Candidate Name	Form Class	Index Number

ANG MO KIO SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2023
SECONDARY FOUR NORMAL ACADEMIC

MATHEMATICS SYLLABUS A **4045/01**
Paper 1 **02 August 2023**
2 hours

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your class, index number and name on all the work you hand in.
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** 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 the marks for this paper is 70.

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.

For Examiner's Use
70

This document consists of **16** printed pages.

Mathematical Formulae

Compound interest

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

Mensuration

Curve surface area of a cone = πrl

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

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

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

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

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

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

Trigonometry

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

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

Statistics

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

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

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

$$73\% \qquad \frac{3}{7} \qquad \frac{\sqrt{3}}{2} \qquad \frac{\pi}{3} \qquad 0.63$$

Answer ....., ..., ..., ..., ... [2]
largest

---

2 Calculate $\dfrac{309.6^3}{18.57 - 6.43}$.

(a) Write your answer correct to 4 significant figures.

Answer ..... [1]

(b) Write your answer to **part (a)** in standard form.

Answer ..... [1]

---

3 The result obtained from an experiment was 9.5036 m/s.
How many significant figures did a student correct the result to if he reported it as 9.50 m/s?

Answer ..... [1]

---

4 $\dfrac{p}{x^2-25}+\dfrac{q}{x+5}=\dfrac{7x-33}{x^2-25}$

Find p and q.

Answer $p =$ .....

$q =$ ..... [3]

---

5 $x^2+10x-5=(x+a)^2+b$

(a) Find a and b.

Answer $a =$ .....

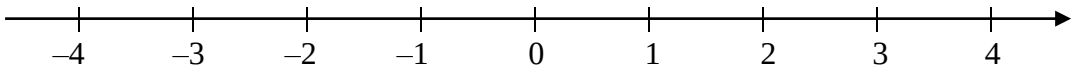
$b =$ ..... [2]

(b) Hence solve $x^2+10x-5=0$, give your answer correct to 2 decimal places.

Answer $x =$ ..... or ..... [2]

---

6 **(a)** Represent $-3 \leq x < 4$ on the number line.



[1]

(b) Find the smallest integer value of y satisfying $-3y + 1 < 15$.

Answer ..... [2]

---

7 The quantities x and y are in the ratio $9 : 4$.
The quantities y and z are in the ratio $12 : 7$

Write down the ratio $x : y : z$ in its simplest form.

Answer ..... : ..... : ..... [2]

---

8 **(a)** Find the lowest common multiple (LCM) of 168 and 540.

Answer ..... [2]

(b) Find the smallest positive integer value of a such that $540a$ is a perfect cube.

Answer $a =$ ..... [1]

---

9 y is inversely proportional to the cube of x.

Given that $y = 3$ when $x = 2$, find y when $x = 4$.

Answer $y =$ ..... [2]

---

10 The first five terms of a sequence are 1, – 4 , – 9, – 14, – 19.

(a) Write down the next two terms of the sequence.

Answer ..... , ... [1]

(b) Find an expression, in terms of n , for the nth term of the sequence.

Answer ..... [1]

(c) Is – 110 a term of this sequence? Explain you answer.

Answer .....

..... [1]

---

11 The stem-and-leaf diagram shows the score of students for the examination.

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

Key		
2	1	represents 21 marks

(a) What is the highest score?

Answer ..... [1]

(b) Find the median score.

Answer ..... [1]

(c) Find the modal score.

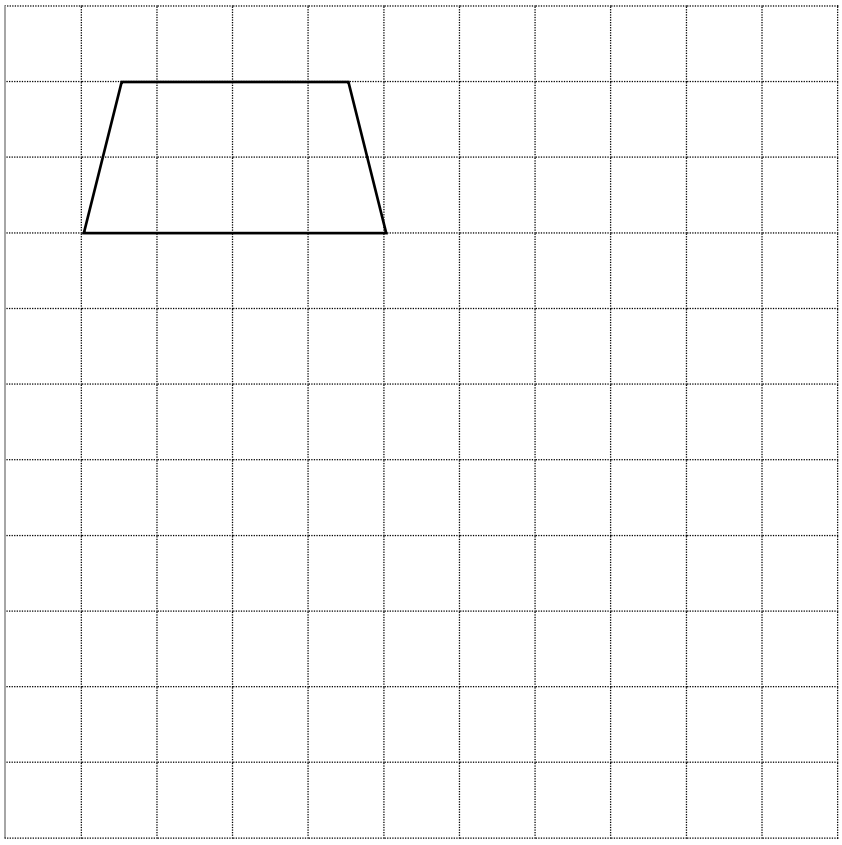
Answer ..... [1]

(d) Student *A* told his friends that 35% of the students failed the examination.
Given that the passing mark was 53, is Student *A*'s statement correct?
Give a reason for your answer.

Answer .....

..... [1]

