Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
November 2025

Mathematics

StemUp Model Solution

Unit M7 Paper 2
(With calculator)
Higher Tier



[GMC72]

GMC72

THURSDAY 20 NOVEMBER, 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 sixteen** questions.

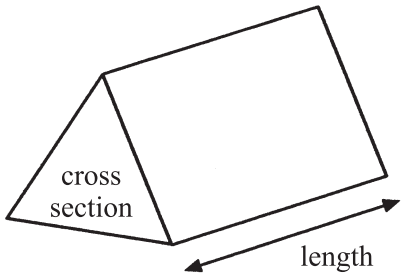
INFORMATION FOR CANDIDATES

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.

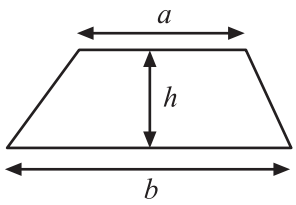
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Formula Sheet

Volume of prism = area of cross section × length

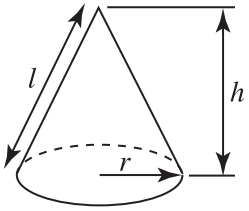


Area of trapezium = $\frac{1}{2}(a+b)h$



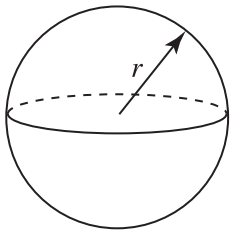
Volume of cone = $\frac{1}{3}\pi r^2 h$

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

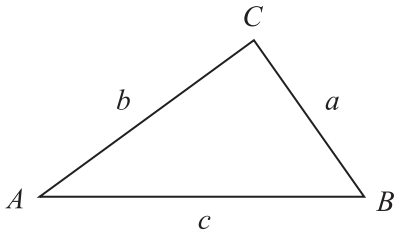


Volume of sphere = $\frac{4}{3}\pi r^3$

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 = $\frac{1}{2}ab\sin C$

15161

1



Buy 1 Cupcake for 75p	Special Offer Buy 3 Cupcakes for £2.10

Carla is buying cupcakes.

Show that **the greatest** number of cupcakes she can buy with £10 is 14

Show your working out clearly.

£10 = 1000p

1000 ÷ 210 = 4.761..., so 4 special offers

4 × 3 = 12 cupcakes, 4 × 210 = 840p

Left over: 1000 − 840 = 160p

160 ÷ 75 = 2.13..., so 2 more cupcakes at 75p

Greatest number = 12 + 2 = 14 cupcakes

[3]

[Turn over

2 Here are two exchange rates:

£1 = 1.33 U.S. dollars

£1 = 1.85 Canadian dollars

How many **more** Canadian dollars than U.S. dollars can be bought with £500?

U.S.: 500 × 1.33 = 665 dollars

Canadian: 500 × 1.85 = 925 dollars

925 − 665 = 260

Answer 260 Canadian dollars [3]

3 Pam is making stew.

1 kg of potatoes makes enough stew for 3 people.

She plans to feed 15 people.

Potatoes cost 65p per lb.

Work out the cost of the potatoes for the stew.

15 ÷ 3 = 5 kg of potatoes

1 kg = 2.2 lb, so 5 × 2.2 = 11 lb

11 × 65p = 715p = £7.15

Answer £ 7.15 [3]

[Turn over

4 Pete has 2 bags of sweets.

In the first bag there are 10 sweets of which 4 are toffee.

In the second bag 6 sweets are toffee.

The probability of taking a toffee sweet from each bag is the same.

How many sweets are there in the second bag?

First bag: $P(\text{toffee}) = \frac{4}{10} = \frac{2}{5}$

Second bag: $\frac{2}{5} = \frac{6}{15}$ (× 3 top and bottom)

so there are 15 sweets in the second bag

Answer 15 [3]

5 A sofa costs £1680

Abbie and Barry share the cost in the ratio 3 : 5

How much less does Abbie pay than Barry?

