



Rewarding Learning

General Certificate of Secondary Education
2024

Centre Number

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Candidate Number

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Mathematics

Unit M7 Paper 2

(With Calculator)

Higher Tier



MV24

[GMC72]

MONDAY 3 JUNE, 10.45 am–12 noon

Time

1 hour 15 minutes, plus your additional time allowance.

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 on blank pages or tracing paper.

Complete in black ink only.

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.

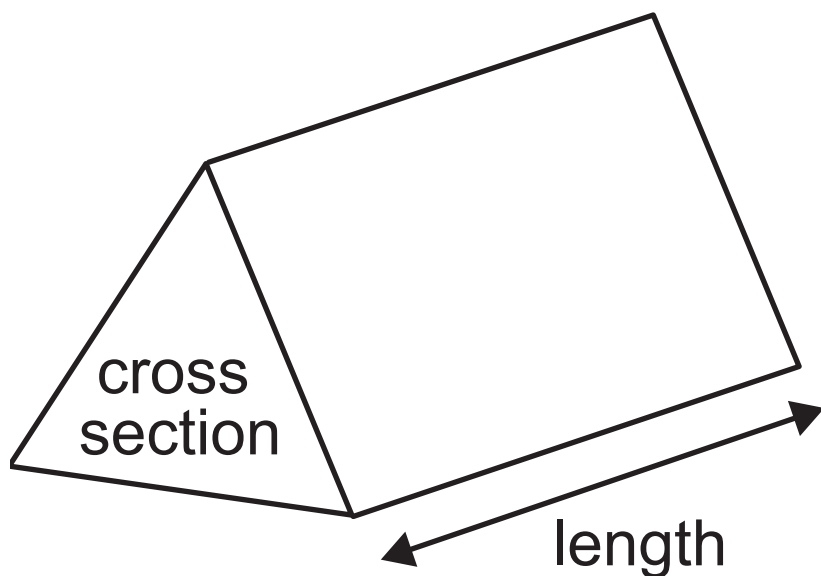
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses and a protractor.

The Formula Sheet is on pages 3, 4 and 5.

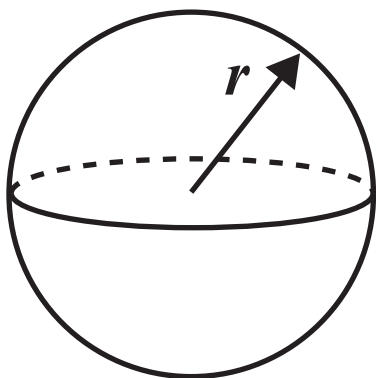
Formula Sheet

Volume of prism = area of cross section \times length



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

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

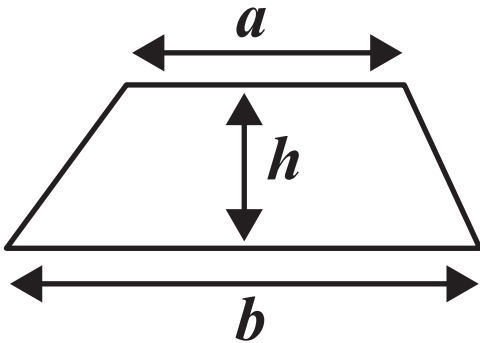


Quadratic Equation

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

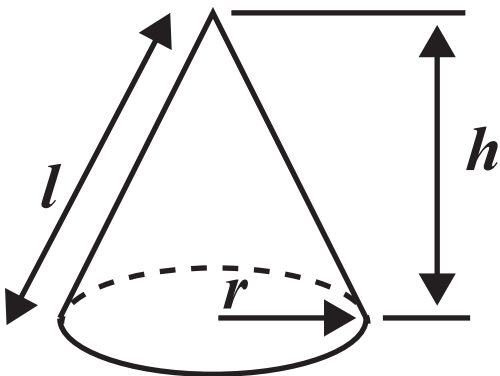
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