12 In the grid below, draw an enlargement of the given figure using a scale factor of 2. [2]



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13 $u = \sqrt{v^2 - 2t}$

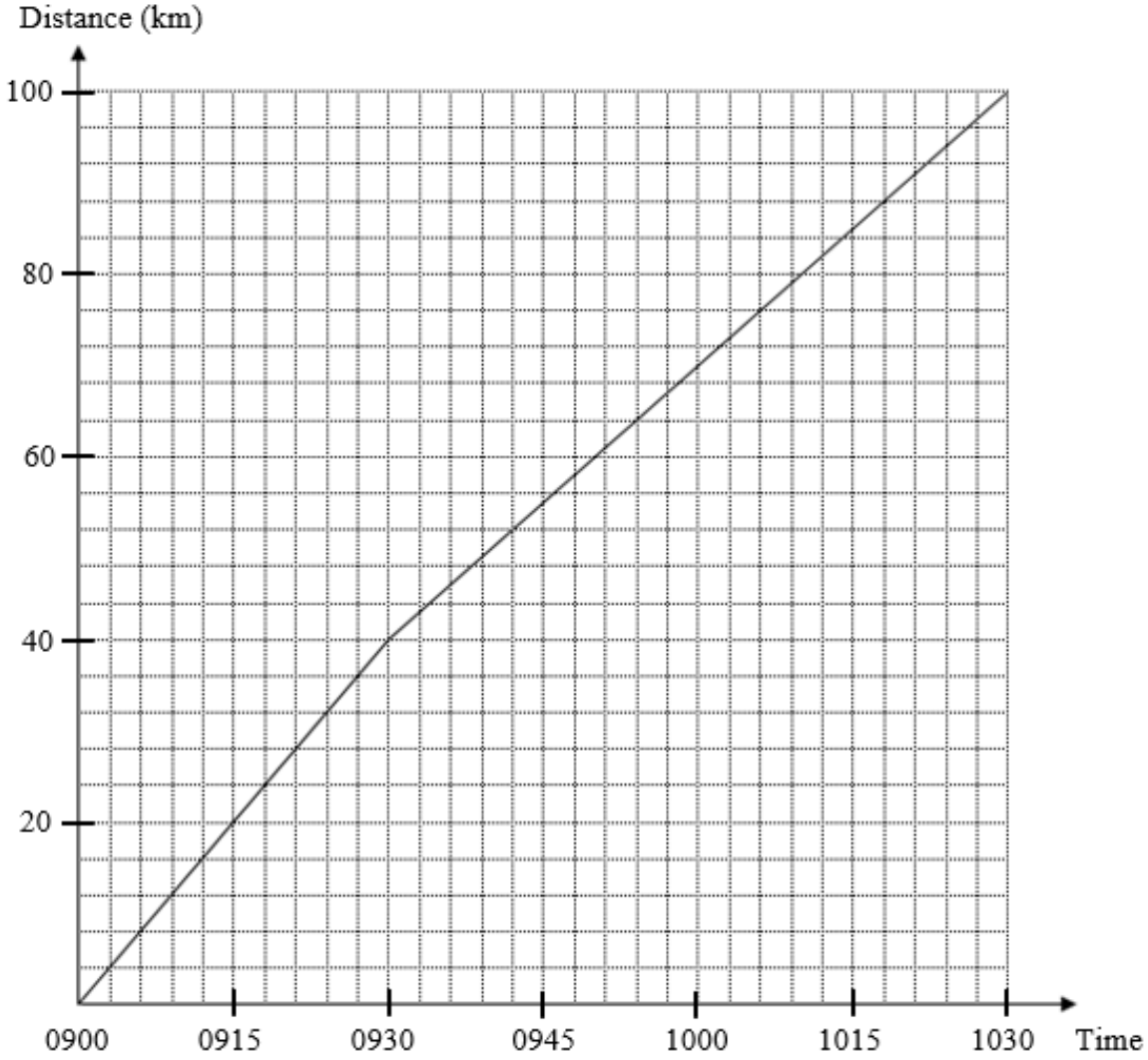
(a) Find the value of u when $v = 4$ and $t = -10$.

Answer $u =$ ..... [1]

(b) Rearrange the formula to make t the subject.

Answer $t =$ ..... [2]

14 The diagram shows the distance-time graph of a vehicle.



(a) How far did the vehicle travel for the first half an hour?

Answer ..... km [1]

(b) At what interval did the vehicle move at a slower average speed? Explain your answer.

Answer .....

..... [1]

(c) Calculate the average speed of its whole journey.

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

15 Regina did a survey and recorded the following information.

Type of food ordered via delivery platform	**% of participants in survey**
Hawker Food	48%
Restaurant	8%
Fast Food	35%
Others	9%

(a) Explain why is it not possible to calculate the number of participants who ordered food from restaurant.

Answer .....

..... [1]

(b) Find the angle of the sector representing the participants who ordered fast food if she wants to present her results in a pie chart.

Answer ..... [2]

16 **(a)** Mrs Tan exchanges 500 dollars ($) for 53 250 Japanese Yen (JPY).
Complete the exchange rate.

Answer $1 = ... JPY [1]

(b) $1 AUD = $0.90
$1 = €0.68

A wallet costs $1080 AUD in Australia.
An identical wallet costs €620 in Spain.

Mr Tan has an Australian friend and a Spanish friend visiting him this month.

Mr Tan thinks that it is cheaper to ask his Spanish friend to buy the wallet.
Do you agree? Explain your answer.

Answer

[3]

17 One of the angles of a triangle measures $x°$.
Given that $\sin x = 0.723$, find the two possible values of $x°$.

Answer $x =$ ..... or ..... [2]

---

18 **(a)** Simplify $\frac{3xy^3}{10} \div \left(\frac{-2y}{5x}\right)^2$.

Answer ..... [2]

(b) Expand and simplify $-2(3x+7)^2$.

Answer ..... [2]

(c) Factorise $2x^2 - 5x - 12$.

Answer ..... [1]

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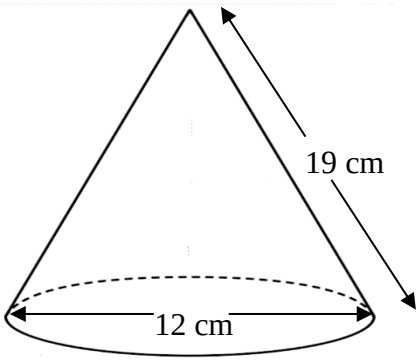
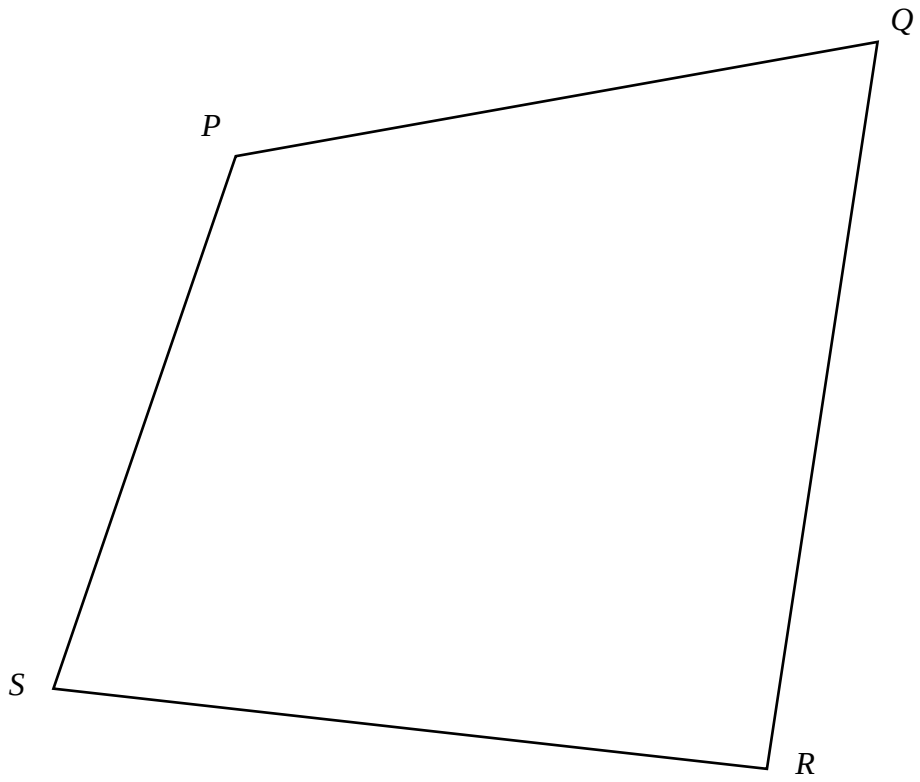
19 A solid cone has a circular base of diameter 12 cm and a slant height of 19 cm.
Calculate its total surface area.



