Name:_____( ) **Class: 4 ( )**

ANGLICAN HIGH SCHOOL
SECONDARY FOUR
PRELIMINARY EXAMINATION 2025

S4

4052/01

MATHEMATICS

Paper 1 **20 August 2025**

Candidates answer on the Question Paper. **2 hours 15 minutes**

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class in the space at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **all** the questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
The total of marks for this paper is 90.

The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

For Examiners' Use

Question	1	2	3	4	5	6	7	8
Marks								
Question	9	10	11	12	13	14	15	16
Marks								
Question	17	18	19	20	21	22	23	
Marks								

Clarity/ Logic	Accuracy/ Precision	Units		90

Parent's Name and Signature:

Date:

This document consists of **19** printed pages and **1** blank page.

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Mathematical Formulae

Compound Interest

$$\text{Total amount} = P\left(1+\frac{r}{100}\right)^n$$

Mensuration

Curved surface area of a cone = πrl

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

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

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

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

Arc length = $r\theta$, where θ is in radians

Sector area = $\frac{1}{2}r^2\theta$, where θ is in radians

Trigonometry

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

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

Statistics

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

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f}\right)^2}$$

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Answer **all** the questions.

1 Simplify $\left(\frac{27\sqrt{a^3}}{b^{-3}}\right)^{-\frac{2}{3}}$, leaving your answer in positive index form.

Answer ..... [2]

---

2 Expand and simplify $(x-y)^2-(x+1)(x-2y)$.

Answer ..... [3]

---

3 Factorise completely $ax-2cy-cx+2ay$.

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Answer ..... [2]

---

4 **(a)** Solve the equation $39-\frac{3}{4}x=3-2(4-x)$.

Answer x = ... [2]

(b) Solve the equation $\frac{2x}{3-2x}-\frac{7}{x-3}=2$.

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Answer x = ... [3]

---

5 Mr Chan is looking at Deepavali decorations. There are two lights, one green and one red, flashing at different intervals. The green light and the red light flash at intervals of 6 seconds and 8 seconds respectively. If the two lights start flashing at the same time, how long will it take for the two lights to next flash simultaneously?

Answer ..... s [2]

---

6 **(a)** Express 2250 as the product of its prime factors.

Answer ..... [1]

(b) The number $\frac{2250h}{k}$, where h and k are integers, is a perfect cube.
Find the smallest positive integer value of h and of k.

Answer h = ...

k = ... [1]

(c) Find two smallest possible integers, one is odd and the other is even, such that they have a lowest common multiple of 2250 and a highest common factor of 45.

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Answer ..... and ..... [2]

---

7 A student makes a pendulum by tying a string to a small solid sphere and hanging it from a retort stand. The time, in seconds, taken by the pendulum to swing from one end to the other and back again is called the period, P seconds. The period is directly proportional to the square root of the length of the string, L cm. If the value of P increases by 25%, what is the corresponding percentage change in the value of L ?

Answer ..... % [3]

---

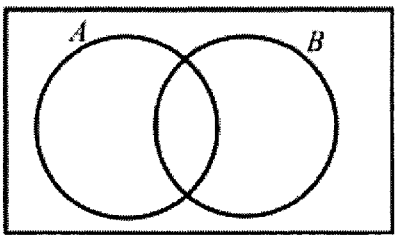
8 The Great Pyramid of Giza, located in Egypt, has a surface area of 8.30×10^{4} m^2 and a volume of 2.45×10^{4} m^3. A vendor is selling geometrically similar replicas of the pyramid. The replica has a volume of 9.22×10^{-6} m^3. Estimate the surface area of the replica, giving your answer in m^2 and in standard form.

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Answer ..... m^2 [4]

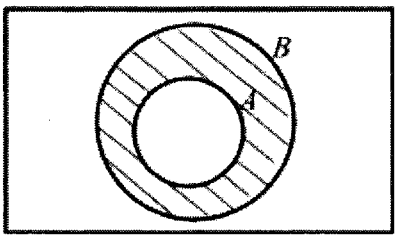
---

9 **(a)** On the Venn diagram, shade the region which represents $(A' \cap B')'$.



[1]

(b) Use set notation to describe the shaded region.



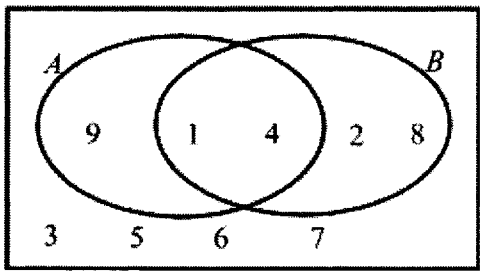
Answer ..... [1]

(c) $\xi = \{x : x \text{ is an integer such that } 0 < x < 10\}$

$A = \{1, 4, 9\}$

$B = \{1, 2, 4, 8\}$

The Venn diagram shows the universal set and the elements in each of its subsets.



(i) Describe the elements of Set A.

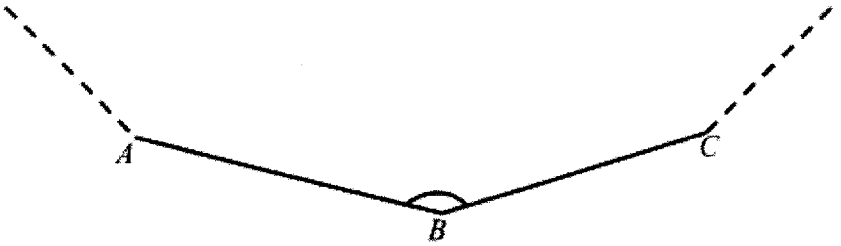
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Answer ..... [1]

(ii) Find the value of $n(A \cup B')$.

Answer ..... [1]

10

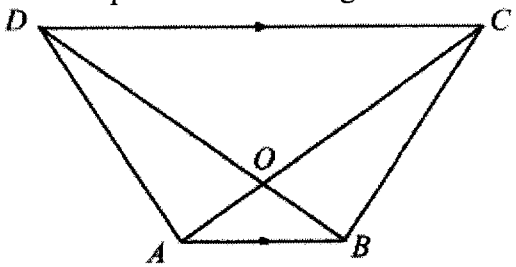


In the diagram above, ABC is part of a polygon. $\angle ABC$ is $148°$. The remaining interior angles are each equal to $139°$. Find the number of sides of this polygon.

