

Candidate Marks Report

Series : 6 2026

This candidate's script has been assessed using On-Screen Marking. The marks are therefore not shown on the script itself, but are summarised in the table below.

Centre No :	PK470	Assessment Code :	4024
Candidate No :	58	Component Code :	22
Candidate Name :	HUZAIFA UMER,		

In the table below 'Total Mark' records the mark scored by this candidate.
'Max Mark' records the Maximum Mark available for the question.

Paper:	4024/22	
Paper	97 / 100	
Total:		
Question	Total /	Max
	Mark	Mark
1	1 /	1
2a	1 /	1
2b	1 /	1
3	0 /	2
4	2 /	2
5a	1 /	1
5b	2 /	2
5c	1 /	1
6a	2 /	2
6b	2 /	2
7a	2 /	2
7b	2 /	2
8a	2 /	2
8b	1 /	1
9	3 /	3
10a	2 /	2
10b	1 /	1
11	2 /	2
12a	2 /	2
12b	3 /	3
13a	1 /	1
13b	2 /	2
14	3 /	3
15a	1 /	1
15b	1 /	1
15c	2 /	2
16	4 /	4
17a	3 /	3
17b	1 /	1
18a	2 /	2
18b	2 /	2
19a	1 /	1

19b	2	/ 2
20	3	/ 3
21a	1	/ 1
21b	3	/ 3
22a	6	/ 6
22b	2	/ 2
23a	3	/ 3
23bi	2	/ 2
23bii	4	/ 4
23biii	3	/ 3
24a	3	/ 3
24b	2	/ 3
24c	2	/ 2
25a	3	/ 3
25b	1	/ 1
25c	1	/ 1



Cambridge O Level

CANDIDATE
NAME

Huzaifa Umer

CENTRE
NUMBER

P K 4 7 0

CANDIDATE
NUMBER

0 0 5 8

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.

Casio

Calculator: fx-991ES PLUS

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 [].

02 05

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 .

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

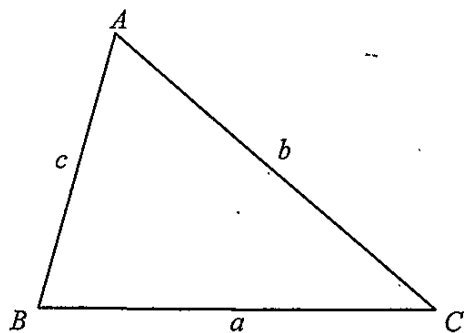
Volume, V , of sphere of radius r .

