Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
January 2020

Mathematics

StemUp Model Solution

Unit M6 Paper 1
(Non-Calculator)
Foundation Tier



[GMC61] *GMC61*

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 fifteen** 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.

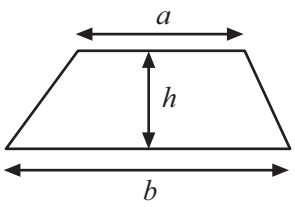
INFORMATION FOR CANDIDATES

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.

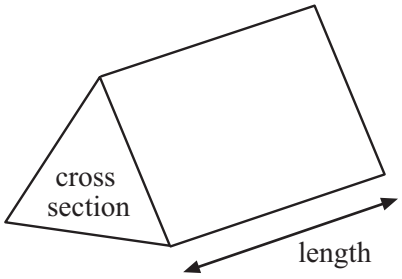
12511

Formula Sheet

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



Volume of prism = area of cross section × length



12511

1 **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

20% of 70 = 70 ÷ 5 = 14 days 15 > 14 → letter

20% of 54 = 54 ÷ 5 = 10.8 days 4 < 10.8 → no letter

20% of 26 = 26 ÷ 5 = 5.2 days 6 > 5.2 → letter

Letters for Autumn and Summer terms

Answer 2 letters [3]

[Turn over

2 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]

3 240 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: 150 ÷ 5 = 30, 30 × 3 = 90 girls

Boys = 150 − 90 = 60 boys

Male adults: 90 ÷ 3 = 30, 30 × 2 = 60 men

Female adults = 90 − 60 = 30 women

Females = 90 + 30 = 120

Males = 60 + 60 = 120

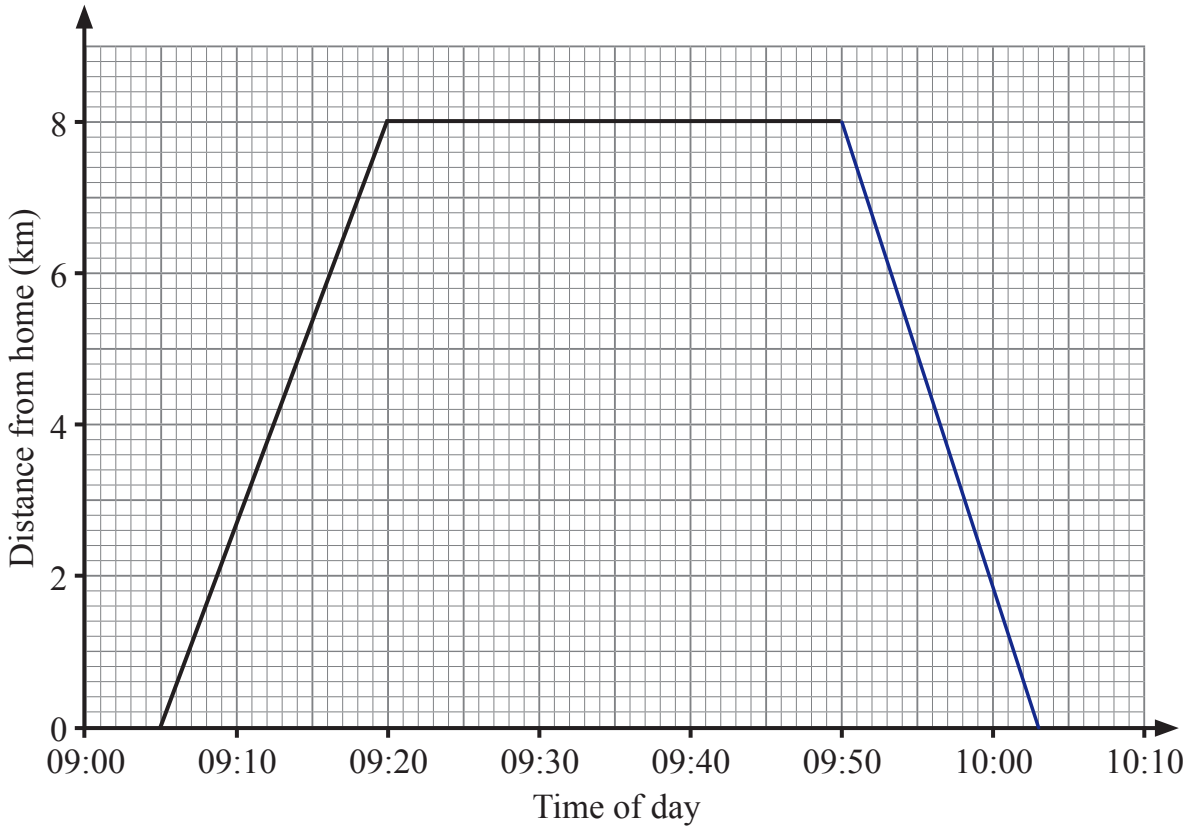
120 = 120, so the same number of females and males

