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BEDOK VIEW SECONDARY SCHOOL

END-OF-YEAR EXAMINATION 2024

CANDIDATE
NAME

REGISTER
NUMBER

CLASS

MATHEMATICS
Secondary 2 Express
Paper 1

4052/01

4 October 2024

1 hour 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your 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.

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 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 .

At the end of the examination, fasten all your work securely together.

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

The total of the marks for this paper is 50.

Total	
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Parent's / Guardian's Signature:

[Turn over

Answer **all** the questions.

- 1 (a) Arrange the following numbers in ascending order.

$$-5.12, \quad 5\frac{1}{3}, \quad 5.3\dot{2}, \quad -\sqrt{25}$$

Answer (a) [2]

- (b) Evaluate $\frac{\sqrt[3]{63.25} - \sqrt{4.2}}{36 - 3.5^2 \times 0.95} - \frac{2}{3}$, giving your answer correct to 2 significant figures.

Answer [2]

-
- 2 Solve the inequality and state the smallest possible x that is an integer.

$$\frac{2x}{5} \leq \frac{3(5-3x)}{-4}$$

Answer [3]

[Turn over

- 3 Solve the pair of simultaneous equations.

$$2x - 3y = 8$$

$$x + 11 = 5y$$

Answer $x = \dots\dots\dots$

$y = \dots\dots\dots$ [3]

- 4 Expand and simplify $-(2a - 3)^2 + (2 - a)(a + 2)$.

Answer $\dots\dots\dots$ [3]

-
- 5 Express $\frac{3b}{5a} - \frac{ab+2}{a^2b} \div \frac{a}{b}$ as a single fraction in its simplest form.

Answer [3]

- 6 Solve $\frac{2x^2 - 19x}{2} = -21$

Answer $x =$ or [3]

- 7 A hexagon has 4 interior angles measuring 130° each. The remaining interior angles measure x° each. Find the value of x .

Answer $x =$ [2]

[Turn over

- 8 The entrance fees to Zoo ABC are priced as below.

Ticket Type	Standard Admission Ticket Price (before G.S.T)
Adult	S\$49
Child Ages 3 to 12 years old	S\$34
Senior citizen Applicable for local residents ages 60 years and above	S\$20

The entrance fees to Zoo ABC are reduced by 15% during the school holidays. Calculate the total amount a family of 5 consisting of 2 adults, 1 senior citizen, 1 teenager who is 14 years old and a child 4 years of age has to pay to visit Zoo ABC during the school holidays inclusive of Goods and Service Tax (G.S.T) of 9%.

Answer \$..... [3]

- 9 A box measures 72 cm by 66 cm by 36 cm.
The box is completely filled with identical cubes.
Find the minimum number of cubes required.

Answer [1]

-
- 10 (a) A bag contains red counters, blue counters and yellow counters.
A counter is picked at random from the bag with 15 counters.

The probability that the counter is blue is $\frac{3}{5}$.

The probability that the counter is red is $\frac{4}{15}$

Find the probability that the counter is yellow.

Answer [1]

- (b) Some red counters are added to the bag.

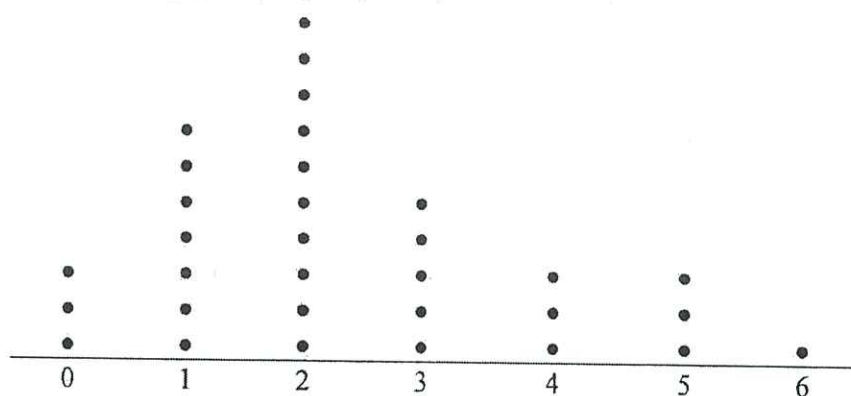
The probability of picking a blue counter is now $\frac{1}{2}$.

