



Cambridge O Level

CANDIDATE
NAME
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MATHEMATICS (SYLLABUS D)

4024/22

Paper 2 Calculator

May/June 2026

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- You should use a scientific calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π , use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].

This document has 20 pages.



List of formulas

Area, A , of triangle, base b , height h .

$$A = \frac{1}{2}bh$$

Area, A , of circle of radius r .

$$A = \pi r^2$$

Circumference, C , of circle of radius r .

$$C = 2\pi r$$

Curved surface area, A , of cylinder of radius r , height h .

$$A = 2\pi rh$$

Curved surface area, A , of cone of radius r , sloping edge l .

$$A = \pi rl$$

Surface area, A , of sphere of radius r .

$$A = 4\pi r^2$$

Volume, V , of prism, cross-sectional area A , length l .

$$V = Al$$

Volume, V , of pyramid, base area A , height h .

$$V = \frac{1}{3}Ah$$

Volume, V , of cylinder of radius r , height h .

$$V = \pi r^2 h$$

Volume, V , of cone of radius r , height h .

$$V = \frac{1}{3}\pi r^2 h$$

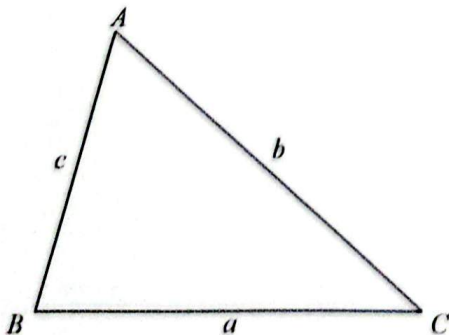
Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

For the equation $ax^2 + bx + c = 0$, where $a \neq 0$

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

For the triangle shown,



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

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

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





- 1 Write these numbers in order of size, starting with the smallest.

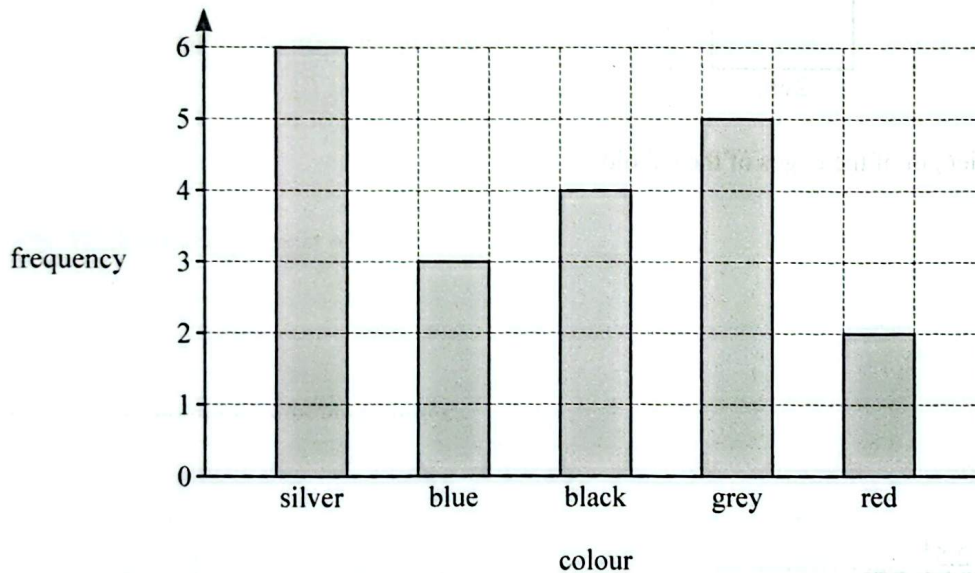
$$\frac{2}{5}$$

0.42

38%

..... [1]
smallest

- 2 Maison records the colours of all the cars in a car park.
The results are shown in the bar chart.



- (a) Write down the colour of car that is recorded the least number of times.