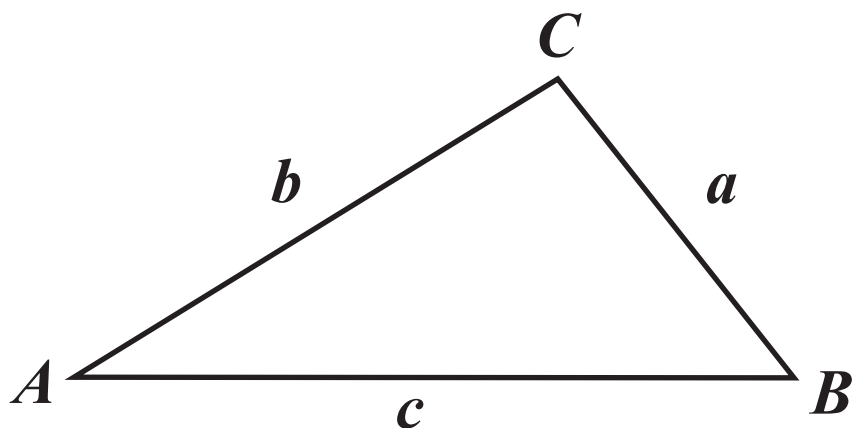


$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Curved surface area of cone} = \pi r l$$



