Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2025

Mathematics

StemUp Model Solution

Unit M7 Paper 2
(With calculator)
Higher Tier



[GMC72]

GMC72

WEDNESDAY 4 JUNE, 10.45am – 12 NOON

TIME

1 hour 15 minutes.

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.**
Questions which require drawing or sketching should be completed using an HB pencil.
All working **must** be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.
Answer **all fifteen** questions.

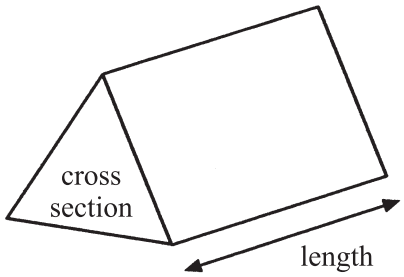
INFORMATION FOR CANDIDATES

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.

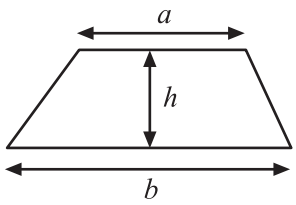
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Formula Sheet

Volume of prism = area of cross section × length

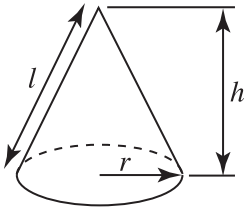


Area of trapezium = $\frac{1}{2}(a+b)h$



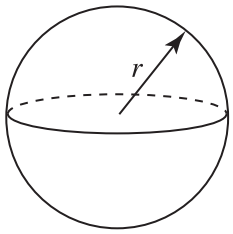
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$

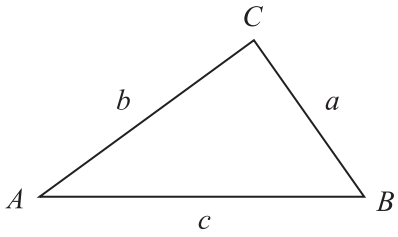


Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



In any triangle *ABC*



Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

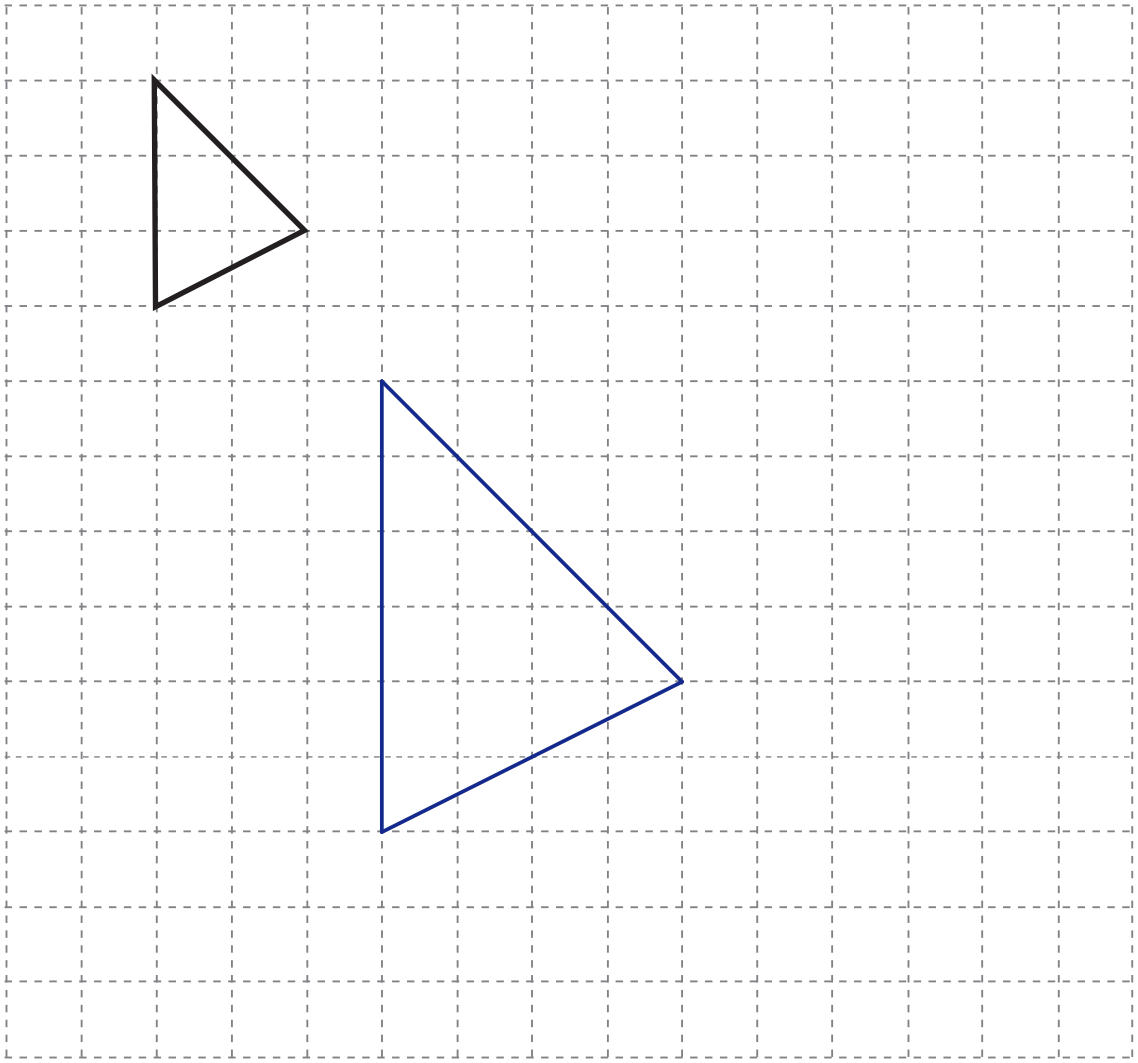
Sine Rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule: $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle = $\frac{1}{2}ab\sin C$