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

20 X is the intersection of the angle bisector of angle QRS and the perpendicular bisector of PS.

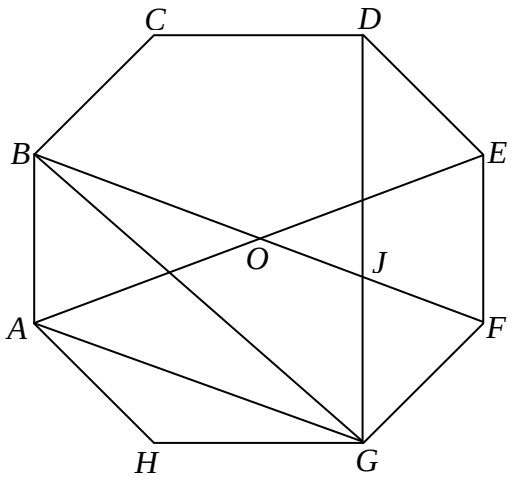


(a) By using constructions, find and label X. [3]

(b) Measure the shortest possible distance of X from a vertex.

Answer ..... cm [1]

21 The diagram shows a regular octagon *ABCDEFGH*. The line *DG* cuts the line *BF* at *J*.



(a) Find

(i) angle *BCD*,

Answer Angle *BCD* = ... [2]

(ii) angle *BOA*,

Answer Angle *BOA* = ... [2]

(iii) angle *BAG*.

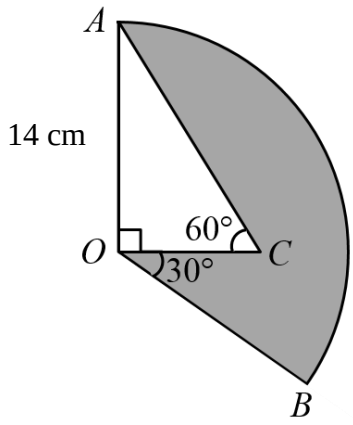
Answer Angle *BAG* = ... [2]

(b) Write down the name of the special quadrilateral *BAGJ*.

Answer ..... [1]

22 *AOB* is a sector of a circle, centre *O*, of radius 14 cm.
AOC is a right-angled triangle. Angle *ACO* = 60° and angle *BOC* = 30°.

Find the area of the shaded region.



Answer ..... cm^2 [4]

END OF PAPER

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ANG MO KIO SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2023
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MATHEMATICS SYLLABUS A **4045/02**
Paper 2 **03 August 2023**
2 hours

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Section A
Answer **all** questions.

Section B
Answer **one** question.

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[Turn Over

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

Section A (62 marks)

Answer **all** the questions in this section.

1 At the beginning of 2022, Hannah found a job as a temporary clerk and was paid a basic wage of $342 for a 36-hour week.

(a) Calculate the basic hourly rate of pay.

Answer $ ..... [1]

(b) For working overtime (above the 36 hours), Hannah would be paid one and a half times the basic hourly rate per hour for the first 10 hours and double the basic hourly rate for the remaining hours.

(i) Calculate Hannah's total wage for a week in which she worked 48 hours.

Answer $ ..... [2]

(ii) In a certain week, Hannah's total wage was $636.50, calculate the number of hours she worked during the week.

Answer ..... hours [2]

2 The petrol consumption of a car is shown in the table below.

Type of road	**Petrol used per 100 km**
Main roads	9.2 litres
Other roads	8.0 litres

(a) How much petrol is used on a journey of 350 km on a main road?

Answer ..... *litres* [2]

(b) On other roads, how far can the car travel on 44 litres of petrol?

Answer ..... km [2]

(c) A journey consists of 200 km on a main road and 160 km on other roads. Find the average amount of petrol used per kilometre of this journey.

Answer ..... *litres* [2]

3 **(a)** The scale of a map is 1 : 200 000.

(i) If a road has a length of 5 cm on the map, find its actual length in km.

Answer ..... km [1]

(ii) If a plot of land has an area of 3 cm^2 on the map, find its actual area in km^2.

Answer ..... km^2 [2]

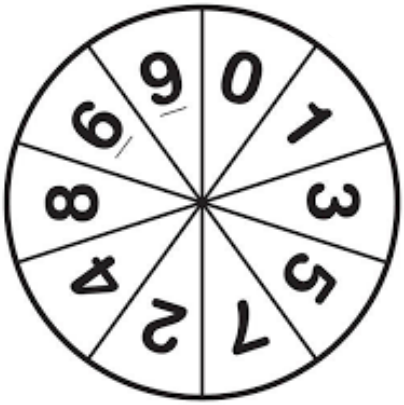
(iii) If the actual area of a lake is 18 000 000 m^2, calculate its area, in cm^2, on the map.

Answer ..... cm^2 [2]

(b) Mr Tan signed up for a 10 years savings plan of $50000 with a compound interest of 5% per annum. Calculate the amount of interest he would receive at the end of the savings plan. Give your answer correct to the nearest cent.

Answer $ ..... [3]

4 **(a)** The spinner in the diagram has an equal chance of landing on each of the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.



Find the probability that the spinner lands on

(i) 11,

Answer ..... [1]

(ii) a prime number,

Answer ..... [1]

(iii) a number more than 3.

Answer ..... [1]

(b) A man took 5 hours 49 minutes to drive from Nara to Tokyo.

(i) He arrived at Tokyo at 14 15. At what time did he start his journey?

Answer ..... [1]

(ii) The distance from Nara to Tokyo is 484 km.
Find the average speed of the journey in metres per second.

Answer ..... m/s [3]

5 **(a)** Factorise

(i) $x^2 - 81y^2$,

Answer ..... [1]

(ii) $10px - 15qx + 6py - 9qy$.

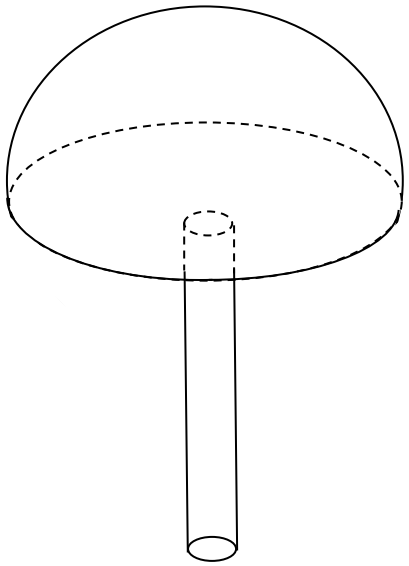
Answer ..... [2]

(b) Solve $\frac{3}{x-2} - \frac{5}{2x+1} = 1$.

You must show all your working.

Answer $x =$ ..... or ..... [5]

6 A mushroom-shaped shelter, fixed onto the ground, is made by joining a solid hemisphere of radius 3 m to a circular pole of radius 0.25 m and height 2 m, as shown in the diagram below.



(a) The solid hemisphere is filled with insulation materials.
Calculate the volume of hemisphere.

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

(b) A painter is hired to paint the exposed area of the mushroom-shaped shelter. The painter thinks that he only requires 8 litres of paint to paint the shelter. Do you agree with him? Show your workings clearly.