Answer ..... [2]

---

11 $ABCD$ is a trapezium where DC is parallel to AB. Diagonals AC and BD intersect at O. $DO = CO$.



(a) Name a pair of similar isosceles triangles.

Answer triangle..... and triangle..... [1]

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(b) Show that triangle *ABC* and triangle *BAD* are congruent.
Give a reason for each statement you make.

.....

.....

.....

.....

..... [3]

---

12 The test scores for a group of 24 students were recorded.

		Test Scores
0	9	
1		
2	1 3	
3	1 3 4 7 7 7 8	
4	2 5 7 9	
5	5 6 7 7 9 9	
6		
7	0 7 8 8	

Key 7 | 0 means 70 marks

The results are shown in the stem-and-leaf diagram.

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(i) Find the interquartile range.

Answer ..... marks [2]

(ii) Find the median result.

Answer ..... marks [1]

(iii) Find the mode result.

Answer ..... marks [1]

(iv) 15 students did not achieve a merit grade. Find the minimum score to achieve merit grade.

Answer ..... marks [1]

---

13 The table shows the number of books read by some students last month.

Number of books	0	1	2	3
Frequency	1	3	x	5

(a) Show that the mean value of the data is 2.

Answer

[2]

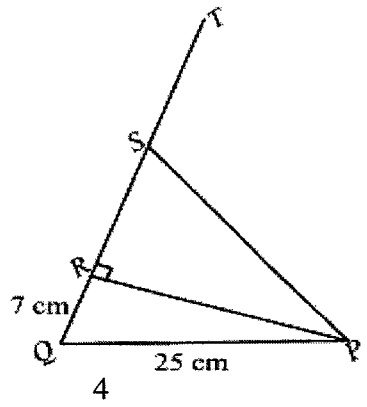
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(b) The standard deviation of the data is 1. Find the value of x.

Answer $x =$ ..... [3]

---

14 In the diagram, $PQ = 25$ cm, $QR = 7$ cm and $\angle SRP = 90°$. $QRST$ is a straight line.



(a) Given that $\sin \angle TSP = \frac{4}{5}$, find the exact value of

(i) $\cos \angle TSP$,

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Answer cos $\angle TSP =$ ..... [1]

(ii) the length of SR.

Time (second)	Fraction of energy captured relative to its maximum capacity
1st	$\frac{1}{2}\left(1-\frac{1}{2}\right)$
2nd	$\frac{1}{2}\left(\frac{1}{2}-\frac{1}{3}\right)$
3rd	$\frac{1}{2}\left(\frac{1}{3}-\frac{1}{4}\right)$
...	...
nth	...

Answer ..... cm [3]

(b) A triangle with vertices ABC has an area of 16.9 cm^2. $AB = 8.9$ cm and $AC = 4.7$ cm.

Find the two possible values of angle BAC.

Answer .....° and .....° [2]

---

15 A new type of energy harvesting device is being developed to capture energy from small environmental vibrations. The engineers observe that the fraction of energy captured by the device during nth second of continuous operation, relative to its maximum capacity, follows a specific pattern.

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(a) Write down the fraction of energy captured for the nth second of operation.

Answer ..... [1]

(b) The team needs to find the total energy captured after K seconds of continuous operation.

Show that the total energy captured after K seconds is $\frac{1}{2}\left(1-\frac{1}{K+1}\right)$.

Answer

[3]

(c) The energy harvesting device is considered a success if it is able to harvest at least 49.8% of its maximum capacity. Find the minimum number of seconds for which the device is considered a success.

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Answer ..... s [3]

---

16 Map A has a scale of 1: 200 000 and map B has a scale of 1: n.

The area of a lake on map A is 4 cm^2 while the area of the same lake on map B is 2.56 cm^2.

Find n.

Answer n = ... [3]

---

17 **(a)** Solve the inequality $\frac{3}{2} < \frac{x-3}{4} \leq \frac{9+x}{7}$,

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Answer ..... [2]

(b) and represent your answer on a number line.



[1]

---

18 E is the point $(2,-4)$ and F is the point $(-1,3)$.

(a) Find the equation of the line EF in the form $y = mx + c$.

Answer ..... [2]

(b) The line PQ has equation $2y+\frac{14}{3}x-1=0$. Explain why PQ does not intersect the line EF.

Answer

.....

.....

..... [2]

---

19 The diagram shows the speed-time graph for a car's journey when it approaches a red traffic light and then drives off when the traffic light turns green. The area beneath each speed-time graph represents the distance travelled by the car.

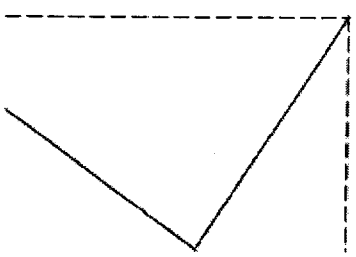
min

32

20

0

36



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km/h

V

(a) Calculate the acceleration of the car for the first 20 minutes.