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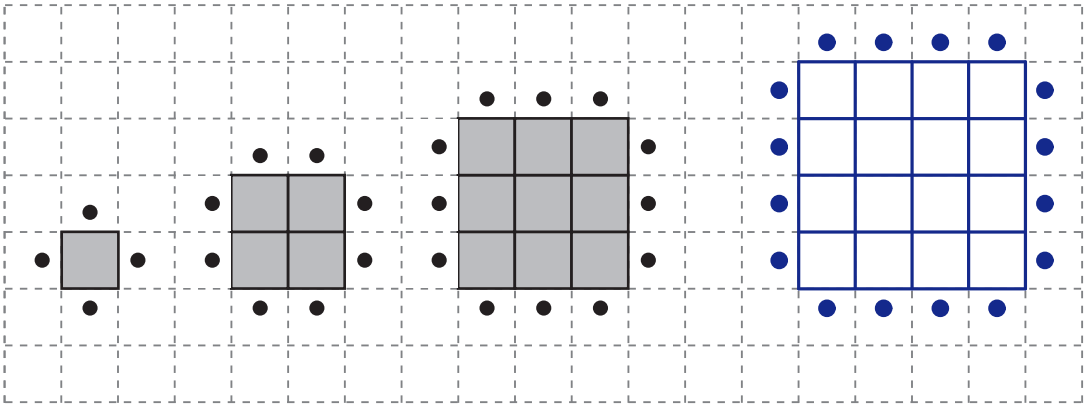
1 Enlarge the triangle using a scale factor of 2



[2]

[Turn over

2 **(a)** Draw Pattern 4 in the space provided.



Pattern 1 Pattern 2 Pattern 3 Pattern 4

[1]

(b) Complete the table.

Pattern number	1	2	3	4	5
Number of squares	1	4	9	16	25
Number of dots	4	8	12	16	20

[2]

(c) A pattern has 81 squares.

What is the pattern number?

$n^2 = 81$

$n = \sqrt{81} = 9$

Answer 9 [1]

(d) A pattern has 32 dots.

How many **squares** does it have?

4 dots for each pattern number
32 ÷ 4 = 8, so Pattern 8
squares = 8^2 = 8 × 8 = 64

Answer 64 [1]

[Turn over

3 Shona plans to roll two fair dice together a number of times.

She makes out a table of possible scores that she can get when she rolls the two dice as shown.

Dice 1 \ Dice 2	**1**	**2**	**3**	**4**	**5**	**6**
1	0	1	2	3	4	5
2	1	0	1	2	3	4
3	2	1	0	1	2	3
4	3	2	1	0	1	2
5	4	3	2	1	0	1
6	5	4	3	2	1	0

(a) What does Shona do with the two numbers on the dice to get her scores?

Answer She finds the difference between the two numbers [1]

(b) What is the most likely score that Shona will get?

1 appears 10 times (most often)

Answer 1 [1]

(c) What is the probability of the score being a 2?

