Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
January 2020

Mathematics

StemUp Model Solution

Unit M5 Paper 1
(Non-Calculator)
Foundation Tier



[GMC51]

GMC51

WEDNESDAY 15 JANUARY, 9.15am–10.15am

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

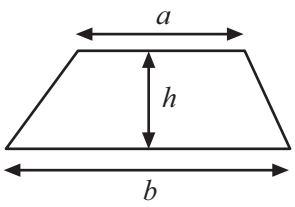
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all thirteen** 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

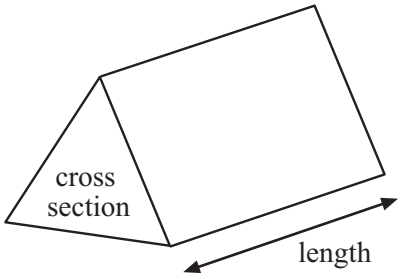
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

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



Volume of prism = area of cross section × length



12509

1 Two shops offer the following deals:

Game Hut
Games console £329 plus any game for an extra £35

Play Zone
Games console plus any game £40 deposit plus six monthly payments of £60

(a) Jon wants to buy a games console and a game.

Which shop is cheaper and by how much?

Game Hut: 329 + 35 = £364

Play Zone: 40 + 6 × 60

= 40 + 360 = £400

400 − 364 = £36

Answer Game Hut by £ 36 [4]

(b) Why might Jon choose the more expensive option?

Answer He may not have enough money to pay it all at once, so paying monthly is easier for him. [1]

[Turn over

2 An airline charges £2.70 for a cup of coffee and £1.85 for a bottle of water.

(a) 74 cups of coffees were sold on a flight.

Estimate the total cost of the coffees sold.

Show your method.

74 ≈ 70 £2.70 ≈ £3

70 × 3 = 210

Answer £ 210 [2]

(b) A total of £77 was spent on water during the flight.

Estimate how many bottles of water were sold.

Show your method.

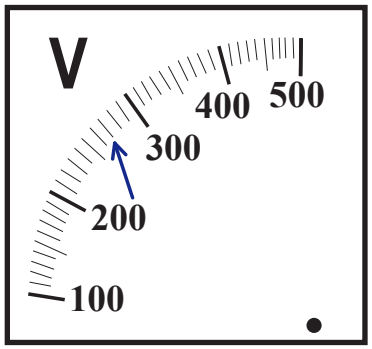
£77 ≈ £80 £1.85 ≈ £2

80 ÷ 2 = 40

Answer 40 bottles [2]

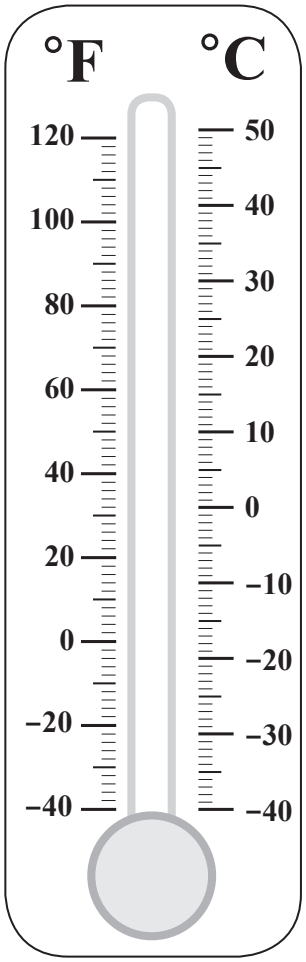
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3 **(a)** Mark with an arrow a reading of 270 volts.



[1]

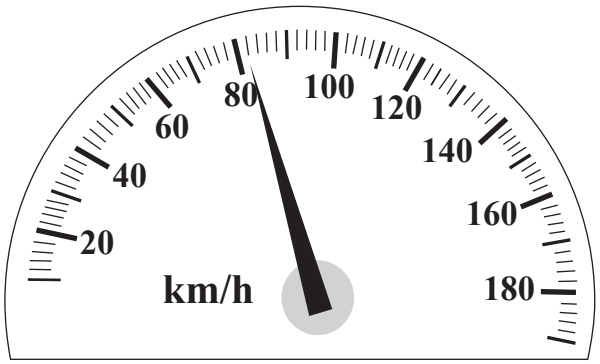
(b) What temperature, in degrees Celsius, is the same as 100 degrees Fahrenheit?



Answer 38 °C [1]

[Turn over

(c) What speed is shown?



Answer 82 km/h [1]

4 The population of each county in Northern Ireland is shown.

County	Population
Antrim	620 000
Armagh	180 000
Down	540 000
Fermanagh	65 000
Londonderry	250 000
Tyrone	180 000

A person is chosen at random from the Northern Ireland population.