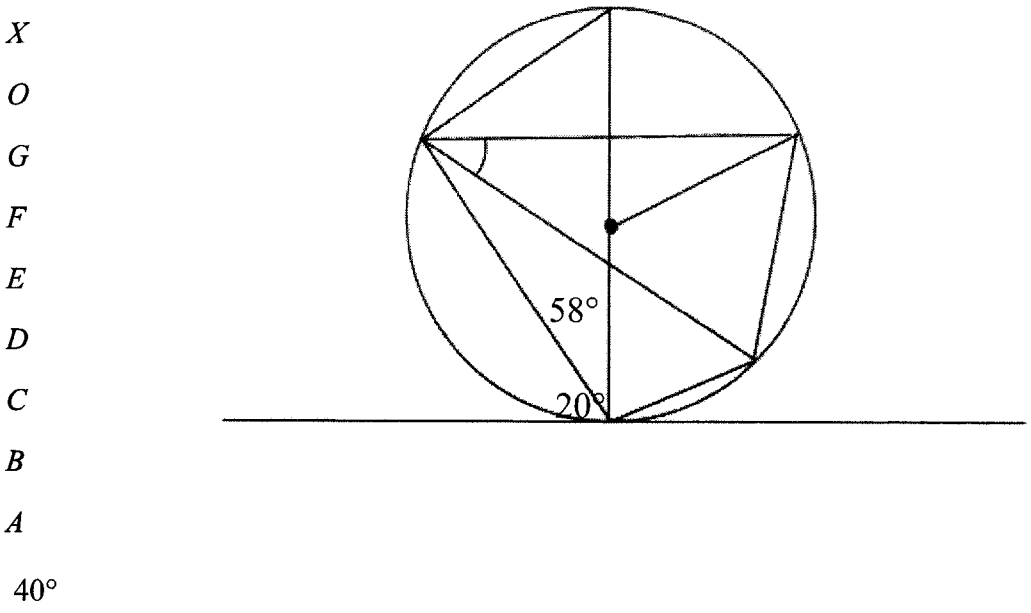
Answer ..... km/h^2 [2]

(b) Given that the distance travelled in the first 20 minutes is the same as the distance travelled between 20 minutes and 32 minutes, calculate the value of V.

Answer $V =$ ..... [2]

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20 In the diagram below, the points *A, E, C, G* and *F* lie on the circle with centre *O*.
BCD is a tangent to the circle at *C*, *AC* is the diameter, angle $GEF = 40°$, angle $EGF = 58°$ and angle $DCG = 20°$.



Find, stating your reasons clearly,

(i) angle *ACG*,

Answer ..... ° [1]

(ii) angle *AEX*,

[Turn Over

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Answer ..... ° [1]

(iii) angle FOA,

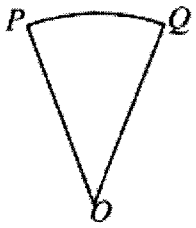
Answer ..... ° [1]

(iv) angle GCE.

Answer ..... ° [2]

---

21 The cross-section of a piece of metal in the shape of a sector of a circle with centre O and radius 20 cm is shown below. The piece of metal is 50 cm thick. The volume of the piece of metal is 2000 cm^3.



(a) Find angle POQ in radians.

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Answer ..... rad [2]

(b) The piece of metal is melted and recast into a sphere. Find the radius of this sphere.

Answer ..... cm [2]

---

22 In Bakery *A*, a chicken pie costs \$2.50, apple pie costs \$2.00 and a taro pie costs \$1.80. In Bakery *B*'s a chicken pie costs \$0.30 less, \$0.20 more for apple pie and \$0.10 more for taro pie.

This information can be represented by the matrix

(a) Peter wants to buy 5 chicken, 4 apple and 2 taro pies.
Jane wants to buy 4 chicken and 7 apple pies.
Represent their purchases in a 2×3 matrix **Y**.

Answer **Y** = [1]

(b) Evaluate the matrix **W** = **YX**.

Answer **W** = [2]

[Turn Over

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(c) What does the last column of **W** represent?

Answer

.....

.....

..... [1]

(d) Find the amount that Peter and Jane should spend in Bakery B.

Answer Peter should spend $ .....

and Jane should spend $ ..... [1]

---

23 The drawing in the answer space below shows three tents, *A*, *B* and *C* pitched at East Coast Park.

(a) Construct

(i) the perpendicular bisector of *AB*, [1]

(ii) the bisector of angle *ABC*. [1]

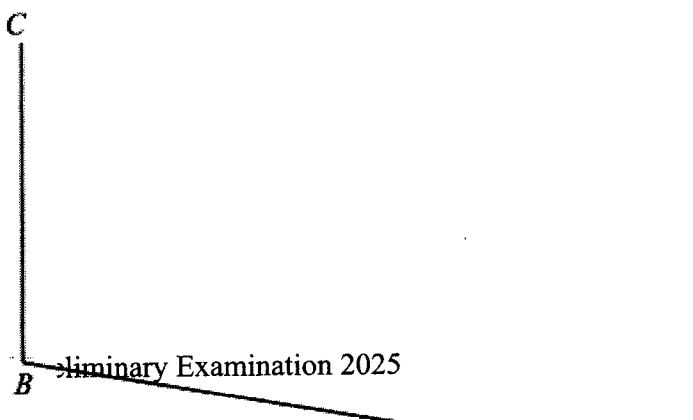
(b) A fast-food restaurant, *M*, is located equidistant from *A* and *B* as well as equidistant from *BC* and *AB*.

Mark and label *M*. [1]

(c) The toilet, *T*, is located equidistant from the 3 tents.

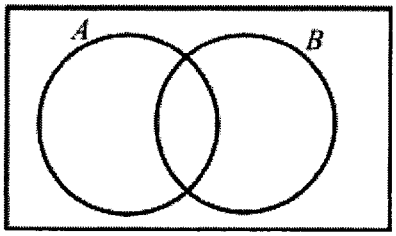
Mark and label *T*. [1]