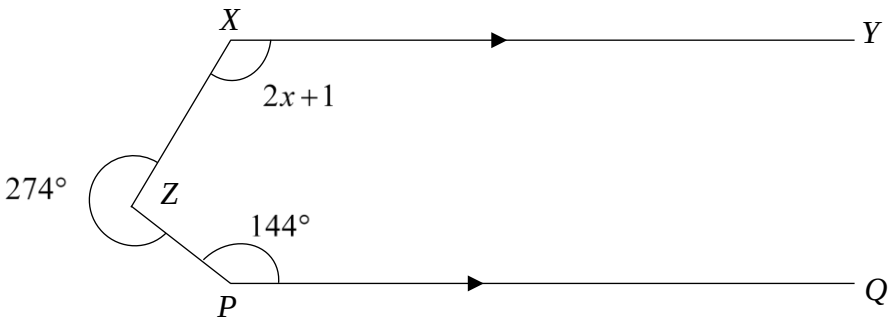
A litre of paint generally covers 10m².

Answer 1 agree / disagree with him because .....

.....

..... [5]

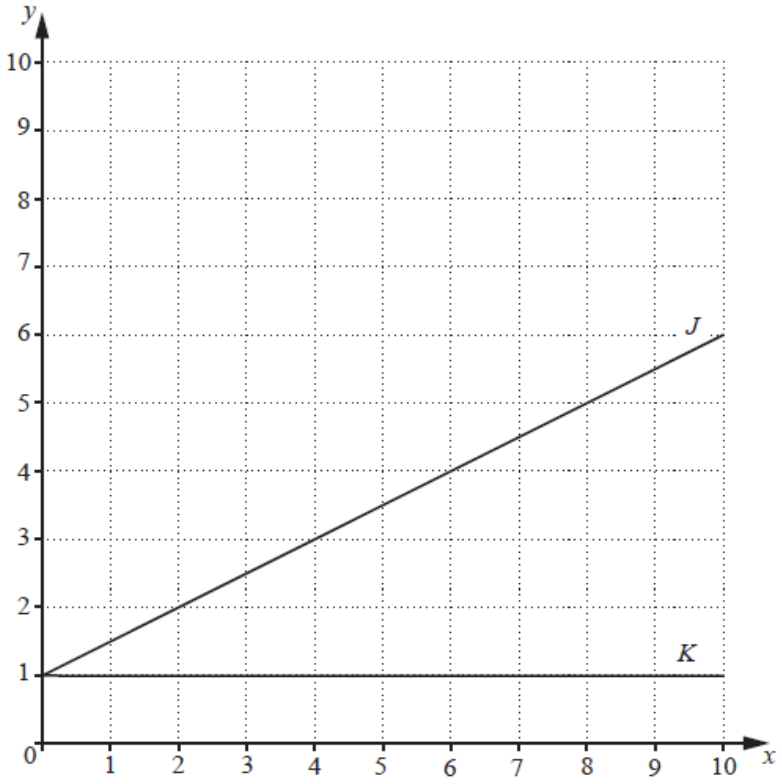
7 In the diagram, XY is parallel to PQ.



Calculate the value of x in the diagram.

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

8 Line K and line J are shown in the grid below.



(a) Write down the equation of line K.

Answer ..... [1]

(b) **(i)** Find the gradient of line J.

Answer ..... [1]

(ii) Find the equation of line J.

Answer ..... [1]

(c) Draw another line L such that it passes through (6, 1) and the area enclosed between J, K and L is 15 cm^2. [2]

9 **(a)** Complete the table of values for $y = \frac{x^2}{3} + \frac{3}{x} - 6$.

x	1	2	3	4	5	6	7
y	–2.7	–3.2		0.1	2.9		10.8

[2]

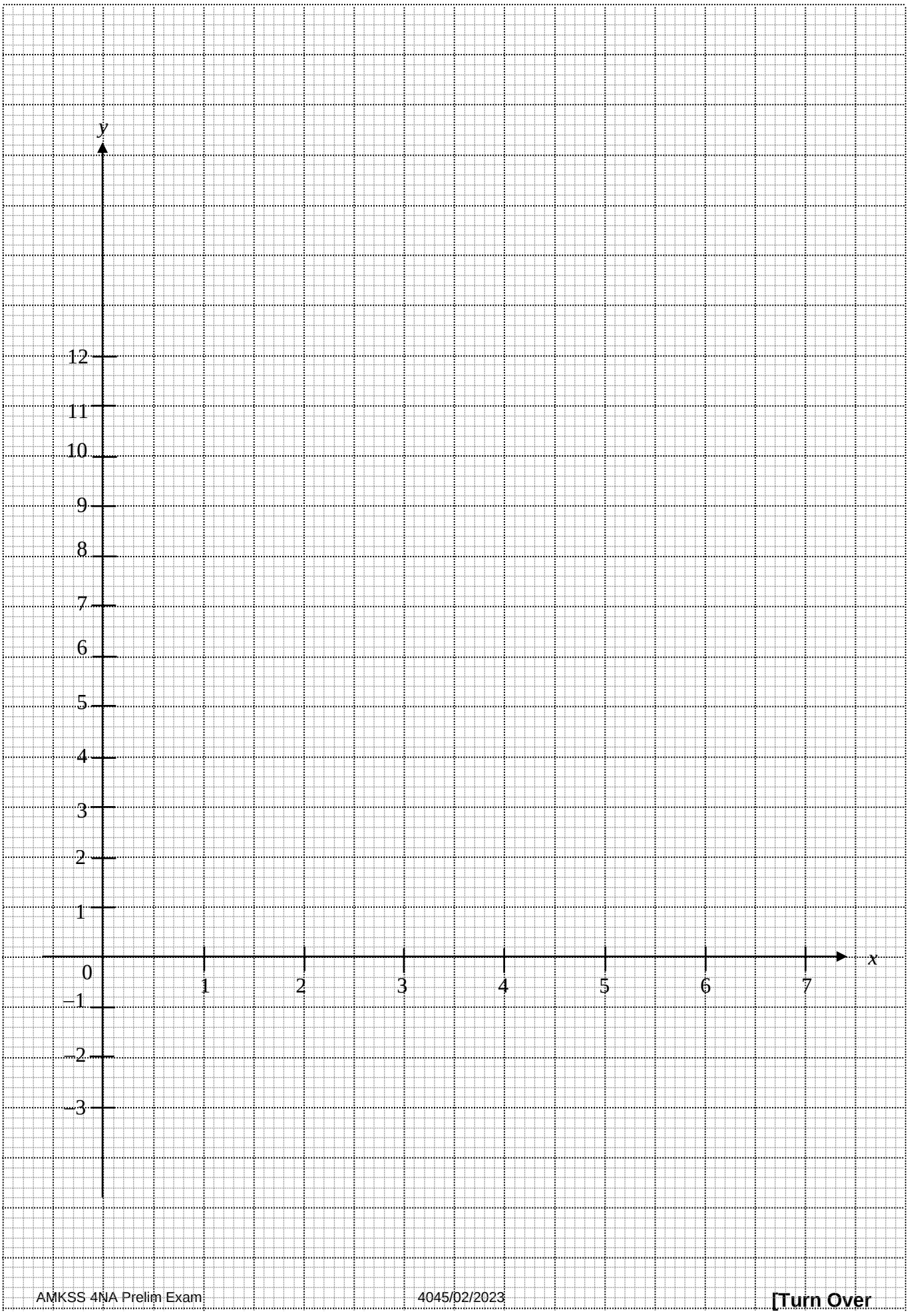
(b) On the grid on the next page, plot the graph for $y = \frac{x^2}{3} + \frac{3}{x} - 6$ for $1 \le x \le 7$. [3]

(c) Use your graph to solve the equation $\frac{x^2}{3} + \frac{3}{x} - 6 = 2$ for $1 \le x \le 7$.