(a) Which county is the person chosen least likely to live in?

Answer Fermanagh [1]

(b) Which counties have the same likelihood that the person chosen lives there?

Answer Armagh and Tyrone [1]

(c) Is the probability that the person chosen is male the same as the probability that the person chosen is female?

Circle the best answer.

Yes No Need more information [1]

[Turn over

5 **Each term**, a letter is sent home if students are absent for **more than** 20% of days.

Here is Peter's attendance record for Year 12

How many letters were sent home for Peter?

You **must show** all your working.

Autumn Term	70 Days	15 Days Absent
Spring Term	54 Days	4 Days Absent
Summer Term	26 Days	6 Days Absent

Autumn: 10% of 70 = 7, so 20% of 70 = 14 days

15 > 14 so a letter is sent

Spring: 10% of 54 = 5.4, so 20% of 54 = 10.8 days

4 < 10.8 so no letter

Summer: 10% of 26 = 2.6, so 20% of 26 = 5.2 days

6 > 5.2 so a letter is sent

Answer 2 letters [3]

6 A sequence is formed using the rule:

"Find the next term by adding the previous two terms"

Use this rule to complete the sequences below.

(a) 1, 7, 8, 15, 23 [1]

(b) 3, −5, −2, −7, −9 [1]

(c) x, 4, $x + 4$, $x + 8$, $2x + 12$ [1]

[Turn over

7 240 people are at the cinema.



There are 150 children.

$\frac{3}{5}$ of the children are girls.

$\frac{2}{3}$ of the adults are male.

Cara says that altogether there are more females at the cinema.

Is she correct?

Show all your working clearly.

Adults = 240 − 150 = 90

Girls = $\frac{3}{5}$ × 150 = 150 ÷ 5 × 3 = 90 Boys = 150 − 90 = 60

Male adults = $\frac{2}{3}$ × 90 = 90 ÷ 3 × 2 = 60 Female adults = 90 − 60 = 30

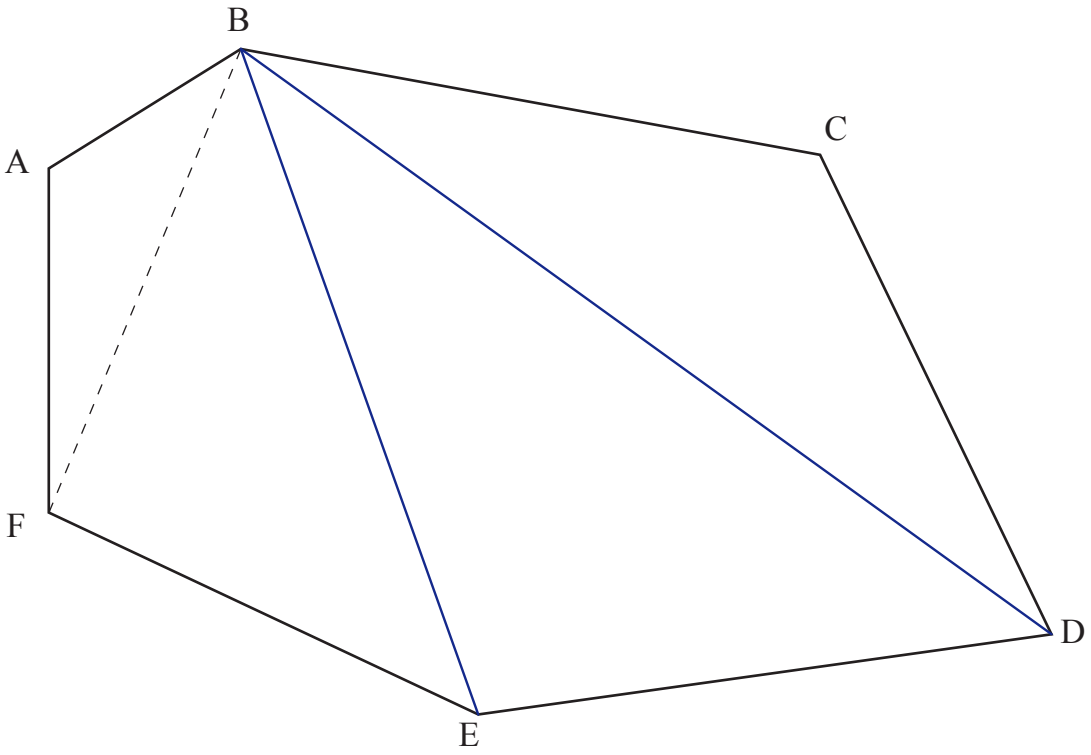
Females = 90 + 30 = 120

Males = 60 + 60 = 120

120 = 120, so the numbers are the same

Answer No because there are 120 females and 120 males [4]

8 Polygon ABCDEF may be divided into triangles. One triangle is shown.



Use triangles to work out the sum of the interior angles of the polygon ABCDEF.