Answer

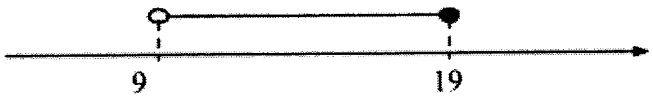


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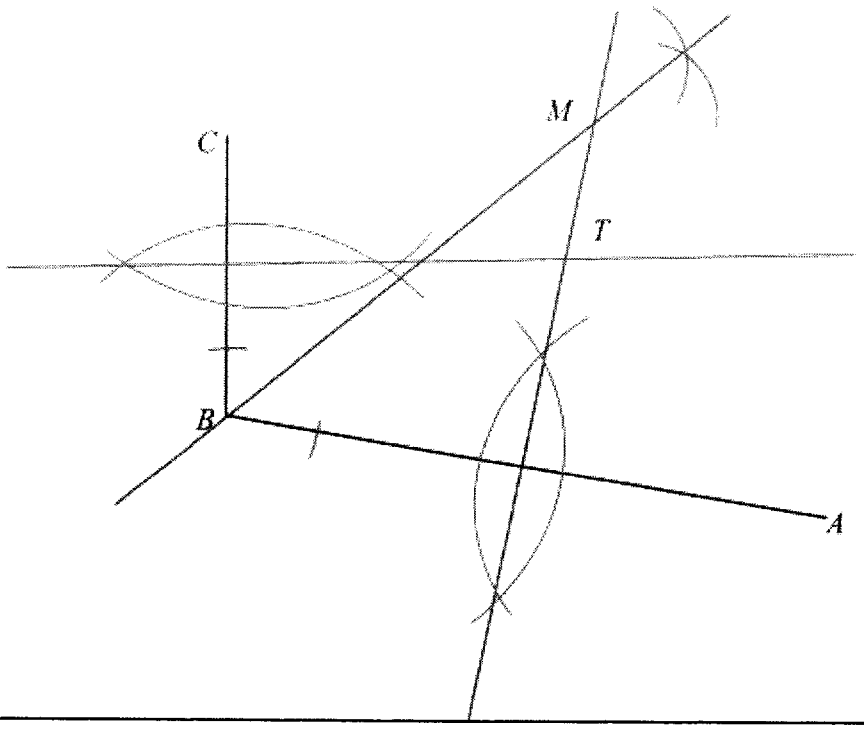
Answer Key

1	$\frac{1}{9ab^2}$	**2**	$y^2 - x + 2y$
3	$(x+2y)(a-c)$	**4a**	$x = 16$
4b	$x = 1.93$ *or* -0.260	**5**	It will take 24 s for the two lights to next flash simultaneously again.
6a	$2250 = 2 \times 3^2 \times 5^3$	**6b**	$h = 3$ and $k = 2$
6c	90 and 1125	**7**	The length of the string increased by 56.25%.
8	4.33×10^{-2} m^2		
9a			
9b	$A' \cap B$	**9c(i)**	Perfect square, square numbers
9c(ii)	7	**10**	9
11a	ΔAOB and ΔCOD		

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11b	AB is common length. ΔODC is an isosceles triangle since $DO = CO$, thus $\angle ODC = \angle OCD$. $\angle OBA = \angle ODC$ and $\angle OAB = \angle OCD$(alt $\angle$s, $DC // AB$), hence $\angle OBA = \angle OAB$ and $AO = BO$. $AC = AO + OC$ $= BO + OD$ $= BD$ Hence, by SAS property, triangle ABC and triangle BAD are congruent.		
12(i)	22.5	**12(ii)**	46
12(iii)	37	**12(iv)**	56
13a	2	**13b**	$x = 3$
14a(i)	$\cos \angle TSP = -\frac{3}{5}$	**14a(ii)**	$SR = 18$ cm
14b	$\angle BAC = 53.9°$ or $126.1°$	**15a**	$\frac{1}{2}\left(\frac{1}{n} - \frac{1}{n+1}\right)$
15b	Total energy captured after K seconds $= \frac{1}{2}\left(1-\frac{1}{2}\right) + \frac{1}{2}\left(\frac{1}{2}-\frac{1}{3}\right) + \frac{1}{2}\left(\frac{1}{3}-\frac{1}{4}\right) + \ldots + \frac{1}{2}\left(\frac{1}{K-1}-\frac{1}{K}\right) + \frac{1}{2}\left(\frac{1}{K}-\frac{1}{K+1}\right) = \frac{1}{2}\left(1-\frac{1}{K+1}\right)$		
15c	$K \geq 249$	**16**	250000
17			
18a	Equation of EF is $y = -\frac{7}{3}x + \frac{2}{3}$		
18b	Since gradient of PQ = gradient of AB, PQ and AB are parallel and will not intersect.		
19a	Acceleration $= -108$ km/hr^2	**19b**	60
20(i)	$\angle ACG = 70°$	**20(ii)**	$\angle AEX = 30°$
20(iii)	$\angle FOA = 60°$	**20(iv)**	$\angle GCE = 98°$
21a	$\angle POQ = \frac{1}{5}$ radians	**21b**	$r = 7.82$ cm
22a	$Y = \begin{matrix} \\ \textit{Peter} \\ \textit{Jane} \end{matrix} \begin{matrix} \begin{matrix} C & A & T \end{matrix} \\ \begin{pmatrix} 5 & 4 & 2 \\ 4 & 7 & 0 \end{pmatrix} \end{matrix}$	**22b**	$\begin{pmatrix} 24.1 & -0.5 \\ 24 & 0.2 \end{pmatrix}$
22c	The last column represents the **savings** for Peter and **extra cost** for Jane if they buy from **Bakery B**		
22d	Peter would spend \$23.60 buying from Bakery B.		

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	Jane would spend $24.20 buying from Bakery B.
23	

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NAME: _____ ( ) CLASS: 4 ( )

ANGLICAN HIGH SCHOOL
SECONDARY FOUR
PRELIMINARY EXAMINATIONS 2025

S4

MATHEMATICS **4052/02**
Paper 2 **25 August 2025**
2 hours 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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The total number of marks for this paper is 90.

For Examiners' Use

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Marks								
Questions	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Marks								

Table of Penalties	**Units**		
	Clarity/Logic		
	Accuracy/Precision		**90**

Parent's Name and Signature:

Date:

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

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

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

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

Arc length = $r\theta$, where θ is in radians

Sector area = $\frac{1}{2}r^2\theta$, where θ is in radians

Trigonometry

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

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

Statistics

Mean = $\frac{\Sigma fx}{\Sigma f}$

Standard deviation = $\sqrt{\frac{\Sigma fx^2}{\Sigma f}-\left(\frac{\Sigma fx}{\Sigma f}\right)^2}$

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1 Rearrange the formula to make c the subject. $D = (a-c)^2 - a^2$

Answer: $c =$ ..... [3]

---

2 **(a)** A investor deposits \$18 000 with a finance company paying compound interest on a monthly basis at 6% per annum.

Calculate the interest received at the end of 5 years, correct to 2 decimal places.