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

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,



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

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

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

SEEN



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

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

0.42

38%

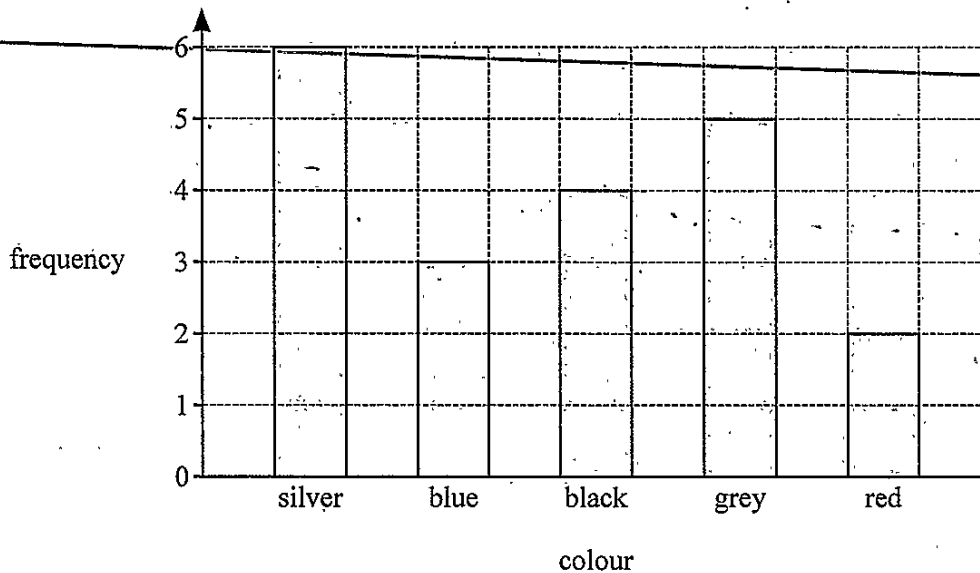
1, 40%

2, 42%

3, 38%

$\checkmark$ $\checkmark$ $\checkmark$
 $\underline{38\%}$, $\underline{\frac{2}{5}}$, $\underline{0.42}$ [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.

red $\checkmark$ [1]

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

$$6 + 3 + 4 + 5 + 2$$

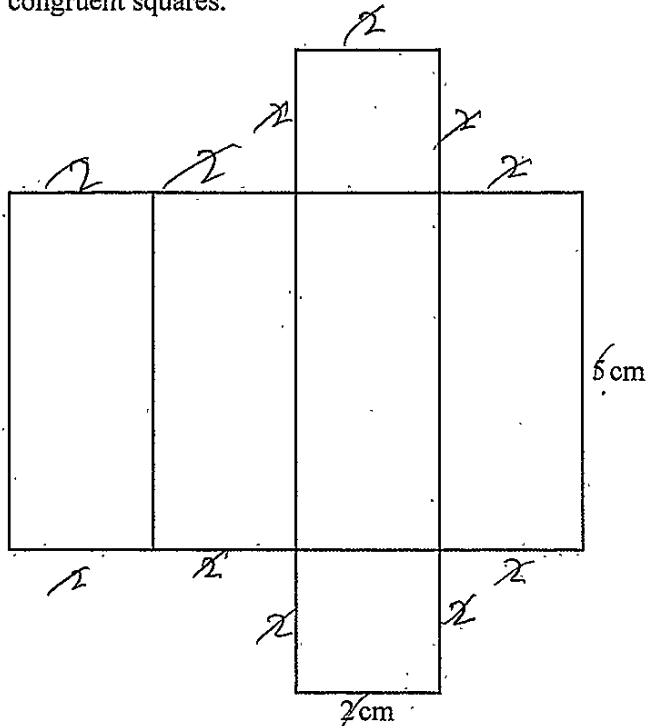
$$= 20$$

20 $\checkmark$ [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.

$$5 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2$$

$$= 34 \text{ cm}$$

M0

34

cm [2]

4 Calculate.

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

Give your answer correct to 2 decimal places.

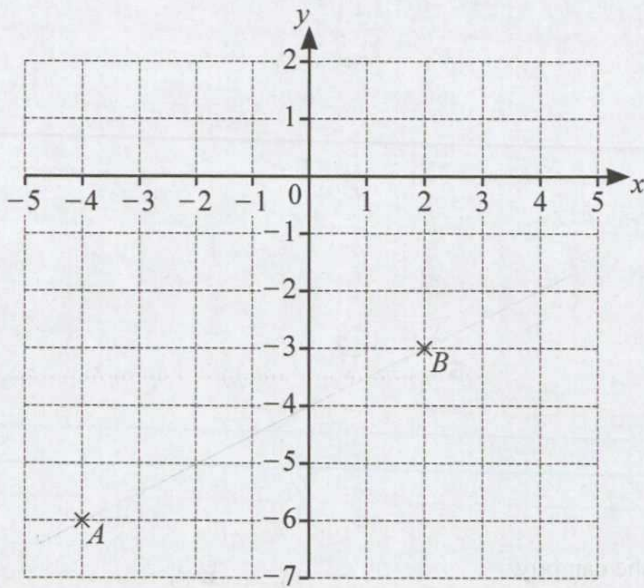
$$= \frac{39.0625}{3.09 + \sqrt{16.98}}$$

$$= 5.417 \approx 5.42$$

5.42

[2]

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



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

(2, -3) [1]