You **must show** your working.

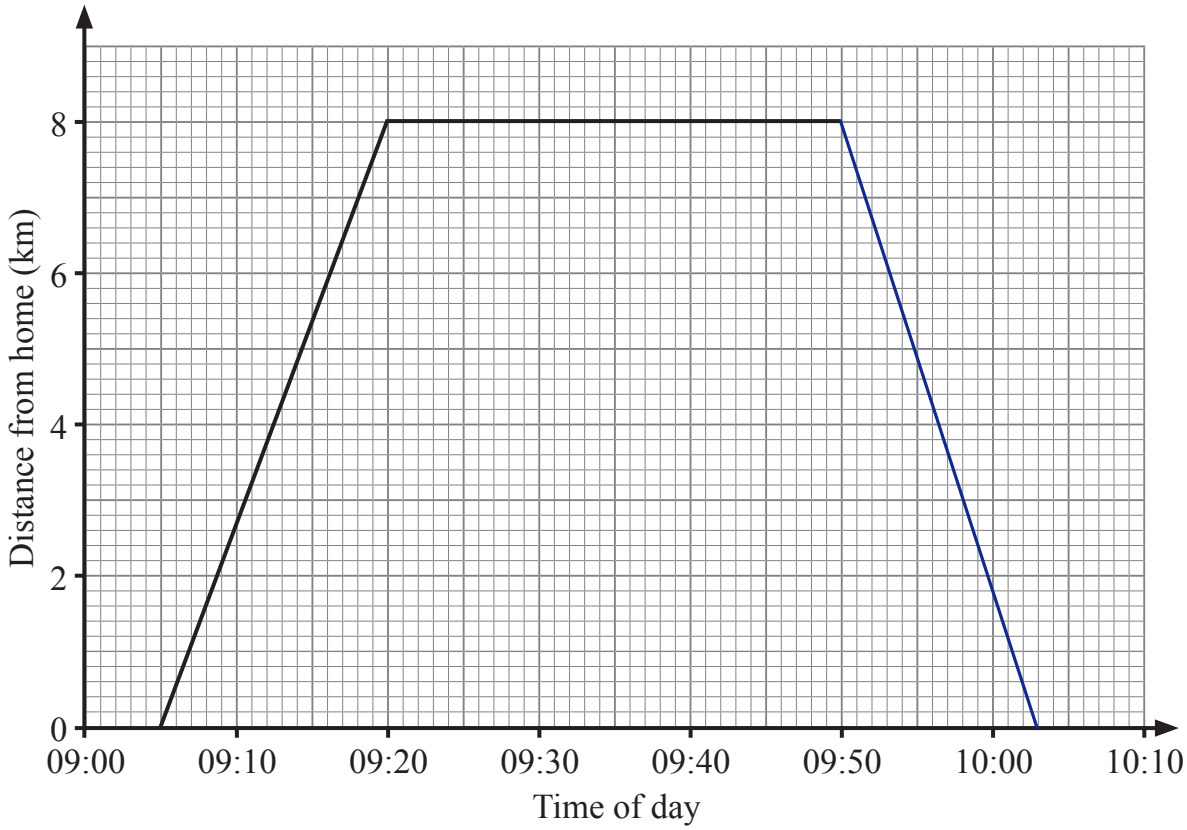
The hexagon splits into 4 triangles from B
Angle sum = 4 × 180° = 720°

Answer 720 ° [2]

[Turn over

9 Seb cycles from his home to his piano teacher's house on Saturday morning.

He stays there for 30 minutes and then returns directly home.



(a) At what time did Seb leave his home?

Answer 09:05 [1]

(b) How long did Seb take to get to his teacher's house?

Answer 15 minutes [1]

Seb arrived home at 10:03

(c) Complete the distance–time graph. [1]

(d) What distance did Seb travel in total?

Answer 16 km [1]

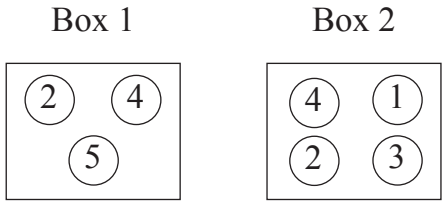
(e) Did Seb travel home at a faster or slower speed?

Explain your answer clearly.

Answer faster because it took him 13 minutes to get home but 15 minutes to get there (same 8 km). [1]

[Turn over

10



There are two boxes of counters.

Each counter has a number on it as shown.

Mike takes one counter at random from Box 1 and then one counter at random from Box 2

(a) Complete the table to show all possible outcomes of counters taken.