..... [1]

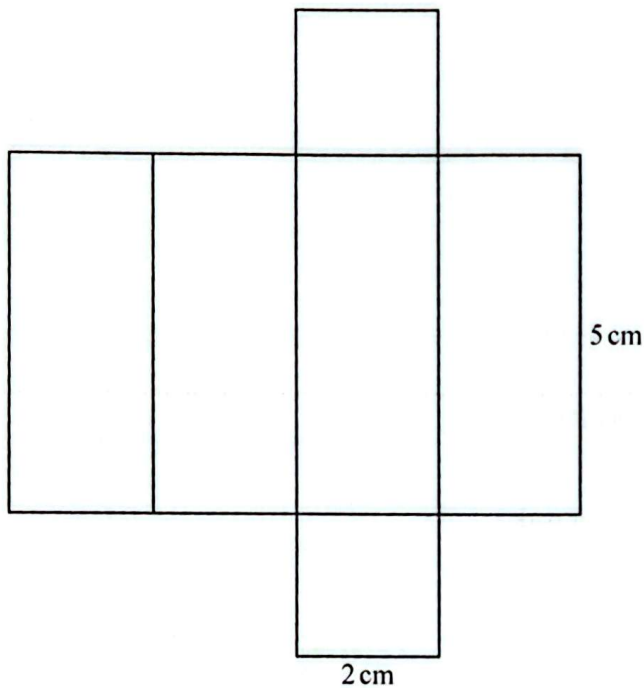
- (b) Find the total number of cars in the car park.

..... [1]





- 3 The diagram shows the net of a cuboid made from four congruent rectangles and two congruent squares.



Find the total length of the edges of the cuboid.

..... cm [2]

- 4 Calculate.

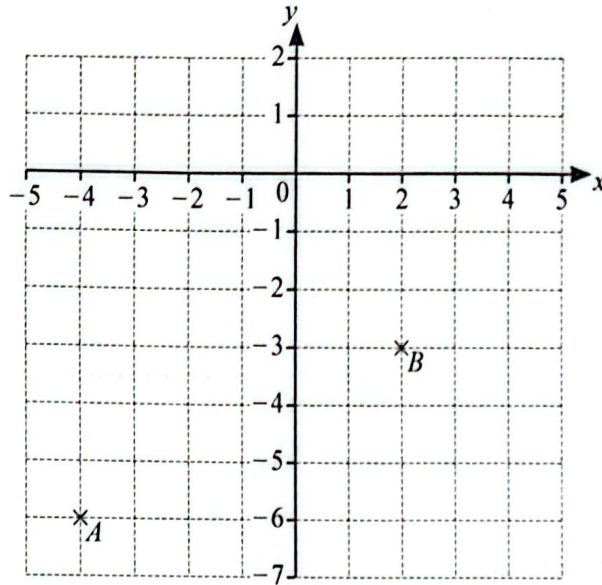
$$\frac{2.5^4}{3.09 + \sqrt{16.98}}$$

Give your answer correct to 2 decimal places.

..... [2]



- 5 Point A and point B are plotted on the grid.



- (a) Write down the coordinates of point B .

(..... ,) [1]

- (b) Work out the gradient of AB .

..... [2]

- (c) Find the coordinates of the midpoint of the line AB .

(..... ,) [1]



- 6 Sara and Bill share some money in the ratio 5 : 6.
Sara receives \$60.

(a) Calculate the amount Bill receives.

\$ [2]

- (b) Sara uses her \$60 to buy books.
Each book costs \$7.

Find the maximum number of books she can buy.

..... [2]

- 7 (a) $\mathbf{c} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$ $\mathbf{d} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$
Write $\mathbf{c} - 2\mathbf{d}$ as a column vector.

$\begin{pmatrix} \\ \end{pmatrix}$ [2]

- (b) Point P has coordinates $(1, 5)$ and $\overrightarrow{PQ} = \begin{pmatrix} -4 \\ 10 \end{pmatrix}$.

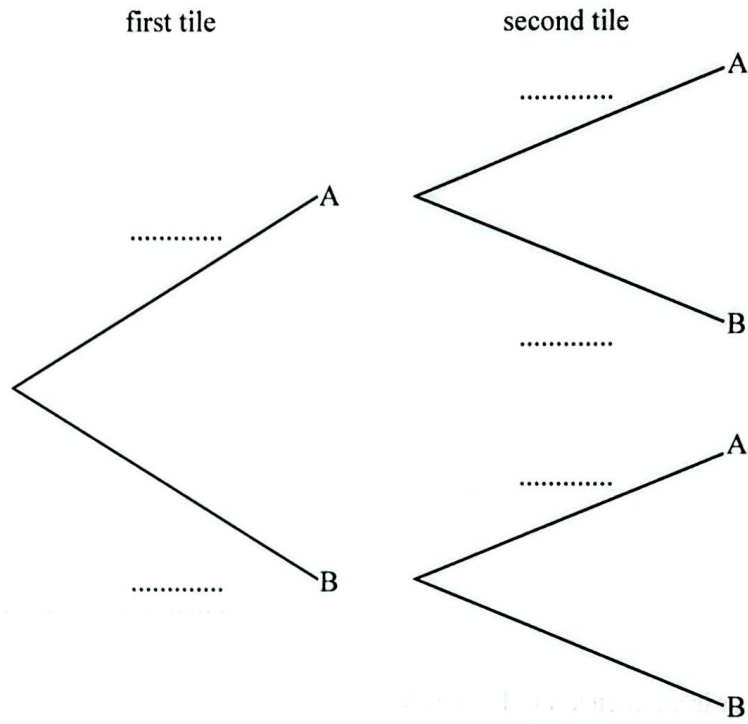
Find the coordinates of point Q .