- (b) Work out the gradient of AB.

$$\begin{aligned} \text{Gradient} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-3 - (-6)}{2 - (-4)} \\ &= \frac{-3 + 6}{2 + 4} \\ &= \frac{3}{6} \\ &= \frac{1}{2} \end{aligned}$$

0.5 [2]

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

$$A = (-4, -6)$$

$$= (-1, -4.5)$$

$$\text{Midpoint} = \left(\frac{-4 + 2}{2}, \frac{-6 - 3}{2} \right)$$

$$= \left(\frac{-2}{2}, \frac{-9}{2} \right)$$

(-1, -4.5) [1]

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

- (a) Calculate the amount Bill receives.

Sara

Bill

$$5 : 6$$

$$60$$

$$x$$

$$x = 72$$

$$x = \frac{60 \times 6}{5}$$

\$ 72 [2]

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

Find the maximum number of books she can buy.

$$60 = 7x$$

$$\frac{60}{7} = x$$

$$\therefore 8 = x$$

$$8.57 = x$$

$$x = \text{books}$$

$$8$$

[2]

7 (a)

$$c = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

$$d = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

Write $c - 2d$ as a column vector.

$$2d = 2 \begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} \quad \left| \quad c - 2d = \begin{pmatrix} 1 \\ 5 \end{pmatrix} - \begin{pmatrix} -4 \\ 6 \end{pmatrix} = \begin{pmatrix} 5 \\ -1 \end{pmatrix} \right. [2]$$

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

Find the coordinates of point Q.

$$\overrightarrow{PQ} = \overrightarrow{OQ} - \overrightarrow{OP}$$

$$\begin{pmatrix} -4 \\ 10 \end{pmatrix} + \begin{pmatrix} 1 \\ 5 \end{pmatrix} = \overrightarrow{OQ}$$

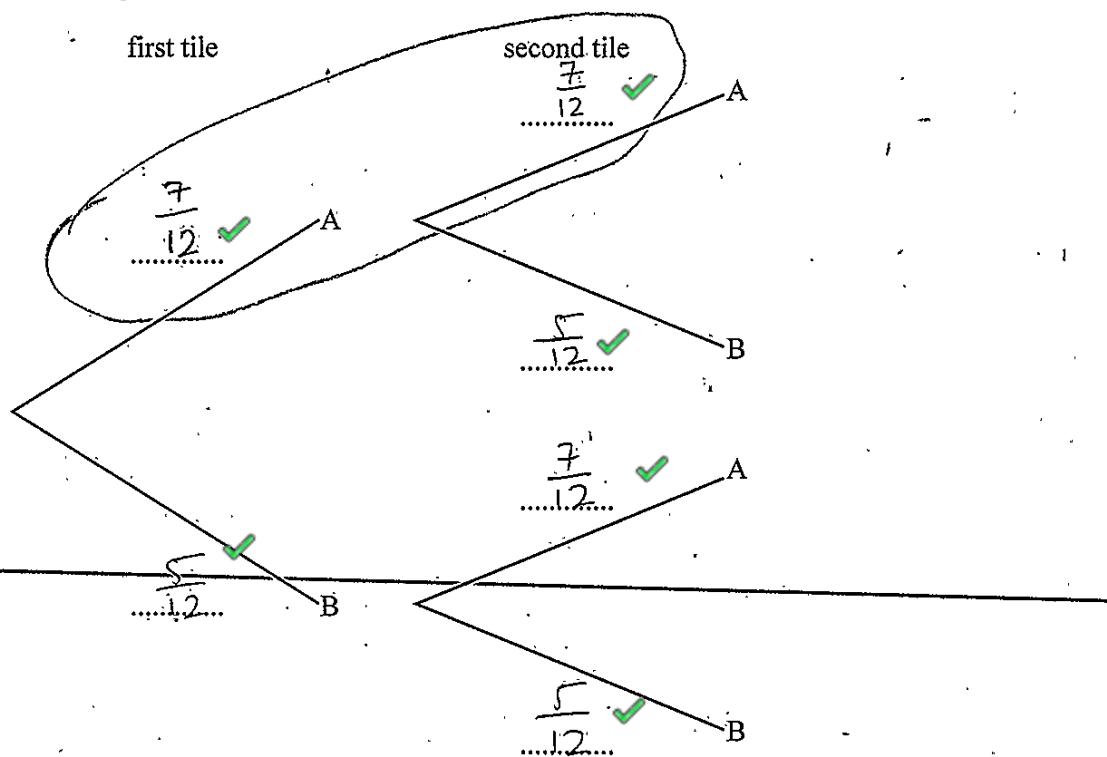
$$\overrightarrow{OQ} = \begin{pmatrix} -3 \\ 15 \end{pmatrix}$$