Answer $x =$ ..... [2]

(d) By drawing a tangent, find the gradient of the graph at the point where $x = 3.5$.

Answer ..... [2]


y
12
11
10
9
8
7
6
5
4
3
2
1
0
–1
–2
–3
1
2
3
4
5
6
7
x

10

Ultra Short Throw Projector
4K UHD HDR
Promotion Price: **$4990**
Hire Purchase available

Robbie wants to buy the projector on hire purchase.
He pays a deposit of 20% and a monthly instalment of $212 for 24 months.
Find the extra amount Robbie has to pay as a percentage of the cash price.

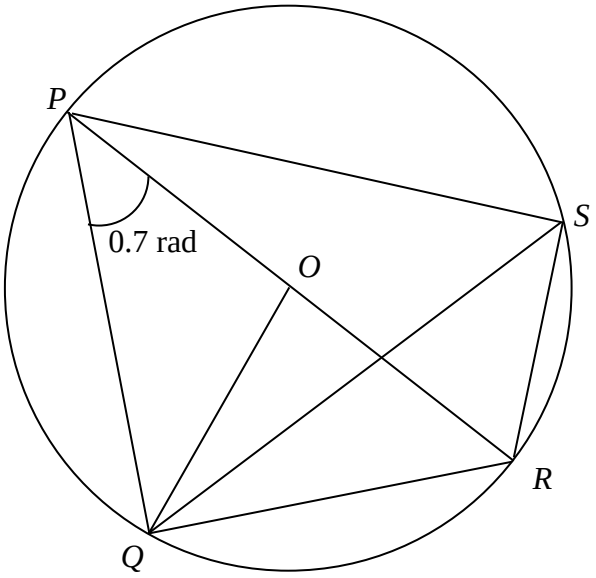
Answer ..... % [4]

TURN OVER FOR QUESTION 11

Section B (8 marks)

Answer one question from this section. Each question carries 8 marks.

11



In the figure above, PR is a diameter of the circle whose centre is O.
$\angle QPR = 0.7$ **radians**.

(a) Giving your answer in radians, find

(i) $\angle QSR$,

Answer $\angle QSR =$ ..... *Reason* ..... [2]

(ii) $\angle QOR$.

Answer $\angle QOR =$ ..... *Reason* ..... [2]

(b) The radius of the circle is 6 cm,

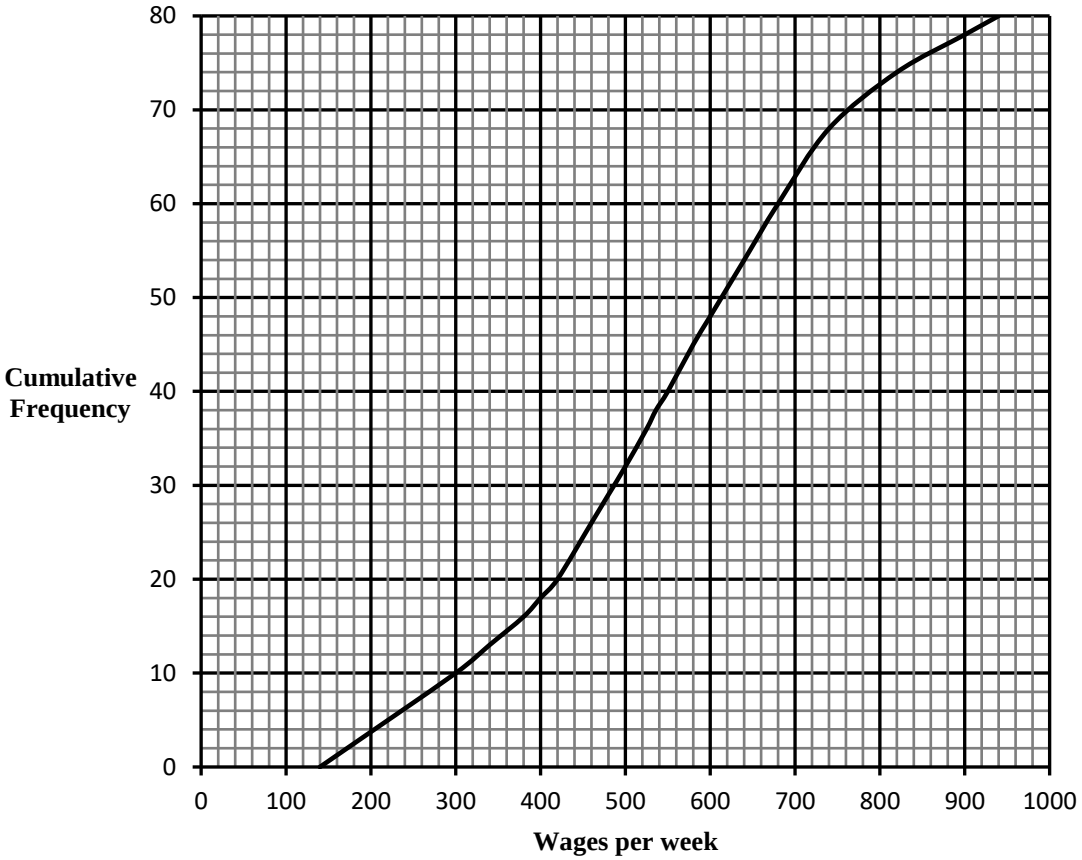
(i) find the area of the minor sector QOR,

Answer ..... cm^2 [2]

(ii) find the area of triangle PQR, given that $PQ = 10.76$ cm.

Answer ..... cm^2 [2]

12 The cumulative frequency graph shows the wages per week of 80 workers in Factory *A*.



(a) Use the graph to find

(i) the number of workers who earn more than \$460 a week,

Answer ..... workers [1]

(ii) the median wage,

Answer \$ ..... [1]

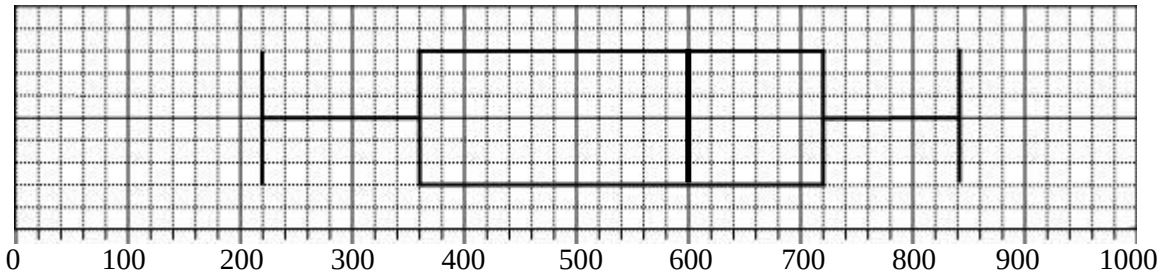
(iii) the interquartile range.

Answer \$ ..... [2]

(b) Two workers are selected at random. Find the probability that one earns less than \$300 and the other earns at least \$640.

Answer ..... [2]

(c) The box-and-whisker plot shows the distribution of wages per week of the workers in Factory *B*.



Wages per week

Compare the weekly wages of the workers in the two factories in two different ways.

Answer .....

.....

.....

.....