(..... ,) [2]



- 8 A bag contains 7 tiles labelled A and 5 tiles labelled B.
A tile is chosen at random from the bag and is then replaced.
A second tile is then chosen at random from the bag.

(a) Complete the tree diagram.



[2]

(b) Work out the probability that both tiles are labelled A.

[1]



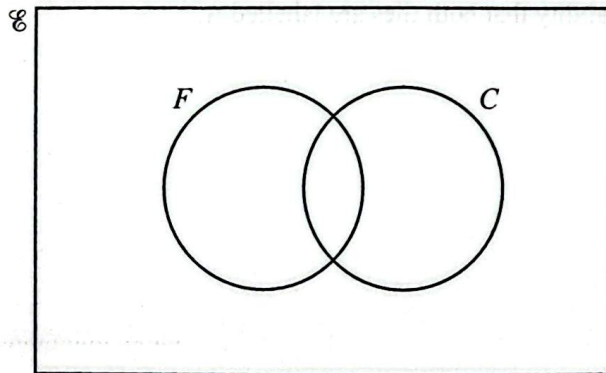
- 9 Amira walks from her home to her friend's house.
She leaves home at 09 35.
She walks a total of 8 km at an average speed of 5 km/h.

Work out the time she arrives at her friend's house.

..... [3]

- 10 $\mathcal{E} = \{x : x \text{ is an integer and } 1 \leq x \leq 9\}$
 $F = \{x : x \text{ is a factor of 6}\}$
 $C = \{x : x \text{ is a cube number}\}$

(a) Complete the Venn diagram.



[2]

(b) Find $n(F \cup C)'$.

..... [1]



- 11 In a sale, a shop reduces all prices by 32%.
Before the sale, a dress costs \$56.

Work out the sale price of the dress.

\$ [2]

- 12 Solve.

(a) $5k - 2 = 12$

$k =$ [2]

(b) $5(2y - 1) = 4(3y + 1)$

$y =$ [3]

13 $f(x) = 2x + 3$ $g(x) = \frac{1}{x-2}, \quad x \neq 2$

- (a) Find $f(-4)$.

..... [1]

- (b) Find $gf(1)$.

..... [2]



- 14 The population of a village is 1260.
The population grows exponentially at a rate of 1.7% per year.

Calculate the increase in the population at the end of 3 years.

..... [3]

- 15 Simplify.

(a) $a^5 \times a^3$

..... [1]

(b) $b \div b^6$

..... [1]

(c) $\left(\frac{4x}{y^2}\right)^3$

..... [2]



- 16 The table gives information about the speeds of 60 cars travelling along a road.

speed (s km/h)	$20 < s \leq 24$	$24 < s \leq 40$	$40 < s \leq 58$	$58 < s \leq 70$
frequency	4	22	28	6

Calculate an estimate of the mean.

..... km/h [4]

- 17 (a) f is inversely proportional to the square of h .

When $f = -\frac{3}{4}$, $h = 2$.

Find f when $h = -5$.

$f =$ [3]

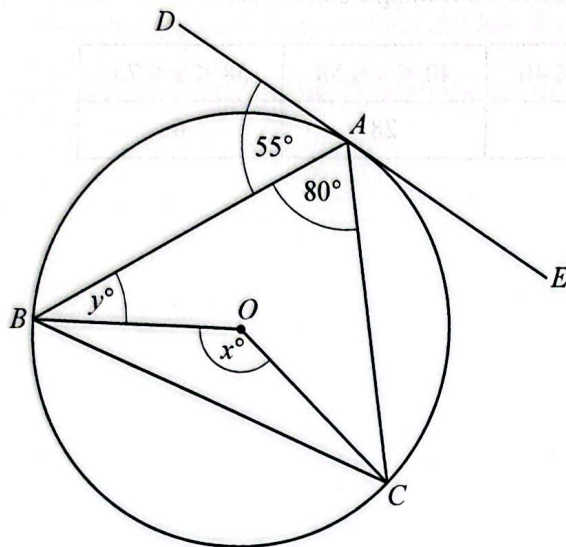
- (b) c is directly proportional to d^2 .