Answer: \$..... [2]

(b) The price of a washing machine is \$900 before discount.
After selling the machine at a 20% discount, the seller still makes a profit of 25%.

Calculate the cost price of the washing machine.

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Answer: $..... [3]

(c) The price of a gaming laptop is $2 999. John buys this laptop on hire purchase after putting a down payment of $600. For the remaining amount of the laptop, John has to pay the seller a monthly instalment of $120 over 2 years.

Calculate the interest rate charged by the seller.

Answer: .....% [3]

---

3 Write as a single fraction in its simplest form $\frac{2}{9x^2-1}+\frac{1}{1-3x}$.

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Answer: ..... [3]

---

4 **(a)** Express $-x^2+4x-3$ in the form $a(x+b)^2+c$.

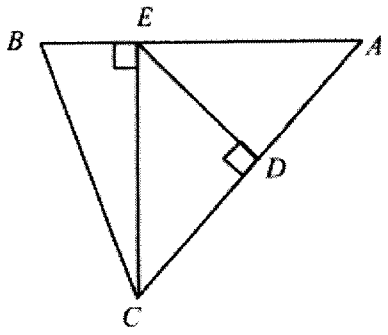
Answer: ..... [2]

(b) Hence, write down the coordinates of the turning point of the graph $-x^2+4x-3$.

Answer: ..... [1]

---

5 In triangle ABC, angle CDE and angle CEB are right angles.
$DE = 2.5$ cm, $CD = 5$ cm, $AE = x$ cm and $CE = y$ cm.



(a) **(i)** Show that ΔECD and ΔACE are similar.

Answer

.....

.....

..... [1]

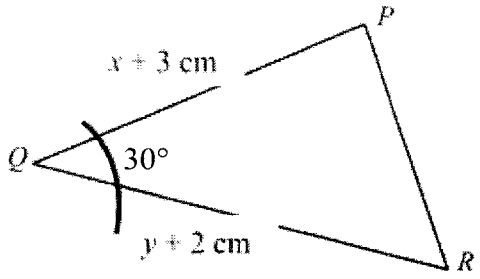
(ii) Express y in terms of x.

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Answer: ..... [1]

(b) **(i)** In triangle PQR, angle $PQR = 30°$, $PQ = x + 3$ cm and $QR = y + 2$ cm.

Express the area of triangle PQR in terms of x and y.



Answer: Area of triangle PQR = ...cm^2 [1]

(ii) The area of triangle PQR is $17\frac{1}{2}$ cm^2.

Using your answer in **a(ii)** and **b(i)**, find the value of x and of y.

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Answer $x =$.....

$y =$..... [3]

---

6 In the Singapore F1 Grand Prix, the drivers must complete 62 laps around a circuit that is 4.940 km long.
One F1 driver completed 32 laps in 65 minutes.

What must be the minimum average speed, in km/h, for the remaining laps if he wants to complete the race in at most two hours?

Answer: .....km/h [3]

---

7 The position vector of point C is $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$. The position vector of point D is $\begin{pmatrix} 4 \\ h \end{pmatrix}$. $|\overrightarrow{CD}| = \sqrt{20}$.

Find the two possible values of h.

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Answer h =.....or ..... [3]

8 There are 180 oranges in a box.
The table shows the distribution of the masses of these oranges.

Mass (m g)	$90 < m \leq 100$	$100 < m \leq 110$	$110 < m \leq 120$	$120 < m \leq 130$	$130 < m \leq 140$
Frequency	10	28	51	45	48

(a) Calculate an estimate of the standard deviation of the masses.

Answer: .....g [1]

(b) The weighing machine was faulty and overestimated each of the oranges by 5g.

Explain, with a reason, what will happen to the standard deviation.

.....

.....

..... [2]

(c) Explain why the range of the masses of oranges may not be 50g.

.....

..... [1]

(d) Roy says, "The modal class is the interval $110 < m \leq 120$ but the modal mass may not be in the interval $110 < m \leq 120$." Is he correct? Give a reason for your answer.

.....

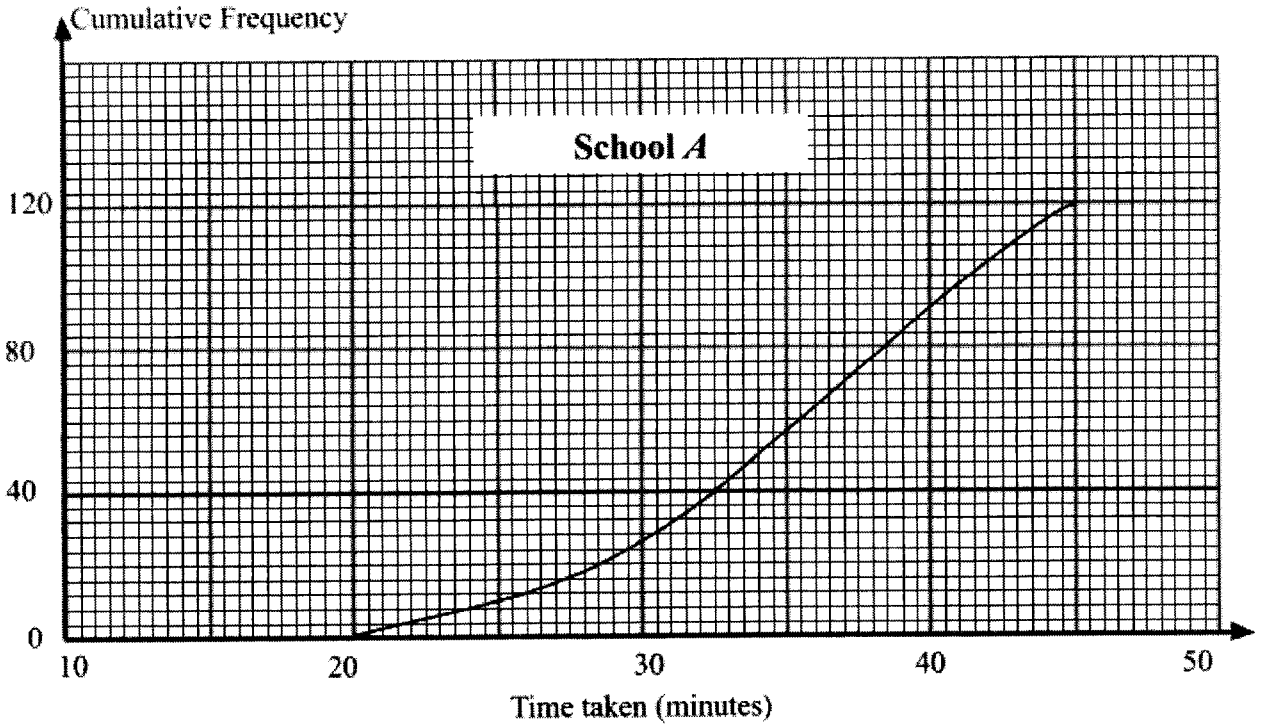
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..... [2]