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

[Turn over

4 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]

09:20 – 09:05 = 15 minutes

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]

8 km there + 8 km back = 16 km

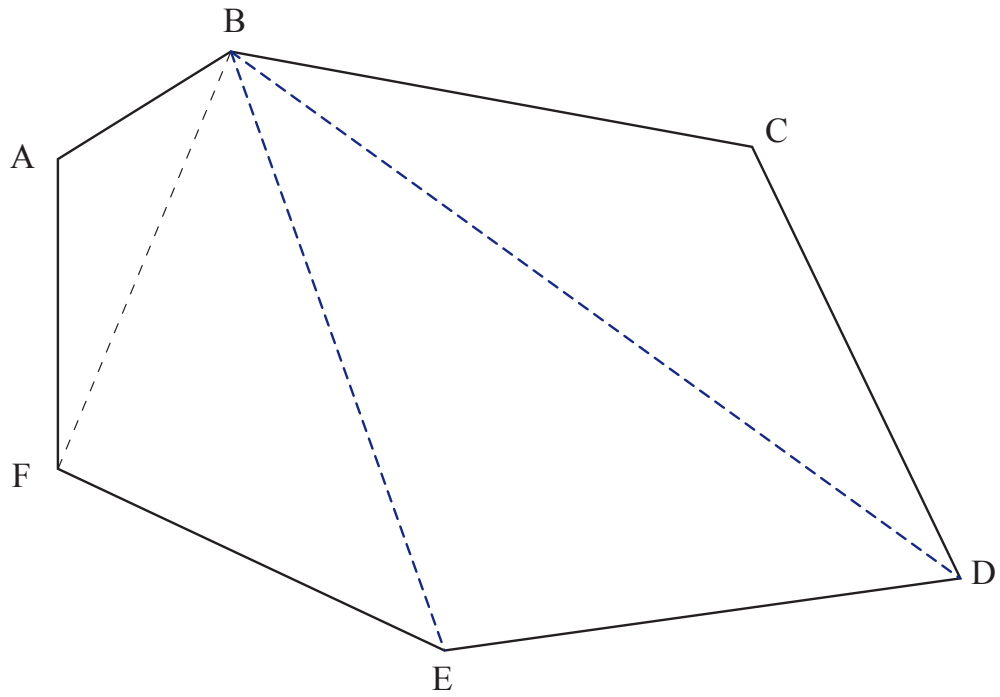
(e) Did Seb travel home at a faster or slower speed?

Explain your answer clearly.

Answer Faster because he took 13 minutes to get home

but 15 minutes to get there (the line is steeper) [1]

5 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.

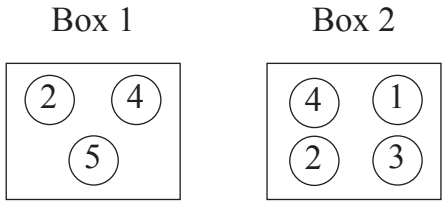
You **must show** your working.

6 sides → 4 triangles
4 × 180° = 720°

Answer 720 ° [2]

[Turn over

6



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?

(2, 2) and (4, 4): $\frac{2}{12}$

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 odd × odd: (5, 1), (5, 3)

Even = 12 − 2 = 10 outcomes, $\frac{10}{12} = \frac{5}{6}$

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?