3 + 5 = 8 parts

1680 ÷ 8 = 210

Abbie: 3 × 210 = £630

Barry: 5 × 210 = £1050

1050 − 630 = £420

Answer £ 420 [3]

[Turn over

6

$$1, \quad \frac{8}{5}, \quad \frac{11}{5}, \quad \frac{14}{5}, \quad \frac{17}{5}, \quad \ldots$$

Olivia says that the next term in the sequence must be 4

Explain why Olivia is correct.

The terms are $\frac{5}{5}, \frac{8}{5}, \frac{11}{5}, \frac{14}{5}, \frac{17}{5},$

so the numerator goes up by 3 each time

(the terms go up by $\frac{3}{5}$ each time)

Next term = $\frac{17}{5} + \frac{3}{5} = \frac{20}{5} = 4$

[2]

7 A rectangle has length $3x$

The rectangle is enlarged by scale factor 4

Write down the new length.

Answer *12x* [1]

8 A spinner has the colours red, blue, pink, yellow and green.

The table shows the probability of the spinner landing on some of the colours.

Colour	red	blue	pink	yellow	green
Probability	0.16	0.08	0.13	0.4	0.23

The probability of landing on red is twice the probability of landing on blue.

(a) Complete the table for red and pink. [3]

Red = 2 × 0.08 = 0.16

Pink = 1 − (0.16 + 0.08 + 0.4 + 0.23) = 1 − 0.87 = 0.13

(b) The spinner is spun 400 times.

How many **more** times do you expect it to land on yellow than green?

Yellow: 0.4 × 400 = 160

Green: 0.23 × 400 = 92

160 − 92 = 68

Answer 68 [3]

[Turn over



9 Two regular pentagons are placed together.

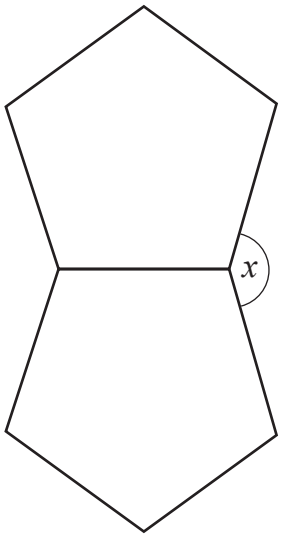


diagram not drawn accurately

Work out the size of angle x.

Sum of interior angles of a pentagon = 3 × 180 = 540°

Interior angle = 540 ÷ 5 = 108°

Angles at a point add up to 360°

x = 360 − (108 + 108) = 144°

Answer 144 ° [4]

10 Simplify

(a) $(m^3)^4$

Answer m^{12} [1]

(b) $\frac{e^{15}}{e^3}$

Answer e^{12} [1]

11 Solve $4x - 1 < 2$

$4x - 1 < 2$

$4x < 3$

$x < \frac{3}{4}$

Answer $x < \frac{3}{4}$ [2]

[Turn over

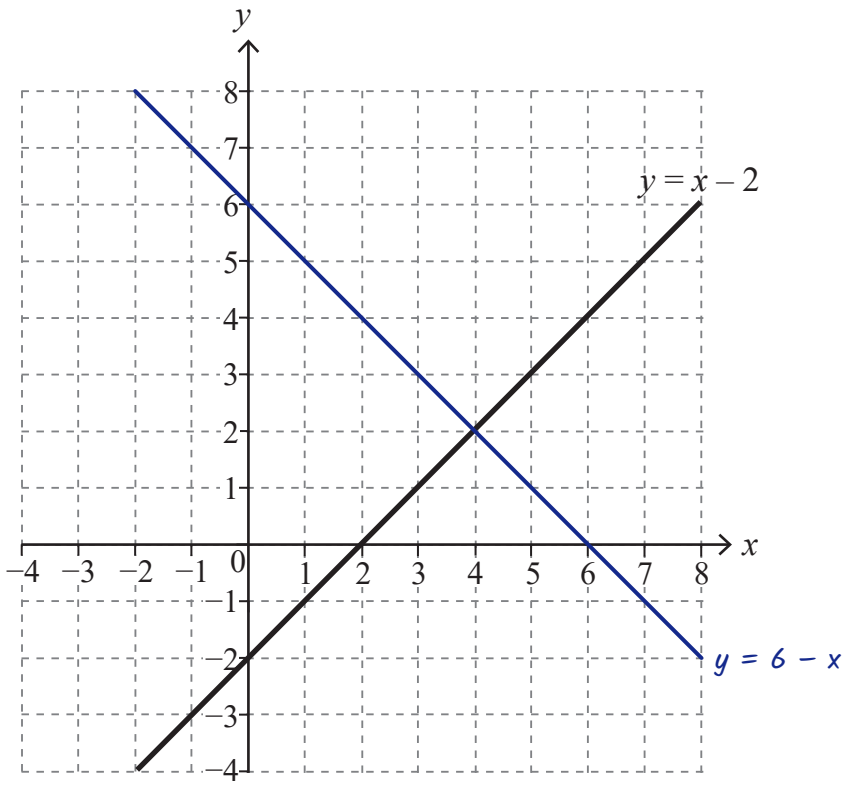
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12 Grace is trying to solve the simultaneous equations