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9 The time taken by 120 students to travel to school *A* was recorded.
The cumulative frequency curve below shows the distribution of their commute times.

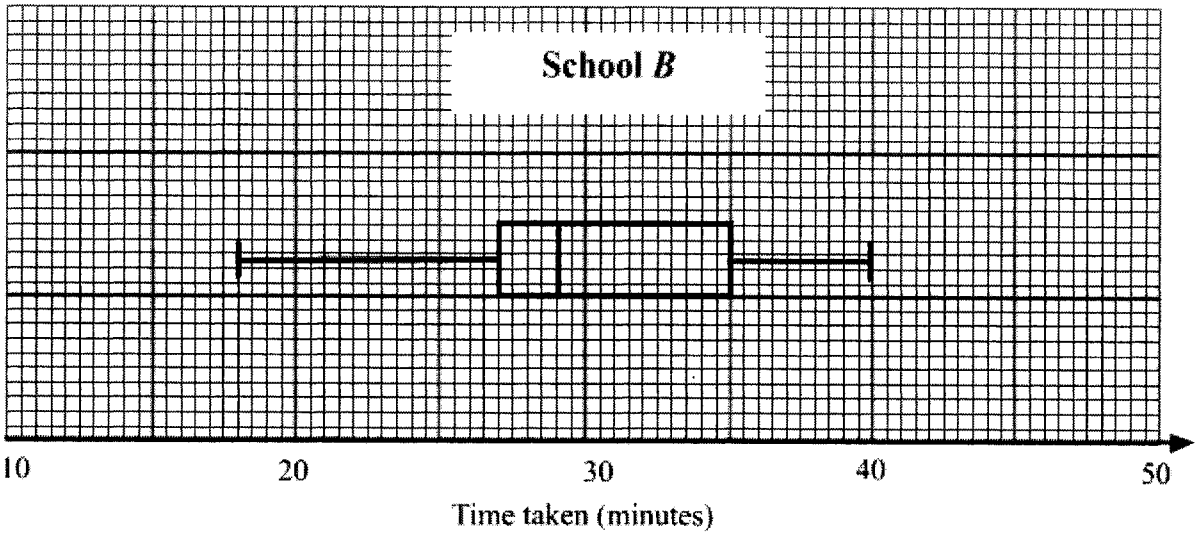


(a) Calculate the percentage of students who took at least 35 minutes to reach school.

Answer: .....% [1]

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The commute times of another group of 120 students from school *B* were recorded.
The box-and-whisker plot below shows the distribution of their travel times.



(b) Mr Chan claims that in school B, there are twice as many students who take less than 27 minutes, than those who take more than 35 minutes.

Comment, with reasons on whether the data supports the claim.

.....

.....

..... [2]

(c) Give two comments comparing the commute times of the two groups of students.

1.....

.....

.....

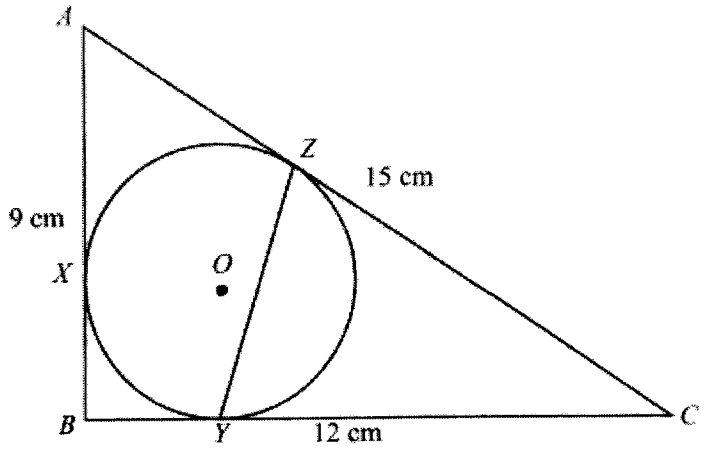
2.....

.....

..... [2]

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10 In the diagram, triangle ABC is a right-angled triangle.
$AB = 9$ cm, $BC = 12$ cm and $AC = 15$ cm.
A circle with centre O and radius 3 cm is inscribed inside triangle ABC.
The circle touches the sides of the circle at X, Y and Z respectively.



(a) Show that the obtuse angle $YOZ = 2.50$ radians, correct to 3 significant figures.

Answer

[2]

(b) Find the perimeter of the major segment YXZ.

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Answer: .....cm [4]

11 A group of N children are at school celebrating National Day.
The children come in either red or white T-shirts.
Three girls from the group wore white T-shirts.

(a) Two children are selected at random from the group.

The probability that both are girls wearing white T-shirts is $\frac{1}{70}$.

Find N.

Answer: $N =$ ..... [2]

(b) One child is selected at random.

The probability that it is a girl wearing a red T-shirt is $\frac{3}{7}$.
Three children are chosen at random.
The probability that one is a boy wearing a white T-shirt and two are girls wearing red T-shirts is $\frac{108}{665}$.

Find the value of a, of b and of c as shown in the table of information about the group of children.