(-3 , 15) [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.

$$\frac{7}{12} \times \frac{7}{12}$$

$$= \frac{49}{144}$$

$$\frac{49}{144}$$

[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.

$$v = \frac{D}{T}$$

$$T = \frac{8}{5} \checkmark$$

$$T = 1.6 \text{ hours}$$

$$1.6 \text{ hours} = 1 \text{ hr } 36 \text{ minutes}$$

$$09 \ 35 + 01 \ 36 \checkmark$$

$$= 11 \ 11$$

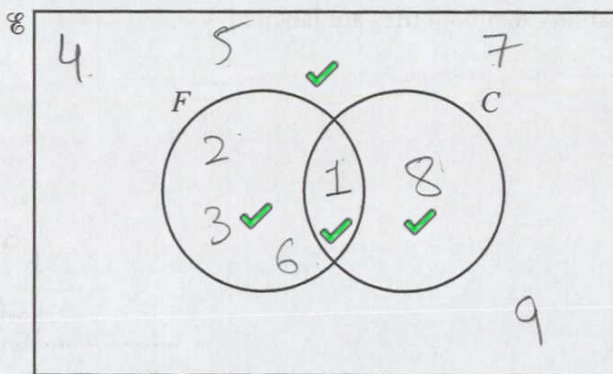
$$\underline{11 \ 11} \checkmark$$

[3]

10

$$\begin{aligned} \mathcal{E} &= \{x : x \text{ is an integer and } 1 \leq x \leq 9\} = [1, 2, 3, 4, 5, 6, 7, 8, 9] \\ F &= \{x : x \text{ is a factor of 6}\} = [1, 2, 3, 6] \\ C &= \{x : x \text{ is a cube number}\} = [1, 8] \end{aligned}$$

(a) Complete the Venn diagram.



[2]

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

$$\underline{4} \checkmark$$

[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.

$$\begin{array}{r} 56 \\ \times 68 \\ \hline \end{array} \quad \begin{array}{r} 100 \\ 68 \\ \hline \end{array} \quad \left| \begin{array}{l} x = \frac{68 \times 56}{100} \\ x = 38.08 \end{array} \right. \quad \checkmark$$

\$ 38.08 [2]

- 12 Solve.

(a) $5k - 2 = 12$

$$\begin{array}{l} 5k = 12 + 2 \\ 5k = 14 \\ k = \frac{14}{5} \end{array} \quad \left| \quad k = 2.8 \right. \quad \checkmark$$

$k = 2.8$ [2]

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

$$\begin{array}{l} 10y - 5 = 12y + 4 \\ -5 - 4 = 12y - 10y \\ -9 = 2y \end{array} \quad \left| \quad \begin{array}{l} \frac{-9}{2} = y \\ -4.5 = y \\ y = -4.5 \end{array} \right. \quad \checkmark$$

$y = -4.5$ [3]

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

$$\frac{1}{2x+3-2}$$

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

$$\begin{array}{l} f(-4) = 2(-4) + 3 \\ = -8 + 3 \\ = -5 \end{array}$$

-5 [1]