..... [2]

END OF PAPER

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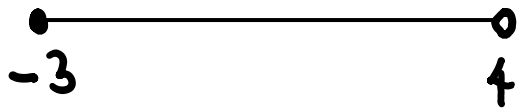
Marking Scheme
4NA PRELIM 2023 EM Paper 1
4045/01

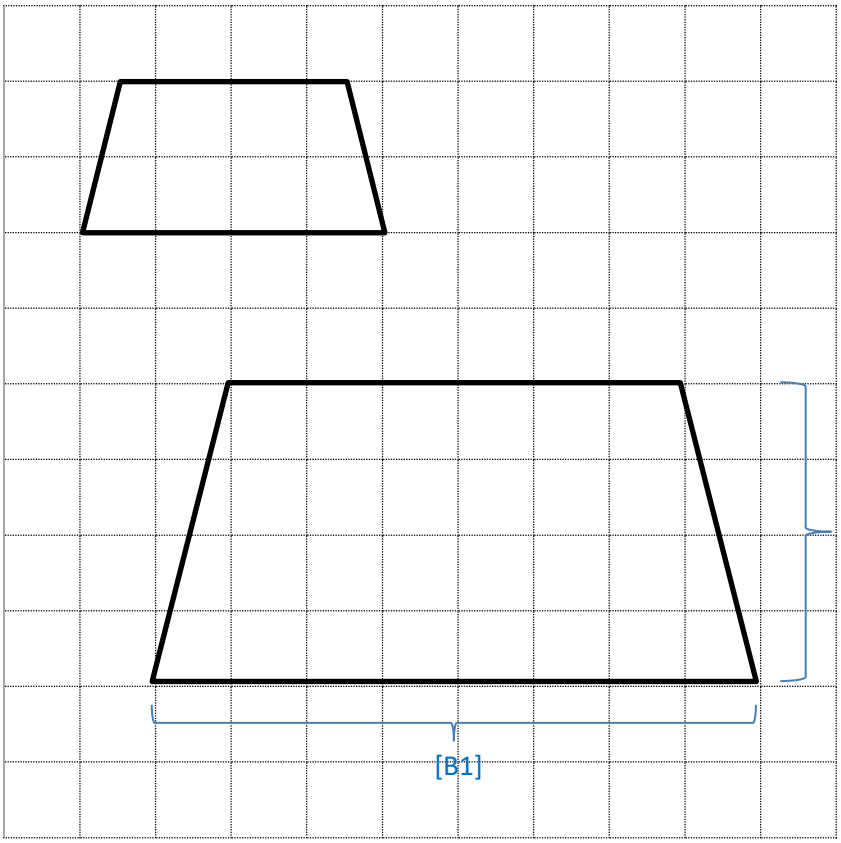
Qn	Working	Note
1	$\frac{\pi}{3}$, $\frac{\sqrt{3}}{2}$, 73% , 0.63 , $\frac{3}{7}$ [B2]	Cover one and all correct (1 mark) All correct 2 marks
2a	2444466.947 = 2444000	
2b	2.444×10^{6} [B1]	Accept their (a) changed to standard form
3	3 [B1]	
4	$\frac{p}{x^2-25}+\frac{q(x-5)}{x+5}=\frac{p+qx-5q}{x^2-25}$ [M1] $7x=qx$ $q=7$ [A1] $p-5q=-33$ $p=-33+35$ $p=2$ [A1]	
5a	$x^2+10x-5$ $=x^2+10x+5^2-5^2-5$ $=(x+5)^2-30$ $a=5, b=-30$ [B1, B1]	If answers wrong, accept M1 for this step
5b	$(x+5)^2=30$ $x+5=\pm\sqrt{30}$ $x=\sqrt{30}-5$ or $x=-\sqrt{30}-5$ $x=0.48, -10.48$ [B1, B1]	If answers wrong, accept M1 for this step
6a	 [B1]	
6b	$-3y+1<15$ $y>\frac{14}{-3}$ [M1] $y>-4\frac{2}{3}$ $Ans: -4$ [A1]	

7	$x:y=9:4=27:12$ $x:y:z=27:12:7$ [A1] [M1]	
8a	$168=2^3\times3\times7$ $540=2^3\times3^3\times5$ $LCM=2^3\times3^3\times5\times7=7560$ [M1, A1] or B2	
8b	$2\times5^2=50$ [B1]	
9	$y=\frac{k}{x^3}$ $3=\frac{k}{2^3}$ $k=24$ $y=\frac{24}{x^3}$ [M1] $y=\frac{24}{4^3}=\frac{3}{8}$ [A1]	
10a	$-24,-29$ [B1]	
10b	$-5n+6$ [B1]	
10c	$-110=-5n+6$ $5n=116$ $n=\frac{116}{5}=23.2$ [M1] Since $n=23.2$ which is not an integer, -110 is not a term in this sequence. [A1]	
11a	89 [B1]	
11b	63 [B1]	
11c	52 [B1]	
11d	$\frac{7}{20}\times100\%=35\%$ Yes, student A is correct as only 7 out of 20 failed , which is 35%. [B1]	
12	Answer behind	
13a	$u=\sqrt{4^2-2(-10)}$ $u=\sqrt{36}$ $u=6$ [B1]	

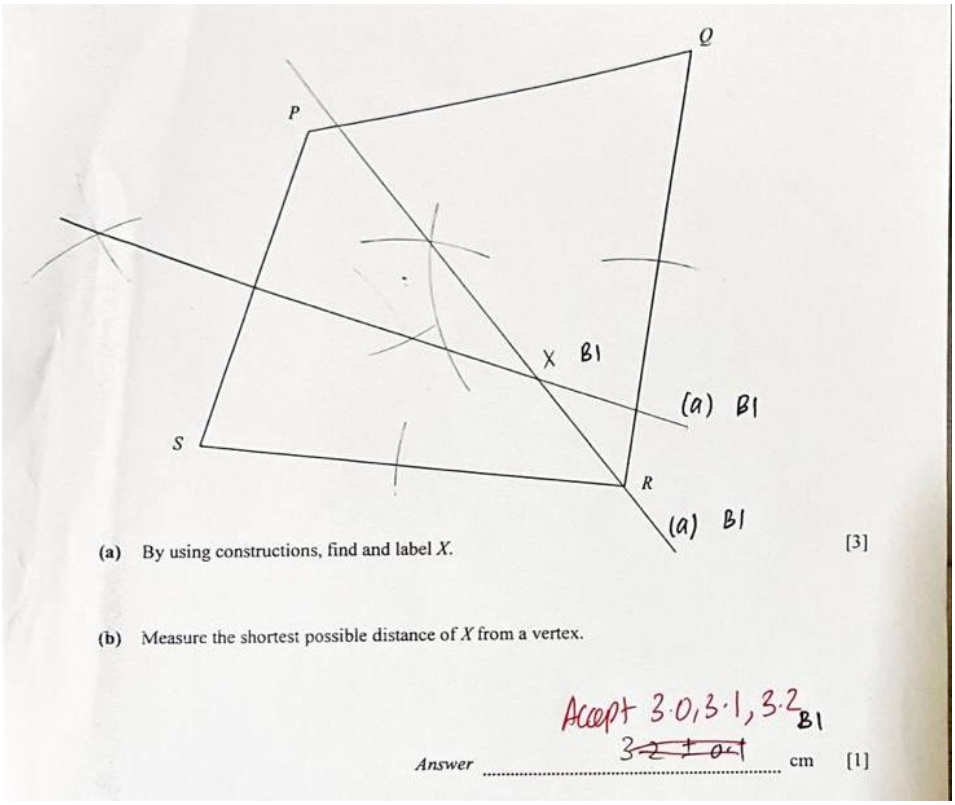
13b	$u^2 = v^2 - 2t$ [M1] $2t = v^2 - u^2$ $t = \frac{v^2 - u^2}{2}$ [A1]	
14a	40 [B1]	
14b	0930 to 1030 The gradient is gentler. [B1]	
14c	$\frac{100}{1.5} = 66.7$ km/h [M1, A1]	
15a	The table only shows the percentage of participants. [B1]	
15b	$\frac{35}{100} \times 360 = 126°$ [M1, A1]	
16a	\$1 = 106.5 JPY [B1]	
16b	\$1 AUD ------ \$0.90 \$1080AUD – 0.9 x 1080 = \$972 [M1] € 0.68 ------- \$1 € 1 ---------- $\frac{1}{0.68}$ €620 ---------- $\frac{1}{0.68} \times 620 = \$911.76$ [M1] Yes, he should ask his Spanish friend to buy as it is cheaper by \$\$60.24 to buy the wallet in Spain than in Australian. [A1]	Must state that is it \$60.24 cheaper.
17	$x = \sin^{-1} 0.723$ $x = 46.3°, 180° - 46.3°$ [M1] $x = 46.3°, 133.7°$ [A1 or B1,B1]	
18a	$\frac{3xy^3}{10} \div \left(\frac{-2y}{5x}\right)^2$ $= \frac{3xy^3}{10} \times \frac{25x^2}{4y^2}$ [M1] $= \frac{15x^3y}{8}$ [A1]	
18b	$-2(3x+7)(3x+7)$ $= -2(9x^2 + 42x + 49)$ [M1] $= -18x^2 - 84x - 98$ [A1]	
18c	$(2x+3)(x-4)$ [B1]	

