £ 350 [2]

[Turn over

8 Sue works in a hotel.

She needs to buy 100 napkins for a party.

Which of these companies, Table Dressing or Party Party, is cheaper and by how much for 100 napkins?

Table Dressing

Pack of 20 Napkins
£2.65



Party Party

Pack of 25 Napkins
£3.40

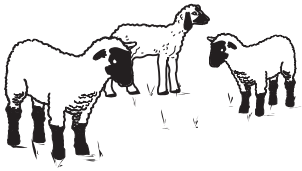


Table Dressing: 100 ÷ 20 = 5 packs

5 × £2.65 = £13.25

Party Party: 100 ÷ 25 = 4 packs

4 × £3.40 = £13.60

£13.60 − £13.25 = £0.35 = 35p

Answer Table Dressing is cheaper by 35p [3]

9 In a group, the number of boys and girls with a certain eye colour is recorded as shown below.

	Boys	Girls
Brown eyes	10	8
Blue eyes	4	7
Green eyes	6	5

A child is chosen at random from this group of boys and girls.

What is the probability that the child is a girl with blue eyes?

Total = 10 + 8 + 4 + 7 + 6 + 5 = 40

Girls with blue eyes = 7

Answer $\frac{7}{40}$ [2]

[Turn over

10 Ticket prices for adults and children are shown for two rugby clubs.

Ulster	Clermont
Adults: £29 each	Adults: €32.50 each
Children: £14.95 each	Children: €17 each

The exchange rate is €1 = £0.83

At which rugby club is it more expensive to buy tickets for 2 adults and 1 child and how much more expensive is it?

State units with your answer.

Ulster: 2 × 29 + 14.95 = £72.95

Clermont: 2 × 32.50 + 17 = €82

€82 × 0.83 = £68.06

£72.95 − £68.06 = £4.89

Answer Ulster is more expensive by £4.89 [4]

11 **(a)** The school is West of the church.

Complete the sentence by filling in the correct direction.

The church is _____East_____ of the school. [1]

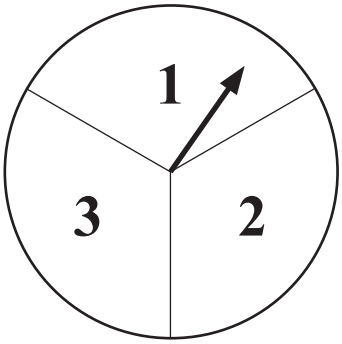
(b) The shop is North East of the station.

Complete the sentence by filling in the correct direction.

The station is _____South West_____ of the shop. [1]

[Turn over

12





The fair spinner shown is spun and a fair dice is thrown.

The number the spinner lands on is added to the number on the dice to give a total score.

(a) Complete the table of total scores.

		Dice					
		1	2	3	4	5	6
Spinner	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9

[2]

(b) What is the probability of a total score of 4?

total of 4: 3 out of 18

Answer $\frac{3}{18} = \frac{1}{6}$ [1]

(c) What is the probability of a total score **greater than or equal to** 5?

total ≥ 5: 3 + 4 + 5 = 12 out of 18

Answer $\frac{12}{18} = \frac{2}{3}$ [1]

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(Questions continue overleaf)

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13 Avril's recipe makes 16 tray bakes with the following ingredients.

Chocolate tray bakes	(to make 16 tray bakes)
crushed biscuits	240 g
butter	200 g
brown sugar	150 g
chocolate	240 g
condensed milk	400 g

Avril has 250 g of butter to make chocolate tray bakes.

She has enough of the other ingredients.

(a) How many tray bakes can she make?

250 ÷ 200 = 1.25
16 × 1.25 = 20

Answer 20 [1]

(b) Complete the amounts needed for the other ingredients.

multiplier = 250 ÷ 200 = 1.25
240 × 1.25 = 300
150 × 1.25 = 187.5
400 × 1.25 = 500

crushed biscuits	300	g
butter	250	g
brown sugar	187.5	g
chocolate	300	g
condensed milk	500	g

[3]

[Turn over

14



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When Susan goes to the cinema, she always buys only one item.

She buys a drink or popcorn or crisps or ice cream.

Some of the probabilities are shown.

Item	Probability
A drink	0.4
Popcorn	0.15
Crisps	
Ice cream	0.2

(a) Work out the probability that Susan buys crisps.

$1 - (0.4 + 0.15 + 0.2)$

$= 1 - 0.75 = 0.25$

Answer 0.25 [2]

(b) Susan goes to the cinema 20 times.

Calculate how many times you would expect her to buy a drink.

$20 \times 0.4 = 8$

Answer 8 [2]

15 Orange juice is mixed with water in the ratio 1:11 (orange juice:water).

How much orange juice and how much water make up 3 litres in total?

Give your answers in ml.

1 + 11 = 12 parts
3 litres = 3000 ml
3000 ÷ 12 = 250 ml
water: 11 × 250 = 2750 ml

Answer Orange juice 250 ml

Water 2750 ml

[3]

[Turn over

16 Adam, Bob and Carol play a coin game.

Two fair coins are tossed.

Adam wins if there are no heads shown.

Bob wins if there is one head shown.

Carol wins if there are two heads shown.



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Is the game fair to all players? Calculate who is most likely to win.

Possible outcomes: HH, HT, TH, TT

Adam (no heads): TT $\frac{1}{4}$

Bob (one head): HT, TH $\frac{2}{4} = \frac{1}{2}$

Carol (two heads): HH $\frac{1}{4}$

The game is not fair.
Bob is the most likely to win.

[2]

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Question Number	**Marks**
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GCSE Mathematics

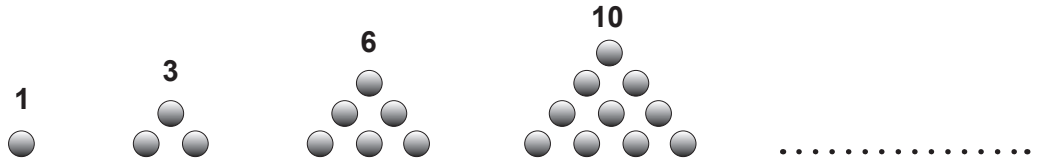
FOUNDATION TIER
ADDITIONAL SUPPORT MATERIALS
(For use in November 2022)

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Numbers

Highest Common Factor (HCF): The highest common factor is the largest number that divides evenly into two or more numbers, e.g. 4 is the HCF of 8 and 20

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).

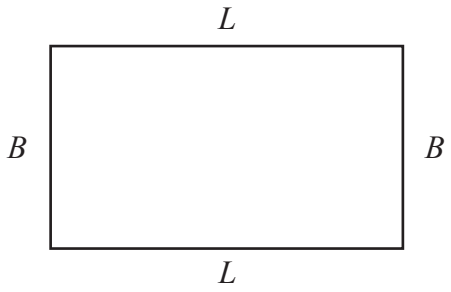
Range

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.

Area and Volume



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

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

The area of a triangle is found by multiplying half the length of the base by the perpendicular height of the triangle.

$A = \frac{1}{2}bh$ where b is the base and h is the perpendicular height of the triangle.

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

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.

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.

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

Compound Measures

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

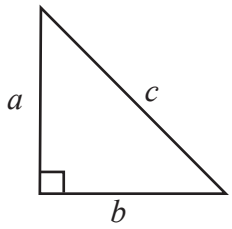
$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

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Pythagoras' Theorem

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

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



Midpoint of a line

If (x_1, y_1) and (x_2, y_2) are the end points of a line, then the coordinates of the midpoint M of the line are

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$