		Box 2			
		1	2	3	4
Box 1	2	(2, 1)	(2, 2)	(2, 3)	(2, 4)
	4	(4, 1)	(4, 2)	(4, 3)	(4, 4)
	5	(5, 1)	(5, 2)	(5, 3)	(5, 4)

[2]

(b) What is the probability that Mike takes a counter with the same number on it from each box?

Same: (2, 2) and (4, 4)

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

(c) The numbers on the counters taken are **multiplied**.

What is the probability of this multiplication giving an **even** number?

Odd only from (5, 1) and (5, 3), so 2 odd outcomes

Even = 12 − 2 = 10 outcomes

Answer $\frac{10}{12} = \frac{5}{6}$ [1]

(d) On another day, Laura takes one counter from each box and **multiplies** the numbers together.

She replaces the counters and does the same thing again for a total of 30 times.

How many times would you expect her to get an **odd** number answer?

$P(\text{odd}) = \frac{2}{12} = \frac{1}{6}$

$\frac{1}{6} \times 30 = 30 \div 6 = 5$

Answer 5 [3]

[Turn over

11 Estimate the value of $\dfrac{593}{4.1 \times 9.7}$

Show all your working.

$593 \approx 600$ $\quad 4.1 \approx 4$ $\quad 9.7 \approx 10$

$\dfrac{600}{4 \times 10} = \dfrac{600}{40} = 15$

Answer 15 [2]

12 The prize money in a golf tournament is divided between the three golfers who finish first, second and third in the ratio 7 : 4 : 3

What **fraction** of the prize money does each of the first three golfers receive?

Write each fraction in its simplest form.

$7 + 4 + 3 = 14$ parts

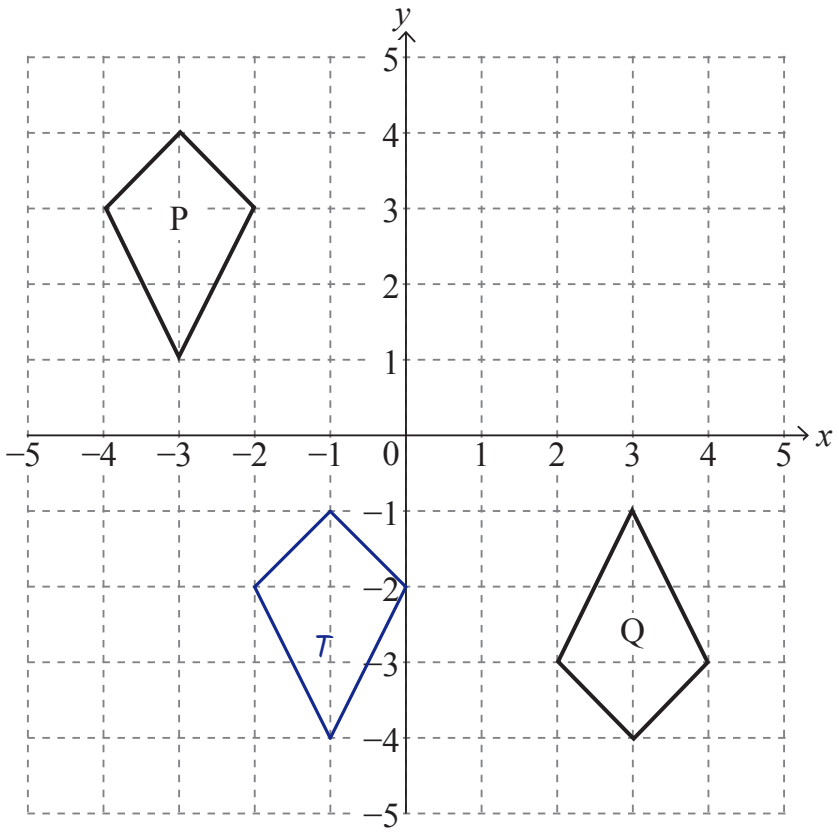
1st: $\dfrac{7}{14} = \dfrac{1}{2}$

2nd: $\dfrac{4}{14} = \dfrac{2}{7}$

3rd: $\dfrac{3}{14}$

Answer 1st $\dfrac{1}{2}$ 2nd $\dfrac{2}{7}$ 3rd $\dfrac{3}{14}$ [3]

13



(a) Describe fully the single transformation which would move shape P to shape Q.

Answer *Rotation 180° about the origin (0, 0)* [3]

(b) Translate shape P by 2 units to the right and 5 units down.

Label the image T. [1]

(c) Describe fully the single transformation which would move shape T back to shape P.

Answer *Translation 2 units left and 5 units up* [2]

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Question Number	**Marks**
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Examiner Number

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