In any triangle ABC

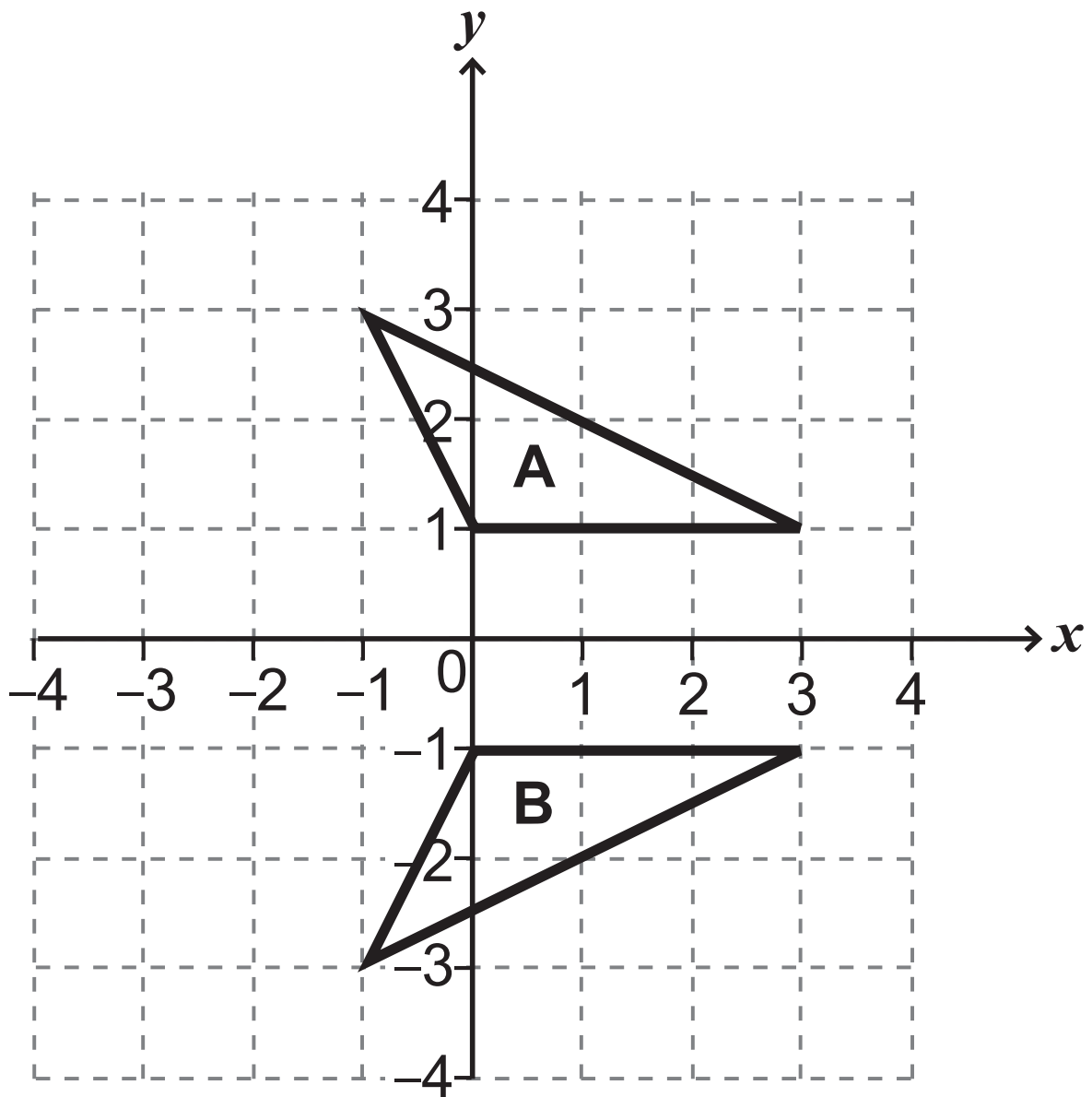


Sine Rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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

- 1 Describe fully the **single** transformation that takes triangle **A** to triangle **B**. [2 marks]



Answer _____

2 Each new number in a sequence is found using the rule

divide by 3 and then subtract 5

Find the next number in this sequence.
[1 mark]

24, 3, _____

3



Pete is filling 5-litre petrol cans from a large tank of petrol.

The tank contains 16 gallons.

Pete knows that 1 gallon = 4.5 litres.

How many 5-litre cans does he need to empty the tank? [2 marks]

Answer _____ cans

4 Jack ran 4 km each day during the month of June.

He thinks he has run the length of 3 marathons.

A marathon is 26.2 miles long.

Is he right?

Explain your answer. [4 marks]

Answer _____ because _____

- 5** The heights (in cm) of students in a Year 1 class are recorded in the table below.

	$90 \leq h < 95$	$95 \leq h < 100$	$100 \leq h < 110$
Girl	6	5	2
Boy	4	7	6

A student is taken at random from the class.

- (a)** What is the probability of taking
[1 mark for each]

- (i)** a girl with height $100 \leq h < 110$,

Answer _____

- (ii)** a boy,

Answer _____

(iii) a student with height $90 \leq h < 95$,

Answer _____

(iv) a girl with height $90 \leq h < 100$?

Answer _____

(b) An event is held for Year 1 students.

600 Year 1 students attend.

Estimate how many of the students have height $100 \leq h < 110$ [2 marks]

Answer _____

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(Questions continue overleaf)

6 The number of oysters collected by divers for a number of dives is recorded.

Name	Number of dives	Number of oysters collected
Diving Dan	16	84
Scuba Sam	11	33
Clammy Colin	24	102

Which diver is the best at collecting oysters?
[2 marks]

Show your working clearly.

Answer _____

because _____

- 7 Work out the value of x in the pentagon below. [4 marks]