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

$$\begin{array}{l} gf(1) = \frac{1}{2(1)+1} \\ = \frac{1}{2+1} \\ = \frac{1}{3} \end{array} \quad \left| \quad \begin{array}{l} g\left(\frac{1}{2x+3-2}\right) = gf \\ \frac{1}{2x+1} = gf(1) \end{array} \right. \quad \checkmark$$

$\frac{1}{3}$ [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.

$$\begin{aligned}
 \text{T. population} &= P \left(1 + \frac{R}{100} \right)^y \quad y = \text{years} \\
 &= 1260 \left(1 + \frac{1.7}{100} \right)^3 \quad \checkmark \\
 &= 1325 \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 &1325 - 1260 \quad \checkmark \\
 &= 65
 \end{aligned}$$

$$\begin{aligned}
 &65 \quad \checkmark \\
 &\dots\dots\dots [3]
 \end{aligned}$$

15 Simplify.

$$\begin{aligned}
 \text{(a)} \quad &a^5 \times a^3 \\
 &= a^8
 \end{aligned}$$

$$\begin{aligned}
 &a^8 \quad \checkmark \\
 &\dots\dots\dots [1]
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad &b \div b^6 \\
 &= b^{-5}
 \end{aligned}$$

$$\begin{aligned}
 &b^{-5} \quad \checkmark \\
 &\dots\dots\dots [1]
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad &\left(\frac{4x}{y^2} \right)^3 \\
 &= \left(\frac{64x^3}{y^6} \right) =
 \end{aligned}$$

$$\begin{aligned}
 &\frac{64x^3}{y^6} \quad \checkmark \quad \checkmark \\
 &\dots\dots\dots [2]
 \end{aligned}$$

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

speed (s km/h)	20 < s ≤ 24	24 < s ≤ 40	40 < s ≤ 58	58 < s ≤ 70
frequency	4	22	28	6
$\sum fx$	88	704	1372	384

Calculate an estimate of the mean.

$$= 42.46$$

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$= \frac{(88) + (704) + (1372) + 384}{4 + 22 + 28 + 6}$$

$$= \frac{2548}{60}$$

$$42.46 \text{ km/h [4]}$$

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

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

Find f when $h = 5$.

$$f \propto \frac{k}{h^2}$$

$$-\frac{3}{4} = \frac{k}{2^2}$$

$$-\frac{3}{4} \times 4 = k$$

$$-3 = k$$

$$f = \frac{k}{h^2}$$

$$f = \frac{-3}{25}$$

$$f = -0.12$$

$$f = -0.12 \text{ [3]}$$

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

$$c \propto d^2 \quad 4 = k(2^2)$$

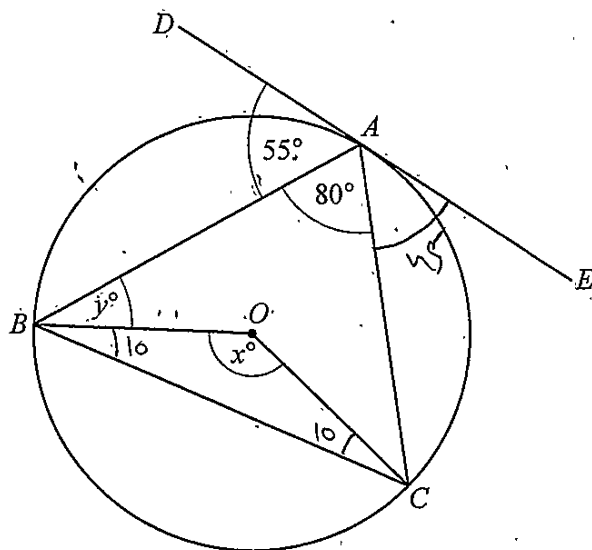
Complete the statement.

$$4 = k(6^2)$$

If d is multiplied by 4, then c is multiplied by 16.

[1]

18.



NOT TO SCALE

$$80 \times 2 = 160$$

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.

$x = 160^\circ$ because Angle at the centre is twice of the angle on the circumference [2]

(b) Find the value of y .