2 appears 8 times out of 36

Answer $\frac{8}{36}$ [1]

(d) What is the probability of the score being greater than 3?

scores 4 and 5: 4 + 2 = 6 out of 36

Answer $\frac{6}{36}$ [1]

4 Clive won £800 prize money.

He spent 70% of it.

He shared the rest between two friends in the ratio 1 : 4

How much did each friend get?

Spent: 0.7 × 800 = £560

Rest: 800 − 560 = £240

1 + 4 = 5 parts

1 part: 240 ÷ 5 = £48

4 parts: 48 × 4 = £192

Answer £ 48 , £ 192 [5]

[Turn over

5 Jill either walks or drives to work.

The probability that Jill walks to work is $\frac{1}{5}$

She is due to work 235 days next year.

Work out the number of days Jill is expected to drive to work next year.

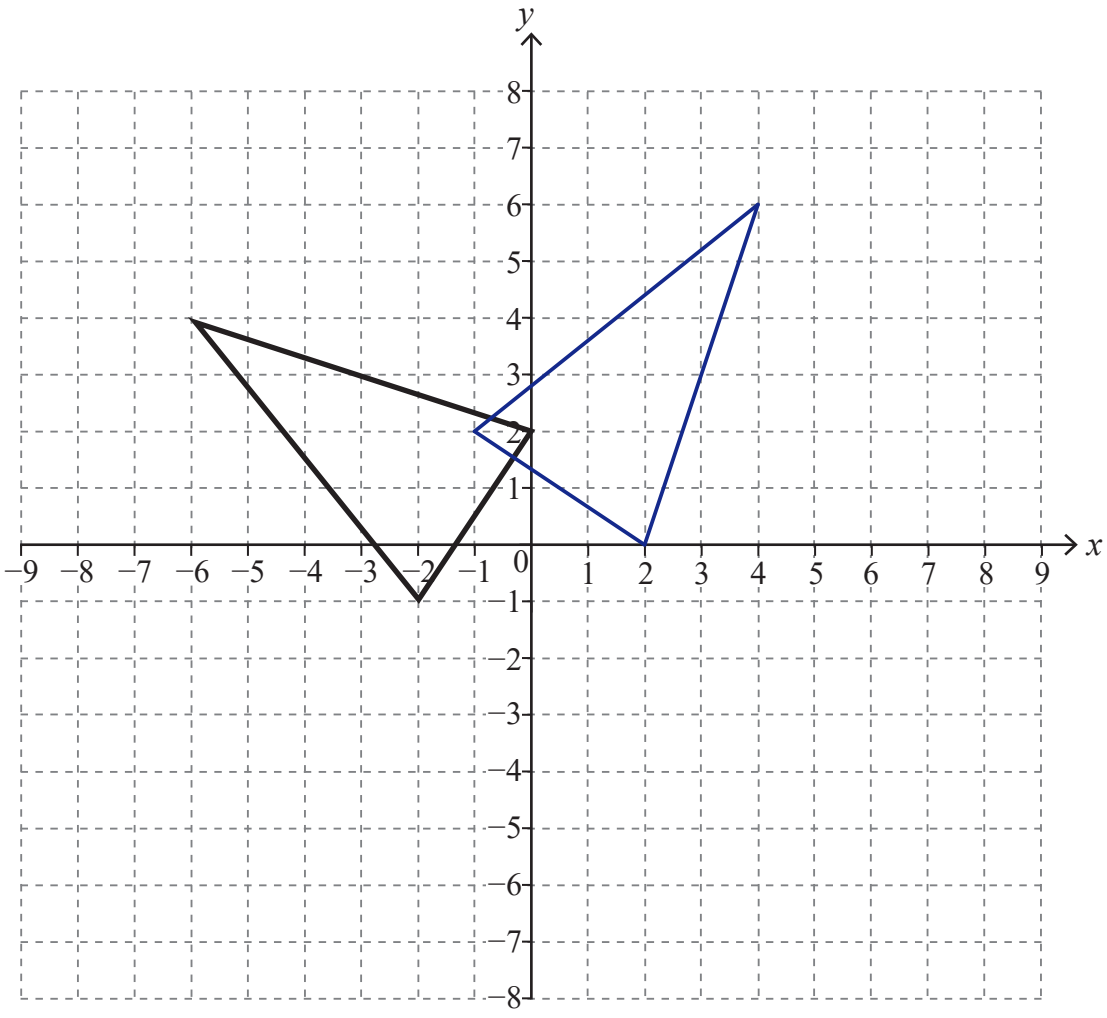
Show your working out clearly.