$y = x - 2$

$y = 6 - x$

Grace begins by drawing the line $y = x - 2$ as shown.



(a) Draw the other line needed to solve the simultaneous equations. [2]

(b) Write down the solution to these simultaneous equations.

Answer $x =$ 4 $y =$ 2 [1]

13 Jack owns a shop.

He offers a special deal when a customer buys a drink, a sandwich and a cookie.

There are 9 different drinks and 6 different sandwiches to choose from.

There are 270 different combinations in this special deal.

How many different cookies are there to choose from?

$9 \times 6 \times c = 270$

$54c = 270$

$c = 270 \div 54 = 5$

Answer 5 [2]

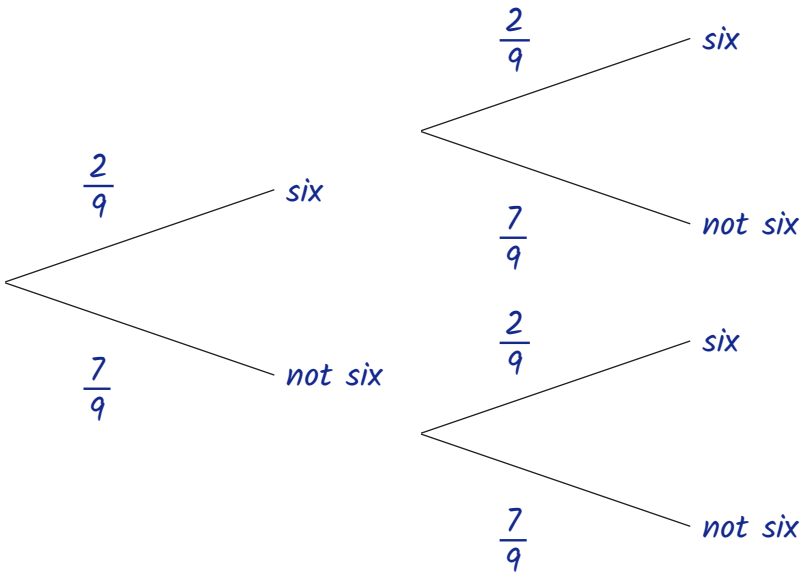
[Turn over

14 A dice is biased.

The probability of getting a six is $\frac{2}{9}$

The dice is rolled twice.

(a) Complete the tree diagram to show this information.



[2]

(b) What is the probability of getting no sixes?

$\frac{7}{9} \times \frac{7}{9} = \frac{49}{81}$

Answer $\frac{49}{81}$ [2]