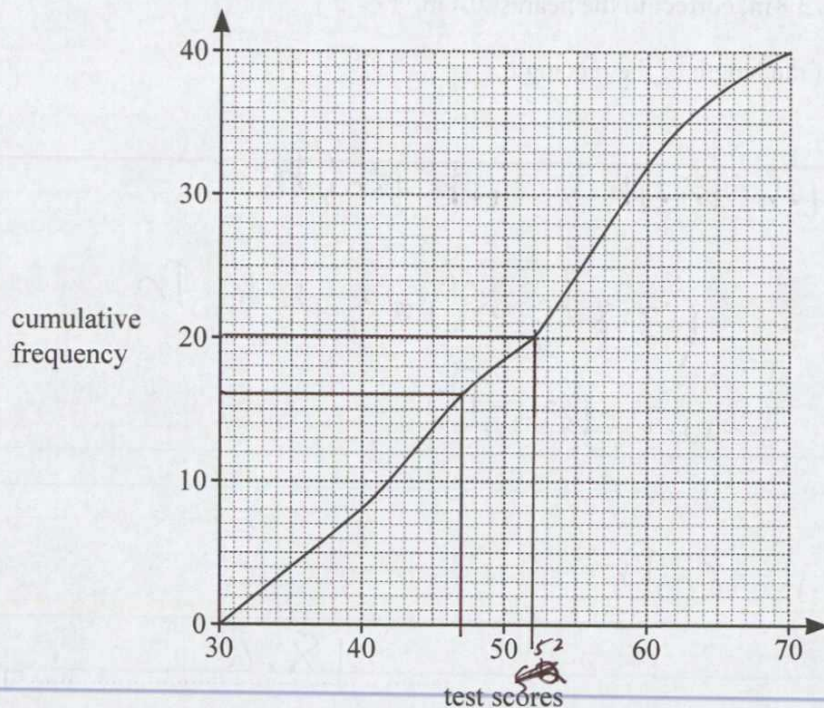
$$45 = y + 10$$

$$45 - 10 = y$$

$$35 = y$$

$$y = 35^\circ [2]$$

- 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.

~~52~~ 52 [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.

$$\begin{array}{l}
 \cancel{60\%} \\
 40 \times 60\% \\
 = 24 \quad \checkmark
 \end{array}$$

47 $\checkmark$

47 [2]

- 20 The area of a rectangle is 69.5 m^2 , correct to the nearest 0.5 m^2 . ± 0.25
 The width of the rectangle is 3.8 m , correct to the nearest 0.1 m . ± 0.05

Calculate the upper bound of the length of the rectangle.

$$\text{U.b area} = \text{L.b width} \times \text{u.b length}$$

$$69.5 + 0.25 = (3.8 - 0.05) \times \text{u.b length}$$

$$\frac{69.75}{3.75} = \text{u.b length}$$

$$18.6 = \text{u.b length}$$

$$\underline{18.6} \text{ m [3]}$$

- 21 Simplify.