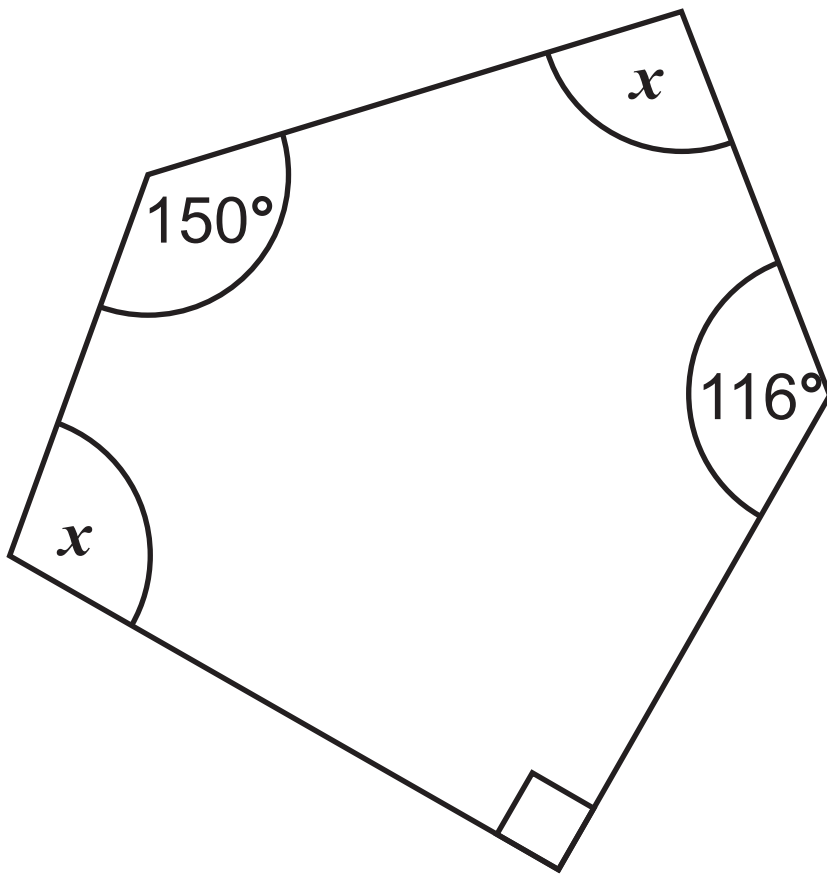


diagram not
drawn
accurately

Answer $x =$ _____ $^\circ$

8 In a local election the following figures were recorded at three polling stations.

Station	Number who voted	Number registered to vote
A	645	1270
B	860	1548
C	1450	3015

Of the total number of those registered to vote, what percentage voted? [3 marks]

Answer _____ %

- 9 Tammy makes cordial using fruit juice and sparkling water in the ratio 1:3

Tammy has 800 ml of fruit juice and 2100 ml of sparkling water.

What is the greatest amount of cordial she can make? [3 marks]

Answer _____ ml

10 Sarah rolls a fair dice and tosses a fair coin.

What is the probability that she gets a number less than 5 and a Head?

[2 marks]

Show your working out.

Answer _____

11 $x^a \times x^4 = x^{12}$

Find the value of a . [1 mark]

Answer $a =$ _____

Blank Page

(Questions continue overleaf)

12 The equation $x^3 - 12x - 2 = 0$ has a solution between 2 and 5

Use a trial and improvement method to find this solution, correct to one decimal place.
[4 marks]

You must show all your working.

x	$x^3 - 12x - 2$
-----	-----------------

Answer $x =$ _____

13 There are 200 students in Year 8 and 160 students in Year 9

There are 120 girls in Year 8 and 100 girls in Year 9

The probability that a girl plays a musical instrument is 0.3

The probability that a boy plays a musical instrument is 0.25

A student is taken at random from the students who play a musical instrument.

What is the probability that it is a boy?
[4 marks]