Walks: 235 ÷ 5 = 47 days

Drives: 235 − 47 = 188 days

Answer 188 days [2]

6 Rotate the triangle shown 90° clockwise about the origin.



[3]

$(x, y) \rightarrow (y, -x)$:

$(-6, 4) \rightarrow (4, 6)$, $(0, 2) \rightarrow (2, 0)$, $(-2, -1) \rightarrow (-1, 2)$

[Turn over

7 A spinner is spun 400 times.

The table shows some of the numbers of times it landed on the number 4 and some of the relative frequency values.

Number of spins	Number of fours	Relative frequency
100	20	0.2
200	39	
300		0.24
400	102	0.255

(a) Calculate the missing relative frequency value.

$\frac{39}{200} = 0.195$

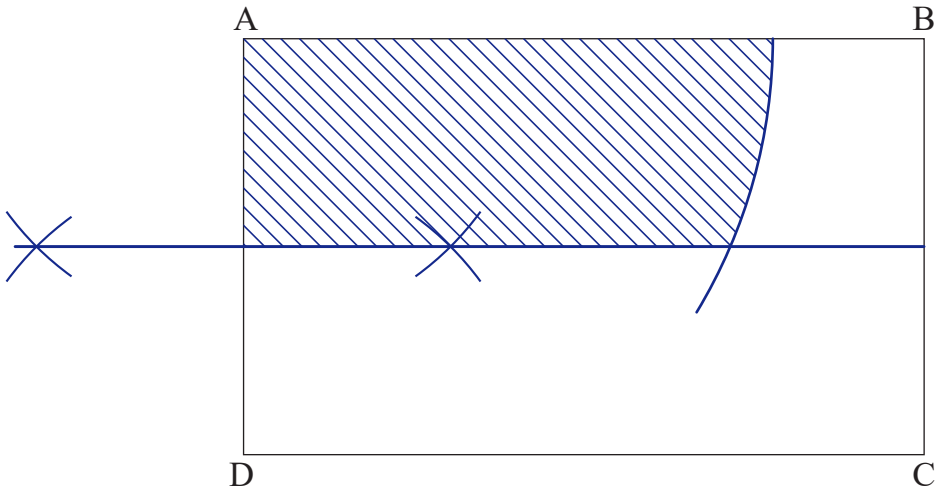
Answer 0.195 [1]

(b) Calculate the number of times it landed on 4 for the first 300 spins.

$300 \times 0.24 = 72$

Answer 72 [1]

8



ABCD is a rectangle.

Shade the region inside the rectangle which is closer to AB than to DC and less than 7 cm from A.

[3]