Complete the statement.

If d is multiplied by 4, then c is multiplied by

[1]

18



A , B and C lie on a circle, centre O .
 DE is a tangent to the circle at A .
 Angle $BAC = 80^\circ$ and angle $BAD = 55^\circ$.

(a) Find the value of x .

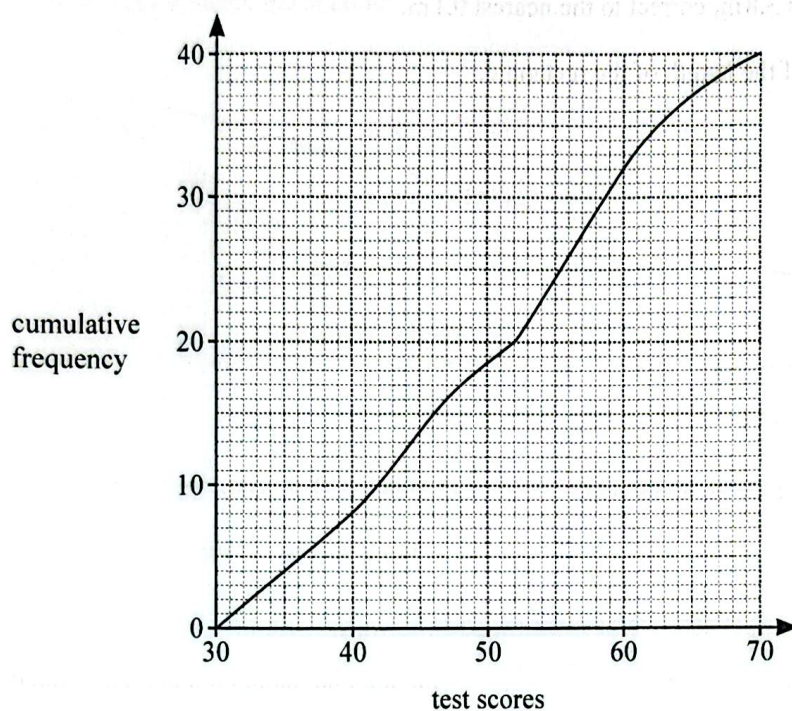
Give a geometrical reason for your answer.

$x = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

(b) Find the value of y .

$y = \dots\dots\dots$ [2]

- 19 The cumulative frequency diagram shows information about the test scores for a group of students.



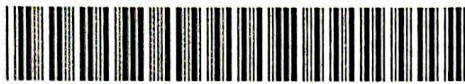
- (a) Use the diagram to find an estimate for the median score.

..... [1]

- (b) In this group, 60% of the students pass the test.

Use the diagram to find the minimum score needed to pass the test.

..... [2]



- 20 The area of a rectangle is 69.5 m^2 , correct to the nearest 0.5 m^2 .
The width of the rectangle is 3.8 m , correct to the nearest 0.1 m .

Calculate the upper bound of the length of the rectangle.

..... m [3]

- 21 Simplify.

(a) $\frac{8}{32x}$

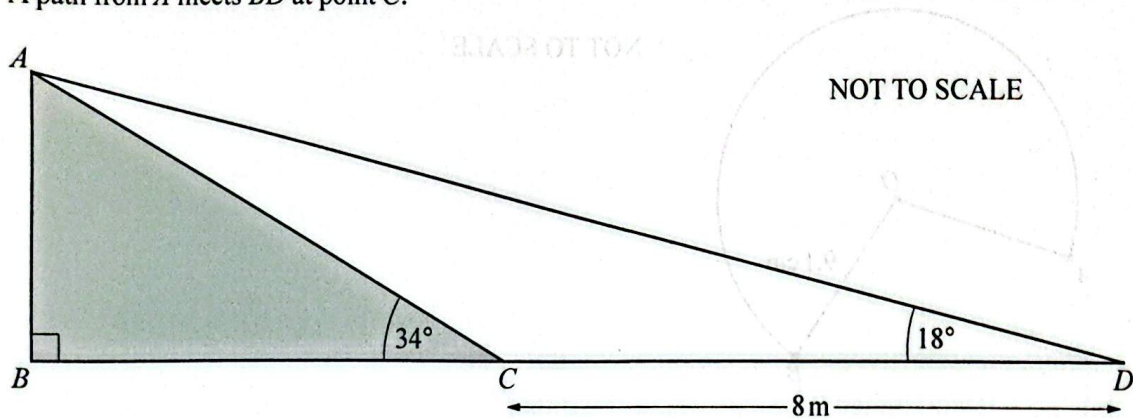
..... [1]