Answer _____

14 A varies directly as the square of x .

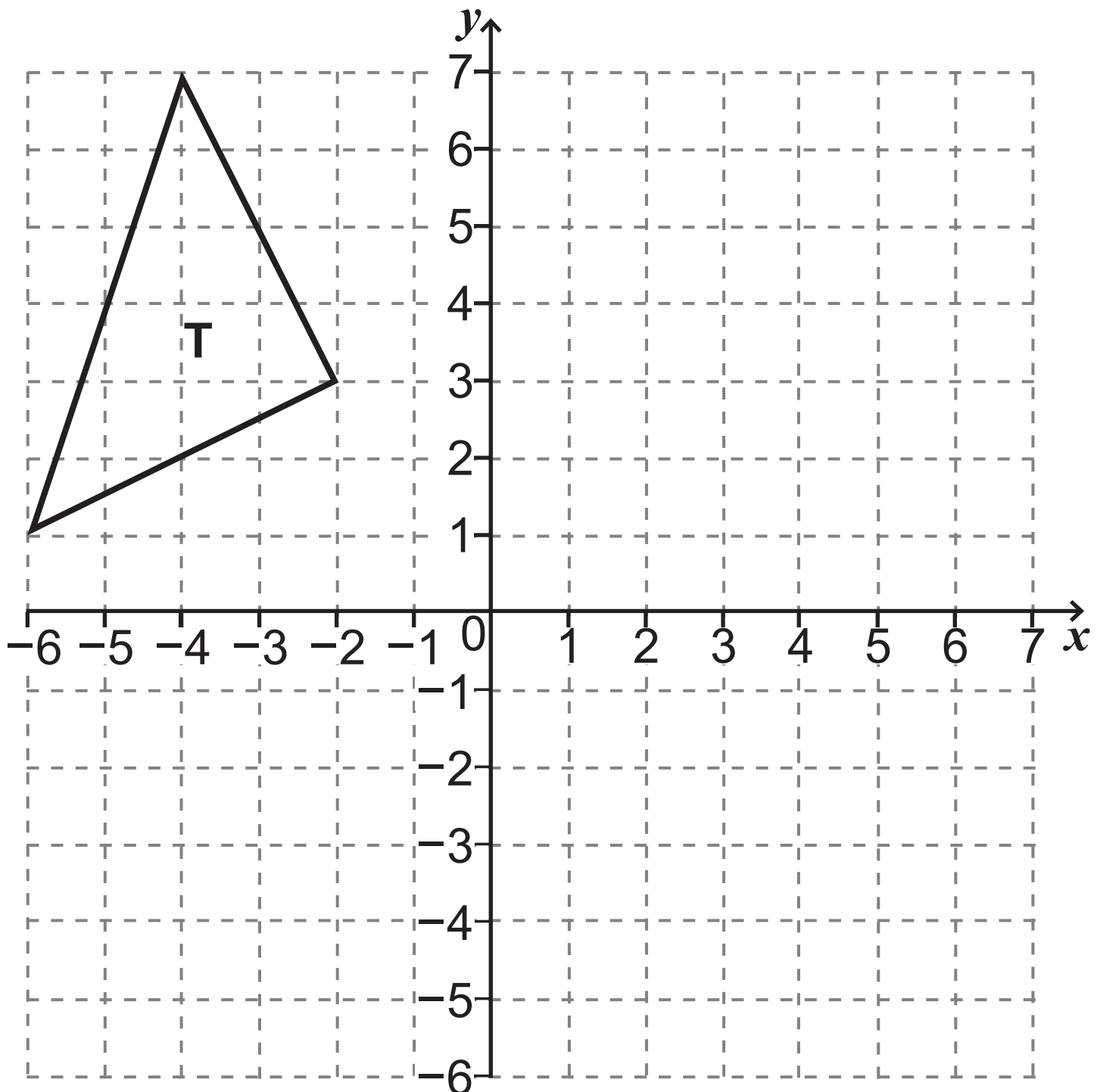
When $x = 5$, $A = 20$

Calculate the value of x when $A = 45$
[4 marks]

Answer $x =$ _____

15 Triangle T is reflected in the line $y = x$ and then enlarged by a scale factor of $\frac{1}{2}$ using the centre of enlargement $(7, 2)$.

Draw the final image and label it F.
[4 marks]



16 The table shows the probability of getting each number on a biased dice.

Number on dice	1	2	3	4	5	6
Probability	0.18	0.2	0.3	0.1	0.1	0.12

The dice is rolled twice and the numbers are added together.

What is the probability of getting a total of 5? [4 marks]

Answer _____

**This is the end of the
question paper**

SOURCES

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Q3 Source: © Getty Images

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
Total Marks	

Examiner Number

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