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

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

Answer 5 [3]

[Turn over

7 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]

8 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

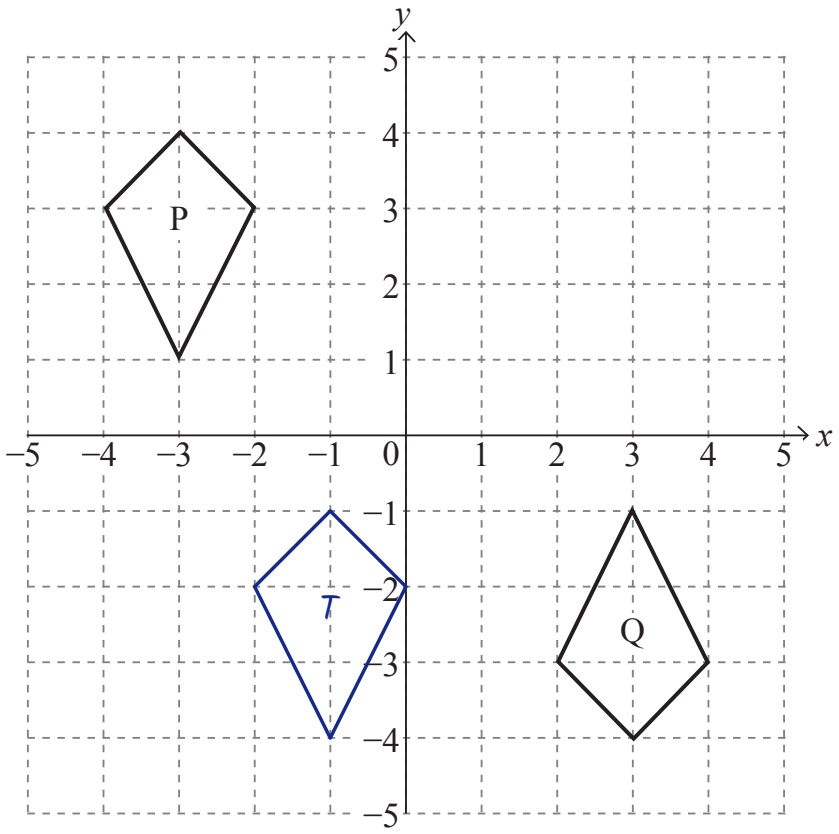
1st: $\dfrac{7}{14} = \dfrac{1}{2}$

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]

9



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

Answer *Rotation of 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 to the left and 5 units up* [2]

[Turn over

10 Simplify the following.

(a) $4y^3 \times 3y^4$

$4 \times 3 = 12, \quad y^{3+4} = y^7$

Answer $12y^7$ [1]

(b) $(m^4)^5$

$m^{4 \times 5} = m^{20}$

Answer m^{20} [1]

11 **(a)** Solve the inequality $6y + 5 \geq 2$

$6y + 5 \geqslant 2$

$6y \geqslant 2 - 5$

$6y \geqslant -3$

$y \geqslant \frac{-3}{6}$

Answer $y \geqslant -\frac{1}{2}$ [2]

(b) Write down the smallest **integer** value of y which satisfies the inequality

$6y + 5 \geq 2$

$y \geqslant -0.5$, so the smallest integer is 0

Answer $y =$ 0 [1]

12 **(a)** Write 25 as a binary number.

16 8 4 2 1
1 1 0 0 1

16 + 8 + 1 = 25

Answer 11001 [1]

(b) Write the binary number 1101001 in decimal form.