19	Curved surface area $= \pi \times 6 \times 19$ [M1] $= 114\pi$ Base $= \pi r^2$ $= \pi (6)^2$ [M1] $= 36\pi$ Total = $114\pi + 36\pi = 471.238898 = 471$ [A1]	Aceept 3 sf or more (471.238898)
20	Answer at the back	
21ai	$\frac{(8-2)\times 180}{8} = 135°$ [M1, A1]	
21aii	$\frac{360}{8} = 45°$ [M1, A1]	
21aiii	$\angle HAG = \frac{180-135}{2} = 22.5°$ [M1] $\angle BAG = 135 - 22.5 = 112.5°$ [A1]	
21b	Parallelogram [B1]	
22	Area of sector AOB $= \frac{120}{360} \times \pi \times 14^2$ [M1] $= 205.25072$ $\tan 60° = \frac{14}{OC}$ $OC = \frac{14}{\tan 60°}$ [M1] Area of ΔAOC $= \frac{1}{2} \times OC \times 14$ $= \frac{1}{2} \times \frac{14}{\tan 60} \times 14$ [M1] $= 56.58032638$ Area of shaded region $= 205.25072\ldots - 56.58...$ $= 148.67$ $= 149$ [A1]	

12



20



(a) By using constructions, find and label X. [3]

(b) Measure the shortest possible distance of X from a vertex.

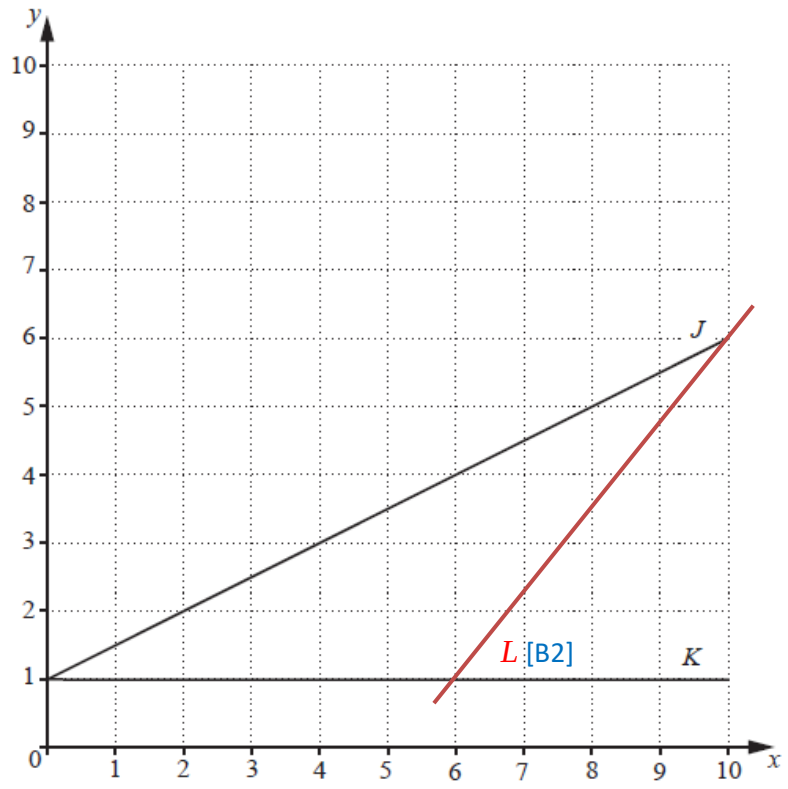
Accept 3·0, 3·1, 3·2 B1

Answer ~~3 2 1 0~~ cm [1]