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

$$= \frac{8}{4 \cdot 32x} = \frac{1}{4x}$$

$$\underline{\frac{1}{4x}} \text{ [1]}$$

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

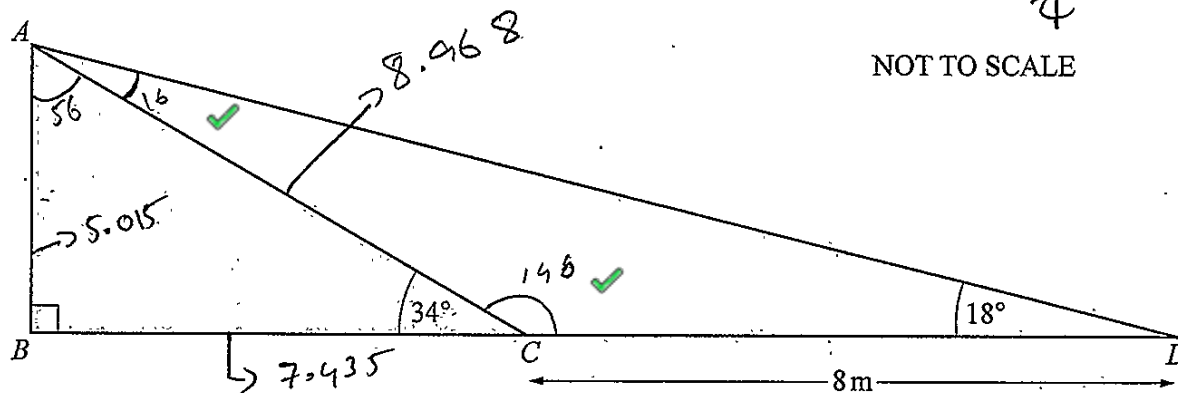
$$= \frac{2f(f-4)}{f^2 - 4^2}$$

$$= \frac{2f \cancel{(f-4)}}{(\cancel{f-4})(f+4)}$$

$$= \frac{2f}{f+4}$$

$$\underline{\frac{2f}{f+4}} \text{ [3]}$$

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



NOT TO SCALE

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

- (a) Calculate the area of triangle ABC .

$$\angle ACD = 180 - 16 - 34 = 146^\circ$$

$$\angle BAC = 180 - (90 + 34) = 56^\circ$$

$$\sin(56) = \frac{BC}{AC}$$

$$\sin(56) \times AC = BC$$

$$7.435 = BC$$

$$AB^2 = BC^2 + AC^2$$

$$AB = \sqrt{7.435^2 + 8.968^2}$$

$$\tan(34) \times BC = AB$$

$$5.015 = AB$$

$$A = \frac{1}{2} (AB)(BC)$$

$$A = 18.64 \approx 18.6$$

Apply br of sine

$$\frac{8}{\sin(18)} = \frac{AC}{\sin(16)}$$

$$\frac{8 \times \sin(18)}{\sin(16)} = AC$$

$$8.968 = AC$$

$$18.6 \text{ m}^2 [6]$$

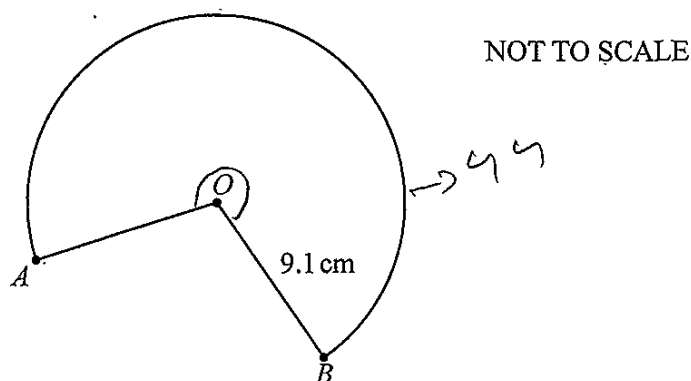
- (b) The shaded area ABC is covered with grass seed.
A box of grass seed costs \$6.
Each box contains enough grass seed to cover an area of 5 m^2 .

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

$$\frac{18.6}{5} = 3.7 \approx 4 \text{ boxes}$$

$$4 \times 6 = 24$$

$$\text{\$ } 24 [2]$$



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 .

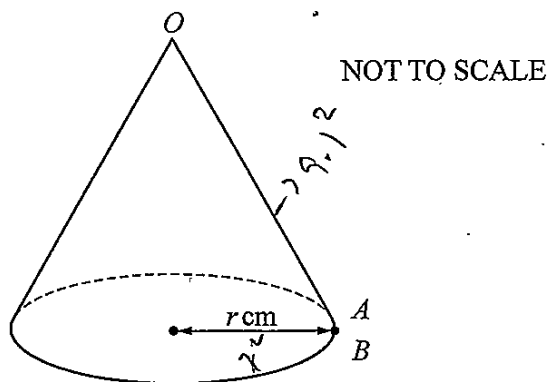
$$\text{Arc length} = \frac{x}{360} \times 2\pi r$$

$$\frac{44 \times 360}{2\pi(9.1)} = x$$

$$277.03 \approx 277^\circ = x$$

$$\dots\dots\dots 277^\circ \dots\dots\dots [3]$$

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



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

Arc length = circumference of circle

$$44 = 2\pi r \quad \left| \quad r = 7.00 \approx r = 7 \right.$$

M1

$$\frac{44}{2\pi} = r$$

A1

[2]