	White T-shirts	Red T-shirts
Boys	a	b
Girls	3	c

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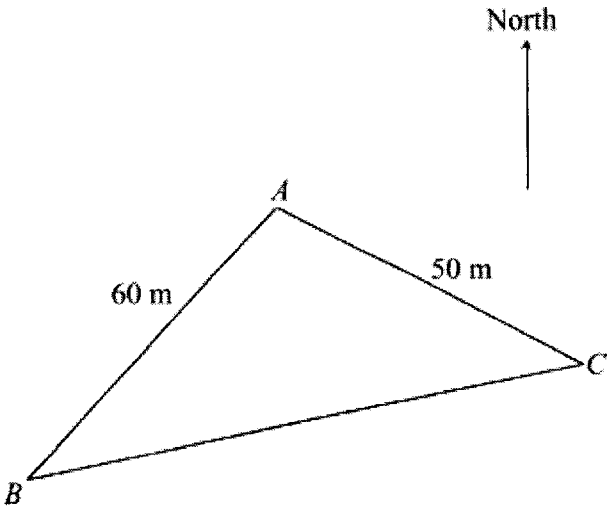
Answer: a = ...

b = ...

c = ...[3]

---

12 The diagram shows three points A, B and C on horizontal ground.
A is at a bearing of 040° from B and C is at a bearing of 125° from A.
AB = 60 m and AC = 50 m.



(a) Find

(i) the bearing of B from A,

Answer: .....° [1]

(ii) the area of triangle ABC,

Answer: .....m^2 [2]

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(iii) the distance BC,

Answer: .....m [2]

(iv) angle ACB,

Answer: .....° [2]

(v) the shortest distance AX, where X is a point along BC.

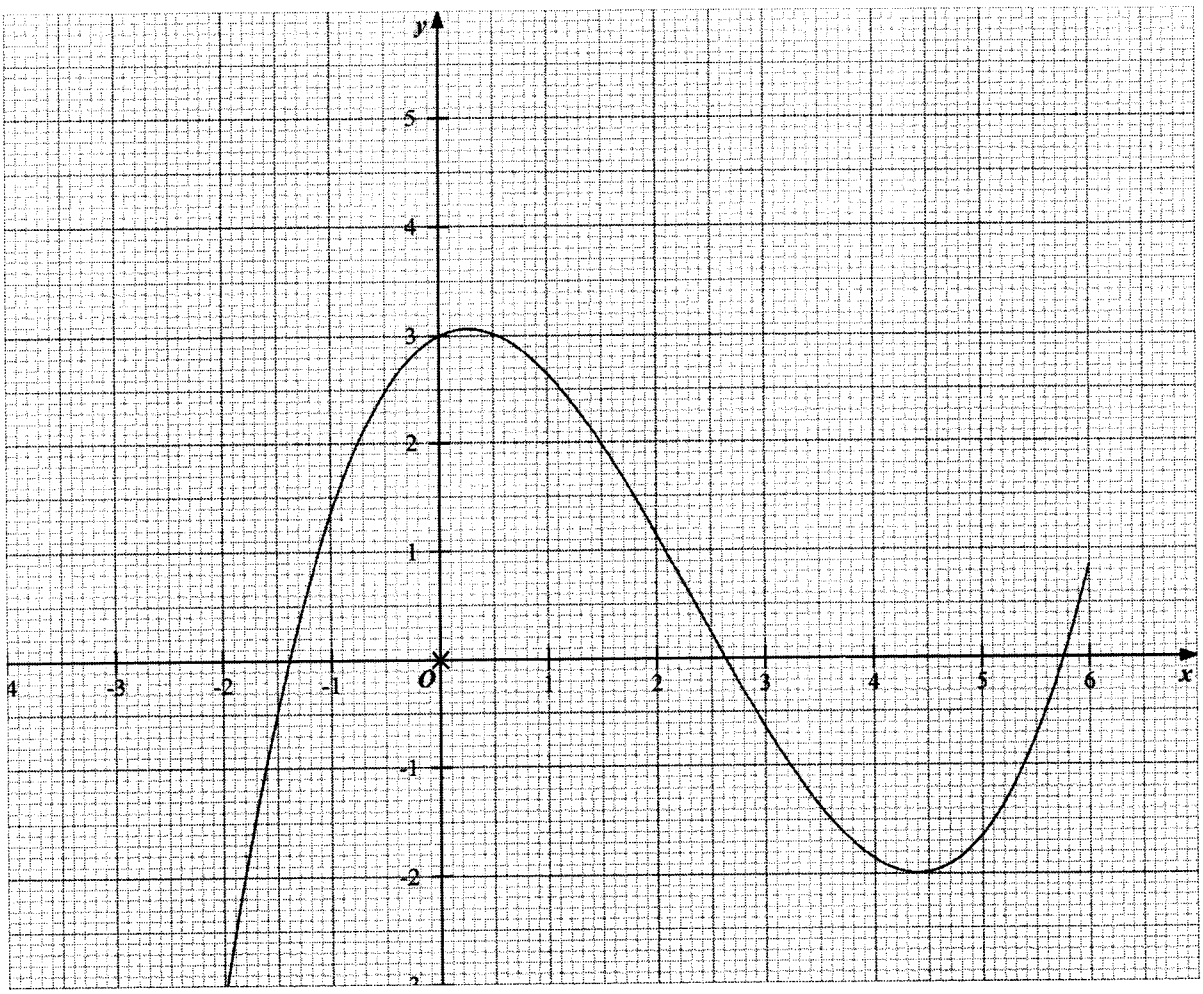
Answer: .....m [2]

(b) Point A is the base of a vertical mast AT. The angle of depression of C from the T is 33°. Find the greatest angle of elevation of T from a point along BC.

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Answer: .....° [3]

13 The graph of $y = \frac{1}{7}x^3 - x^2 + \frac{1}{2}x + 3$ is drawn on the grid.



Using your graph,

(a) write down the range of values of x such that $y \geq 2$.

Answer: ..... [1]

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(b) find the gradient of the tangent to the curve where $x = -0.5$.