Marking Scheme
4NA PRELIM 2023 EM Paper 2
4045/02

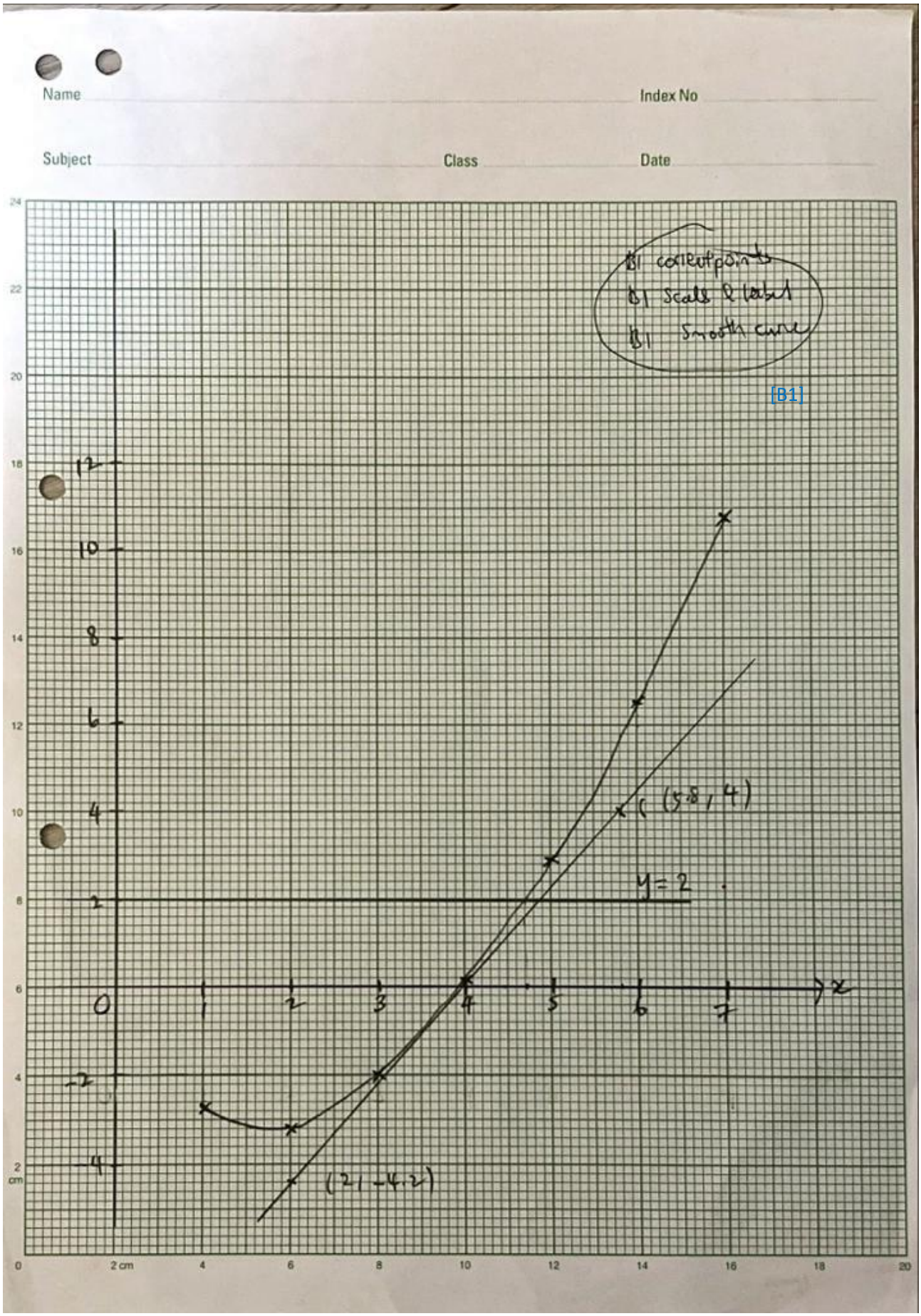
Qn	Working	Note
1a	$\frac{342}{36} = \$9.50$ [B1]	
1bi	$1.5 \times \$9.50 = \$14.25$ for 10 hours = \$142.50 $2 \times \$9.50 = \$19.00$ for 2 hours = \$38.00 Total = 342 + 142.50 + 38 = \$522.50 [M1, A1]	
1bii	$636.50 - 342 = \$294.50$ $\$294.50 - \$142.50 = \$152$ [M1] $\$152 \div \$19 = 8 hours$ $36 + 10 + 8 = 54$ [A1]	
2a	$9.2 \times \frac{350}{100} = 32.2$ [M1, A1]	
2b	$\frac{48}{8} = 5.5$ [M1] $5.5 \times 100 = 550 km$ [A1]	
2c	200 km: $9.2 \times 2 = 18.4 l$ 160 km: $8.0 \times 1.6 = 12.8 l$ 360 km: $31.2 l$ [M1] 1 km: $\frac{31.2}{360} = 0.0867 l$ [A1]	Minus one mark for 0.087 (less than 3sf)
3ai	10 km [B1]	
3aii	$1 cm ----- 2 km$ $1 cm^2 ----- 4 km^2$ [M1] $3 cm^2 ----- 12 km^2$ [A1]	
3aiii	$1 km ----- 0.5 cm$ $1000 m ---- 0.5 cm$ [M1] $1000000 m^2 -- 0.25 cm^2$ $18000000 m^2 -- 4.5 cm^2$ [A1]	
3b	$A = 50000\left(1 + \frac{5}{100}\right)^{10} = \$81444.73$ [M1] $81444.73 - 50000 = \$31444.73$ [M1,A1]	
4ai	0 [B1]	
4aii	$\frac{2}{5}$ [B1]	

4aiii	$\frac{3}{5}$ [B1]	
4bi	08 26 [B1]	
4bii	$\frac{484000}{5h49\min}$ [M1] $=\frac{484000}{20940}$ [M1] $=23.1\ m/s$ [A1]	Conversion from 484 km to 484000m [M1]
5ai	$(x-9y)(x+9y)$ [B1]	
5aii	$10px-15qx+6py-9qy$ $=5x(2p-3q)+3y(2p-3q)$ [M1] $=(5x+3y)(2p-3q)$ [A1]	
5b	$\frac{3}{x-2}-\frac{5}{2x+1}=1$ $3(2x+1)-5(x-2)=(x-2)(2x+1)$ [M1] $6x+3-5x+10=2x^2+x-4x-2$ $2x^2-4x-15=0$ [M1] $x=\frac{4\pm\sqrt{136}}{4}$ [M1] $=3.92\ \ or\ \ -1.92$ [A1, A1]	Must show this step with $\sqrt{136}$ for M1
6a	Volume of hemisphere $=\frac{1}{2}\times\frac{4}{3}\times\pi\times3^3$ [M1] $=56.54866776$ $=56.5$ [A1]	**Did not** deduct marks for those who went to comvert to cm2 but did wrongly. Marked correct so long as they showed 56.5 in working.
6b	Curve surface of hemisphere $=\frac{4\pi(3)^2}{2}$ [M1] $=56.54866776$ Big circle – small circle $=\pi(3)^2-\pi(0.25)^2$ [M1, M1] $=28.07798434$ Curved surface of pole $=2\pi\times0.25\times2$ [M1] $=3.141592654$ Total surface area $=87.76824476$ Disagree because he would need more than 8 litres of paint to cover 87.8 m^2. [A1]	

7	$180-144=36°$ [M1] $2x+1=130$ [M1] $2x=129$ $x=64.5°$ [A1]	
8a	$y=1$ [B1]	
8bi	$\frac{1}{2}$ [B1]	
8bii	$y=\frac{1}{2}x+1$ [B1]	
		
9a	When $x = 3$, $y = -2$ [B1] When $x = 6$, $y = 6.5$ [B1]	
9b	points [5 points B1, all points B2] smooth curve [B1]	Graph at bottom
9c	$x = 4.7 \pm 0.1$ [B2, or M1, A1]	Draw $y = 2$ [M1]
9d	*Draw tangent* [M1] *Gradient* = 2.088 ± 0.5 [A1]	Drawing tangent [M1]

10	$\frac{20}{100}\times 4990 = \$998$ [M1] $212\times 24 = \$5088$ [M1] $Total = 998 + 5088 = \$6086$ Extra amount $= 6086 - 4990$ $= \$1096$ $\frac{1096}{4990}\times 100\% = 21.96 = 22.0\%$ [M1,A1]	Accept 22%
11ai	0.7 [B1] Angles in the same segment [B1]	
11aii	1.4 [B1] Angle and centre = 2 angles at circumference [B1]	
11bi	Area of minor sector $= \frac{1}{2}\times 6^2 \times 1.4$ [M1] $= 25.2$ [A1]	
11bii	Area of triangle $= \frac{1}{2}\times 10.76\times 12\times \sin 0.7$ [M1] $= 41.5906...$ $= 41.6$ [A1]	
12ai	$80 - 26$ $= 54$ [B1]	
12aii	550 [B1]	
12aiii	680-420 = 260 [M1, A1 or B2]	
12b	$\frac{10}{80}\times\frac{26}{79} = \frac{13}{316}$ [M1, A1]	
12c	The **interquartile range** for Factory B is **higher** at \$620 than Factory A indicating a **greater spread**. [B1] The **median** wage of Factory B is **higher** at \$600 than Factory A at \$550 indicating the workers are **paid better** at Factory B. [B1]	Must indicate the bolded words. If any wrote about IQR and median, one mark given

10


Name
Index No
Subject
Class
Date
B1 correct points
B1 scales & label
B1 smooth curve
[B1]
(3.8, 4)
y = 2
(2.1, -4.2)
x
0
2 cm