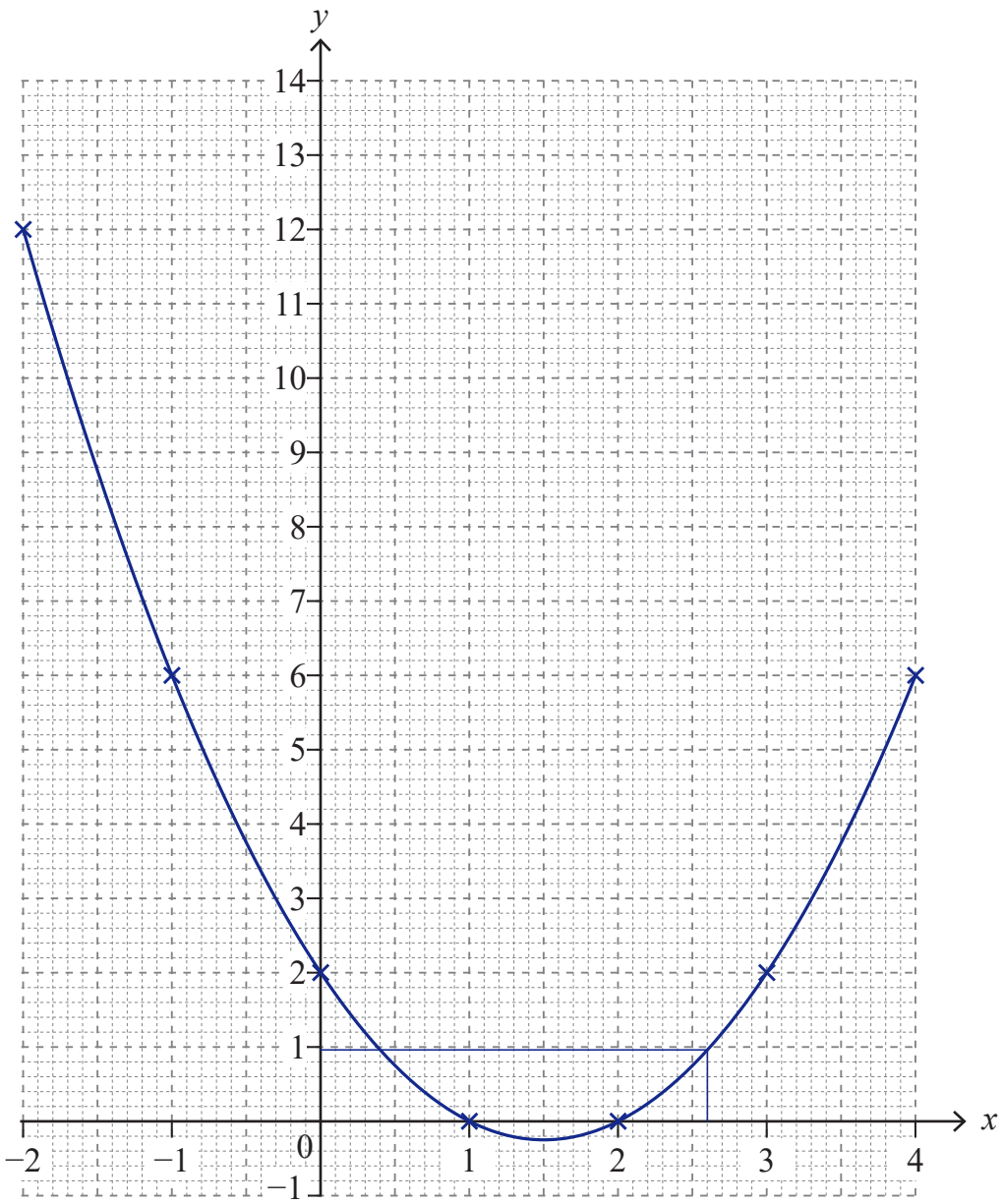
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(Questions continue overleaf)

[Turn over

15 (a) Draw the graph of $y = x^2 - 3x + 2$ from $x = -2$ to $x = 4$ [3]



x	−2	−1	0	1	2	3	4
y	12	6	2	0	0	2	6

(b) Use your graph to estimate the value of y for $x = 2.6$

Answer 1 [1]

(c) Use your graph to estimate the minimum value of y.

lowest point at x = 1.5

Answer −0.25 [1]

[Turn over

16 A and B are similar shapes.

The area of A is $10\,cm^2$ and the area of B is $160\,cm^2$

The height of A is x cm and the height of B is $(x + 9)$ cm.

Work out the value of x.

Show your working out clearly.

Area scale factor = 160 ÷ 10 = 16

Length scale factor = $\sqrt{16}$ = 4 (ratio of heights 1 : 4)

$$\frac{1}{4} = \frac{x}{x+9}$$

$4x = x + 9$

$3x = 9$

$x = 3$

Answer $x =$ 3 [4]

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For Examiner's use only	
Question Number	**Marks**
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Examiner Number

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