(ii) Calculate the volume of the cone.

$$\begin{aligned}
 h^2 + r^2 &= 9.1^2 \\
 h^2 &= 9.1^2 - 7^2 \\
 h^2 &= \sqrt{33.81} \\
 h &= 5.81
 \end{aligned}$$

$$\begin{aligned}
 v &= \frac{1}{3} \pi r^2 h \\
 v &= \frac{1}{3} \pi (7)^2 (\sqrt{33.81}) \\
 v &= 298.36 \approx 298.4
 \end{aligned}$$

298.4

cm³ [4]

(iii) Oliver has a cone that is mathematically similar to Jamila's cone.
The volume of Oliver's cone is 2387 cm³.

Calculate the radius of Oliver's cone.

0.125

$$\left(\frac{r}{R} \right)^3 = \frac{298.4}{2387} \quad \checkmark$$

$$\frac{343 \times 2387}{298.4} = R^3 \quad \checkmark$$

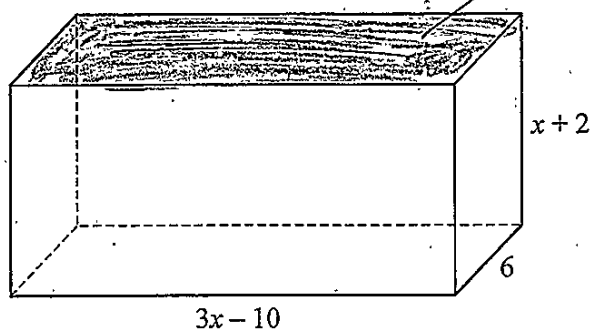
$$\sqrt[3]{2743.77} = R \quad \checkmark$$

$$13.44 \approx 14 = R$$

14

cm [3]

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



NOT TO SCALE

$$6(x+2) = 6x+12$$

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

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

$$V = l \times b \times h$$

$$720 = (3x-10)(x+2)(6)$$

$$720 = (3x-10)(6x+12)$$

$$720 = 18x^2 + 36x - 60x - 120$$

$$18x^2 - 24x - 120 - 720 = 0$$

$$18x^2 - 24x - 840 = 0$$

$$6(3x^2 - 4x - 140) = 0$$

$$3x^2 - 4x - 140 = \frac{0}{6}$$

$$3x^2 - 4x - 140 = 0$$

[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.

Now apply Quadratic formula

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

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(3)(-140)}}{2(3)}$$

$$x = 7.530 \approx 7.53$$

$$x = -6.197 \approx -6.20$$

$$x = -6.20 \text{ or } x = 7.53 \quad [3]$$

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

$$(3x - 10)(6) = A$$

$$(3(7.53) - 10)(6) = A$$

$$(12.59)(6) = A$$

$$75.54 = A$$

$$75.5$$

$$75.5 \text{ cm}^2 \quad [2]$$

Question 25 is on the back page.

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

$$= 2(x^2 - 4x) + 7$$

$$= 2(x^2 - 4x + 2^2 - 2^2) + 7$$

$$= 2((x-2)^2 - 4) + 7$$

$$= 2(x-2)^2 - 8 + 7$$

$$= 2(x-2)^2 - 1$$

$$2(x-2)^2 - 1 \quad [3]$$

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

$$(2, -1) \quad [1]$$

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

Complete the inequality for k .

$$k > -1 \quad [1]$$

$$y = 2x^2 - 8x + 7$$

$$y = k$$

$$-1 = k$$

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