9 Fill in the blanks.

(a) $d^{12} \div d^3 = d^{\boxed{9}}$ 12 − 3 = 9

(b) $d^2 \times d^{\boxed{6}} = d^8$ 2 + 6 = 8

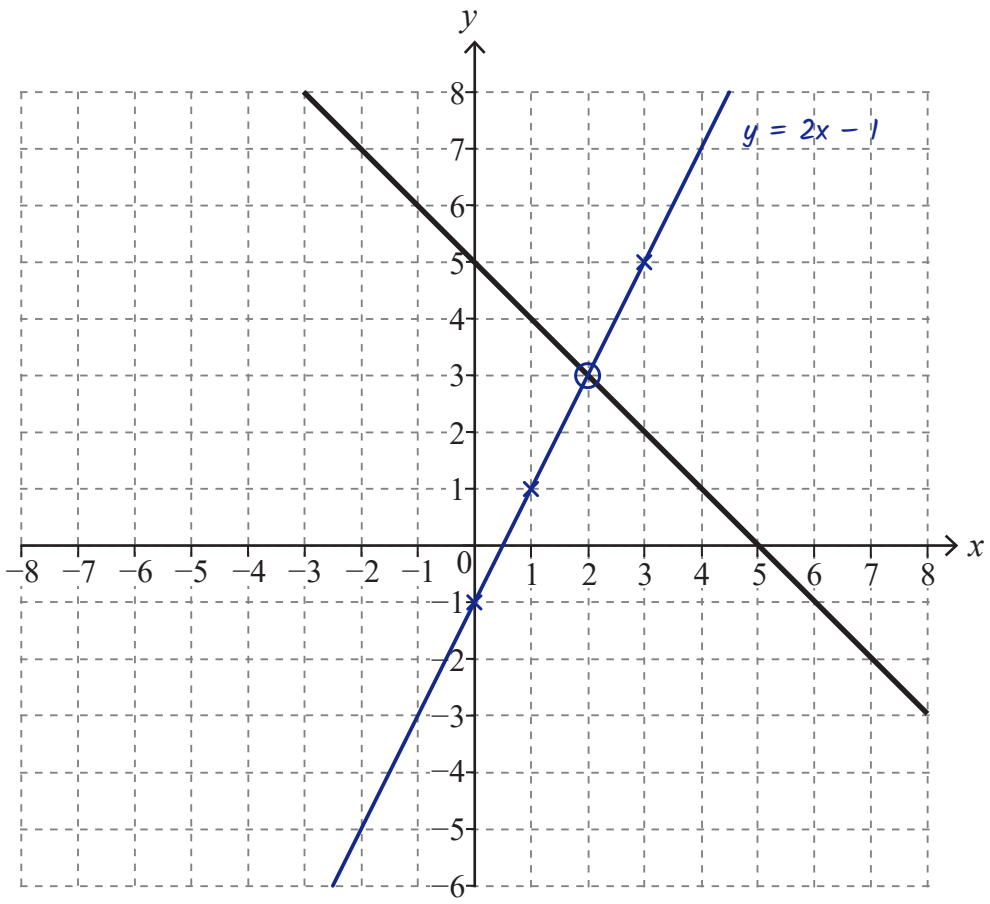
(c) $\dfrac{d^{30}}{(d^2)^5} = d^{\boxed{20}}$ $(d^2)^5 = d^{10}$, 30 − 10 = 20

[3]

[Turn over

10 By drawing a suitable line on the grid, solve the simultaneous equations

$$y = 5 - x \quad \text{and} \quad y = 2x - 1$$



$y = 2x - 1$: $x = 0, y = -1$; $x = 1, y = 1$; $x = 3, y = 5$

Lines cross at (2, 3)

Answer $x =$ 2 $y =$ 3 [4]

11 Solve the inequality $3(2x + 1) < 8$

$3(2x + 1) < 8$

$6x + 3 < 8$

$6x < 5$

$x < \frac{5}{6}$

Answer $x < \frac{5}{6}$ [3]

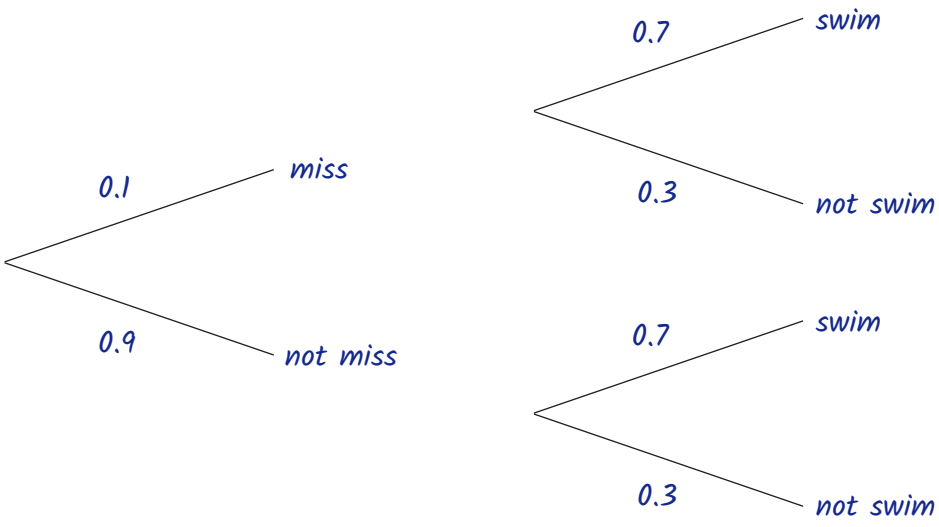
[Turn over

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12 **(a)** The probability that Jo misses a midweek hockey practice is 0.1

The probability that Jo goes swimming on Saturday is 0.7

Complete the tree diagram to show this information.



[3]

(b) What is the probability that Jo misses the midweek hockey practice and does not go swimming on Saturday?

P(miss and not swim) = 0.1 × 0.3
= 0.03

Answer 0.03 [1]

13 Make x the subject of the formula $5x = vx + 4y$

$5x = vx + 4y$

$5x - vx = 4y$

$x(5 - v) = 4y$

$x = \frac{4y}{5 - v}$

Answer $x =$ $\frac{4y}{5 - v}$ [3]

[Turn over

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14 (a) Rachel is buying a scoop of ice cream and a scoop of sorbet.