(b) $\frac{2f^2 - 8f}{f^2 - 16}$

..... [3]

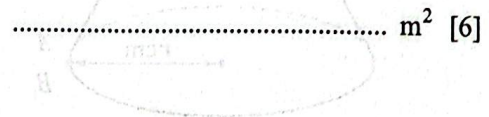


- 22 The diagram shows a triangular garden ABD .
A path from A meets BD at point C .



$CD = 8\text{ m}$, angle $ADC = 18^\circ$, angle $ACB = 34^\circ$ and angle $ABC = 90^\circ$.

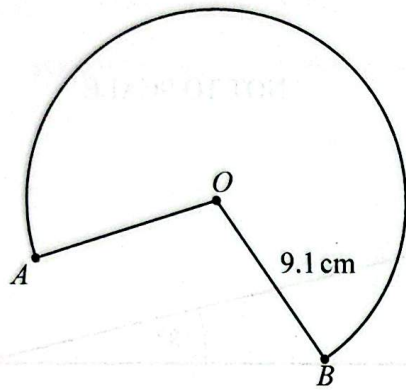
- (a) Calculate the area of triangle ABC .



- (b) The shaded area ABC is covered with grass seed.
A box of grass seed costs \$6.
Each box contains enough grass seed to cover an area of 5 m^2 .

Calculate the total cost of the boxes needed to cover this area with seed.

\$ [2]



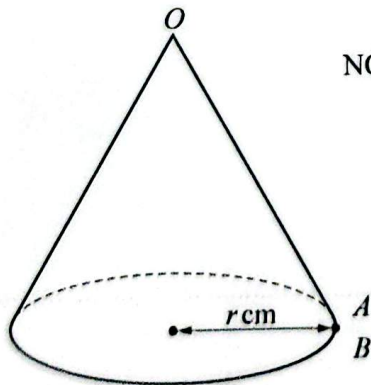
NOT TO SCALE

The diagram shows a sector of a circle with centre O and radius 9.1 cm.
The length of the major arc AB is 44 cm.

- (a) Find the angle of the major sector AOB .

[3]

- (b) Jamila joins OA to OB to form the curved surface of a cone.



NOT TO SCALE

- (i) Show that the radius, r , of the cone is 7.0 cm, correct to 1 decimal place.

[2]



(ii) Calculate the volume of the cone.



..... cm^3 [4]

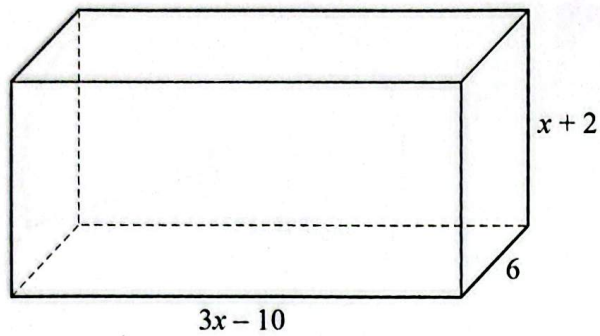
(iii) Oliver has a cone that is mathematically similar to Jamila's cone.
The volume of Oliver's cone is 2387 cm^3 .

Calculate the radius of Oliver's cone.

..... cm [3]



- 24 The diagram shows a solid cuboid.
All the lengths are in centimetres.



NOT TO SCALE

- (a) The volume of the cuboid is 720 cm^3 .

Show that $3x^2 - 4x - 140 = 0$.

[3]





- (b) Use the quadratic formula to solve $3x^2 - 4x - 140 = 0$.
Show all your working and give your answers correct to 2 decimal places.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

- (c) Calculate the area of the top face of the cuboid.

$\dots\dots\dots \text{cm}^2$ [2]

Question 25 is on the back page.





25 (a) Write $2x^2 - 8x + 7$ in the form $a(x-b)^2 + c$.

..... [3]

(b) Write down the coordinates of the turning point of the graph of $y = 2x^2 - 8x + 7$.

(.....,) [1]

(c) The equation $2x^2 - 8x + 7 = k$ has two solutions.

Complete the inequality for k .

$k > \dots\dots\dots$ [1]

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