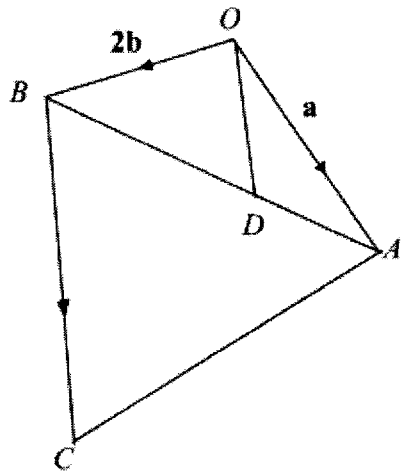
Answer: ..... [2]

(c) by drawing a suitable straight line on the grid, solve the equation $6x^3 - 42x^2 + 126 = 21x$.

Answer: ..... [3]

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14



OACB is a quadrilateral.

$\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OB} = 2\mathbf{b}$ and $\overrightarrow{BC} = 2\mathbf{a} + 2\mathbf{b}$. $BD : DA = 2 : 1$.

(a) Write each of the following in terms of **a** and **b**,

(i) $\overrightarrow{AB}$,

Answer: .....[1]

(ii) $\overrightarrow{CA}$,

Answer: .....[1]

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(iii) $\overrightarrow{DO}$.

Answer: .....[1]

(b) Explain why $\overrightarrow{DO}$ is parallel to $\overrightarrow{BC}$.

.....

..... [1]

(c) Show that the area of $\frac{\text{Area of triangle } OBD}{\text{Area of triangle } BCD} = \frac{1}{3}$.

Answer

[1]

(d) Find

(i) $\frac{\text{Area of triangle } BCD}{\text{Area of triangle } CAD}$,

Answer: .....[1]

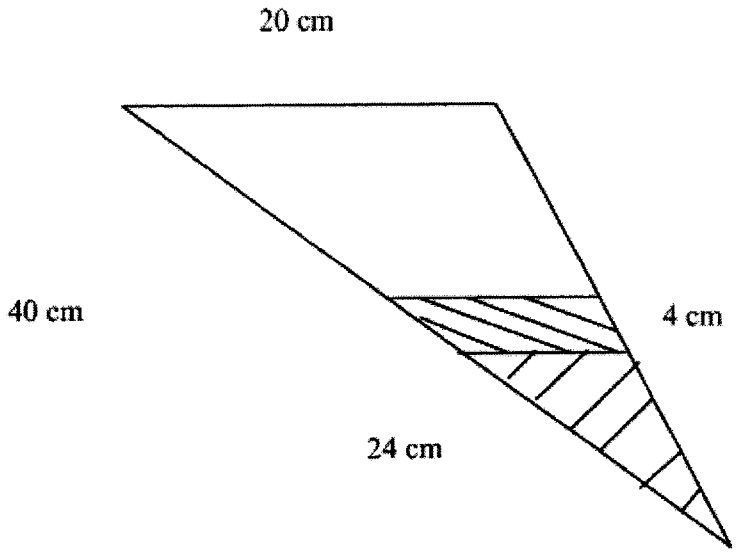
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(ii) $\dfrac{\text{Area of triangle } OBD}{\text{Area of triangle } CAD}$.

Answer: .....[1]

---

15 The diagram shows a container with diameter 20 cm and height 40 cm.
It contains water to a height of 24 cm from the vertex of the container.
A layer of oil of height 4 cm floats on the water surface.



(a) Calculate the diameter of the water in the container.

Answer: .....cm [1]

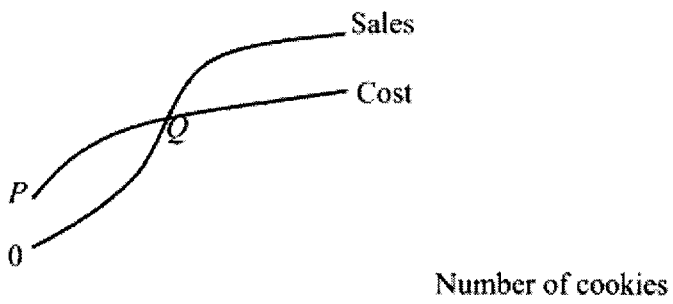
(b) The curved surface area of the container is 150 cm^2.

Calculate the curved surface of the container in contact with the oil.

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Answer: .....cm^2 [3]

16 The graph below shows the monthly cost and total sales of cookies by Mrs Tan.



(a) Explain what does point *P* represent.

.....

.....

.....[1]

(b) Explain what does point *Q* represent.

.....

.....

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.....[1]

Mrs Tan bought 3 ovens costing $10 950 that will be fully depreciated (means reduced to $0) in 2 years.

Each oven is to be used to bake large, medium and small cookies respectively.
Each large, medium and small circular cookie has a thickness of 0.4 cm and measures 6 cm, 4 cm and 3 cm in diameter respectively.

Selling price for each large cookie is $1, medium cookie is $0.80 and small cookie is $0.50.
Order for each type of cookies must be in multiples of 20.

On a particular day, she receives orders from 18 locations amounting to a total of 160 large, 100 medium and 140 small pieces of cookies. The cost of delivery to each location is $3.50.

The table below shows the cost of producing and packing the cookies on a particular day.

- Electricity and water usage : $6.
- Depreciation of oven : $15.
- Cost of delivery.
- Cost of materials.
- Cost of packaging.

The cost of materials are shown in the table below.

Each piece of	**Cost of material**
Large cookie	20 cents
Medium cookie	15 cents
Small cookie	11 cents

Mrs Tan wants to pack exactly 20 cookies in each container. The table below shows the dimensions and cost of the different types of containers from a supplier for her to select.

Dimensions of circular containers available		**Cost of each circular container**
Diameter (cm)	**Height (cm)**	
7	10	$0.60
6	7	$0.50
5	10	$0.40
4	7	$0.30

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(c) By taking 1 year to be 365 days, show that the depreciation cost of the 3 ovens per day is $15.

Answer

[1]

(d) Calculate Mrs Tan's profit from the sales of cookies on this particular day.

Answer

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[6]

(e) Without raising the price of the large, medium and small cookies, suggest a way to help Mrs Tan increase the profit margin.

Answer:

.....

.....[1]

End of Paper

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