64 32 16 8 4 2 1
1 1 0 1 0 0 1

64 + 32 + 8 + 1 = 105

Answer 105 [1]

13 Make m the subject of the formula $H = mr + s$

$H = mr + s$

$H - s = mr$

$\frac{H - s}{r} = m$

Answer $m =$ $\frac{H - s}{r}$ [2]

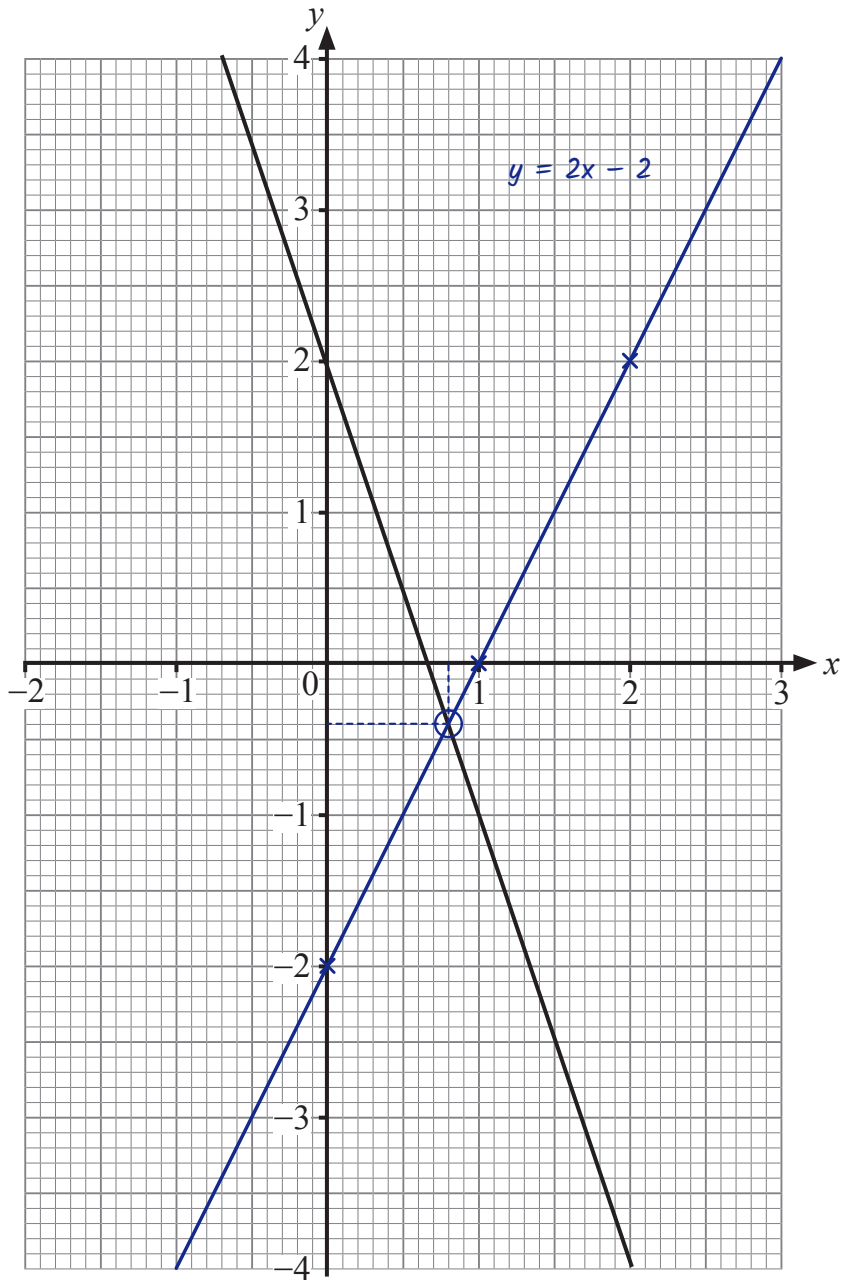
14 Two fair dice are rolled.

Make a list of all the ways it is possible to get a total score of 7 on the two dice.

Answer 1 + 6, 2 + 5, 3 + 4, 4 + 3, 5 + 2, 6 + 1 [2]

[Turn over

15



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By drawing a suitable line on the grid opposite solve the simultaneous equations

$y = 2x - 2$

$y = -3x + 2$

$y = 2x - 2$: $x = 0, y = -2$; $x = 1, y = 0$; $x = 2, y = 2$

The lines cross at $(0.8, -0.4)$

Answer $x =$ 0.8 $y =$ −0.4 [4]

THIS IS THE END OF THE QUESTION PAPER

DO NOT WRITE ON THIS PAGE

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
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Total Marks	

Examiner Number

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