The eight flavours of ice cream are mint, peach, lemon, vanilla, butterscotch, honeycomb, chocolate and coffee.

The five flavours of sorbet are mint, peach, lemon, raspberry and strawberry.

In how many ways can she choose one scoop of ice cream and one scoop of sorbet?

$8 \times 5 = 40$

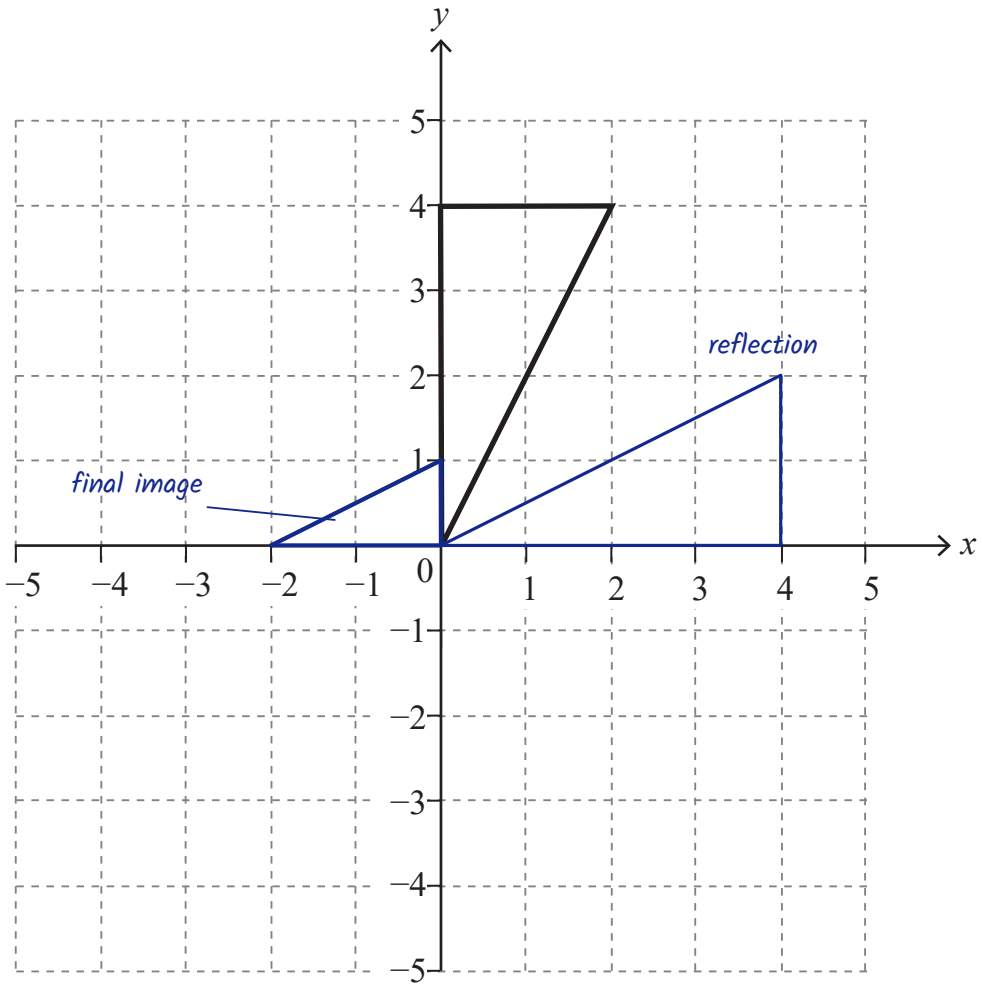
Answer 40 [2]

(b) In how many ways can she choose one scoop of ice cream and one scoop of sorbet which are different flavours?

Same flavours: mint, peach, lemon = 3
$40 - 3 = 37$

Answer 37 [1]

15 Draw the image of the triangle after a reflection in the line $y = x$, **followed** by an enlargement of scale factor $\frac{1}{2}$ with centre $(-4, 0)$.



[4]

Reflect in y = x: (0, 0), (0, 4), (2, 4) → (0, 0), (4, 0), (4, 2)
Enlarge ½, centre (−4, 0): → (−2, 0), (0, 0), (0, 1)

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Question Number	**Marks**
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Examiner Number

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