Find the number of red counters added to the bag.

Answer [3]

[Turn over

- 11 It is recommended for teenagers to exercise 2.5 hours to 5 hours per week. A group of teenagers took part in a survey to find out the number of hours spent on exercising per week. The dot diagram shows the number of hours the teenagers exercised in a week, approximated to the nearest hour.



Number of hours spent on exercising per week by a teenager

- (a) Find the percentage of teenagers surveyed that failed to meet the recommended number of hours spent on exercising per week.

Answer% [2]

- (b) What conclusion can you draw from the survey?

Answer

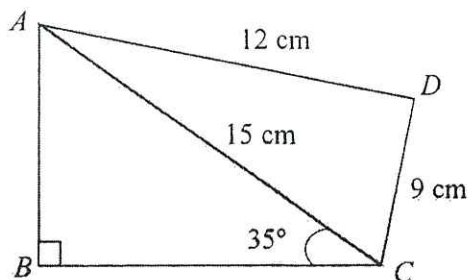
.....
 [1]

- (c) Explain why a dot diagram is not suitable to represent these survey results. What statistical diagram will you use instead?

Answer

.....
 [2]

- 12 The diagram shown below is made up of two triangles ABC and ACD .
 $AC = 15$ cm, $AD = 12$ cm, $CD = 9$ cm and $\angle ACB = 35^\circ$.



- (a) Determine if triangle ACD is a right-angled triangle.

Answer [2]

- (b) Find AB and BC .

Answer $AB =$ cm

$BC =$ cm [3]

- (c) Hence, find the area of quadrilateral $ABCD$.

Answer cm² [2]

[Turn over

13 A map has a scale of 1: 3 000 000.

- (a) The distance between Singapore and Kuala Lumpur is 306 km.
Calculate the distance, in centimetres, between Singapore and Kuala Lumpur on the map.

Answer cm [2]

- (b) The area of Malaysia is 367.5 cm² on the map.
Calculate the area, in square kilometres, of Malaysia.

Answer km² [2]

-
- 14 (a) Construct an equilateral triangle PRQ with $QR = 8$ cm.
The line QR has been drawn for you.

Answer (a)

[2]

Q ————— R

- (b) Join point P to the middle of QR . Measure and write down the length of this line.

Answer cm [1]

- (c) Draw a circle within the equilateral triangle drawn in part (a) whereby the circle touches all sides of the equilateral triangle at one point. [1]

- (d) Hence, calculate the area of the circle.

Answer cm^2 [1]

END OF PAPER



BEDOK VIEW SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2024

CANDIDATE
NAME

REGISTER
NUMBER

CLASS

MATHEMATICS
Secondary 2 Express
Paper 2

4052/02

08 October 2024

1 hour 15 minutes

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your 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.

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 use of an approved scientific calculator is expected, where appropriate.

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

The number of marks is given in brackets [] at the end of each question or part question.
The total of the marks for this paper is 50.

Total	
--------------	--

Parent's / Guardian's Signature:

[Turn over

Answer **all** the questions.

- 1 (a) Use a calculator to find the value of $\cos^{-1}\left(\frac{16^2 + 10^2 - 24^2}{2(16)(10)}\right)$, leaving your answer correct to 1 decimal place.

Answer [1]

- (b) A watch costs 840 000 Indonesian Rupiah (Rp). The conversion rate is S\$1 = 11 890 Rp. Without using a calculator, estimate the price of the watch in S\$. Show your working clearly.

Answer [2]

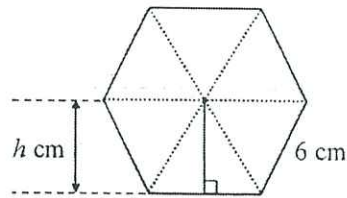
-
- 2 Explain why $(4x + 1)^2 - (2x - 1)^2$ is always even. Show your working clearly.

Answer

.....
..... [3]

[Turn over

- 3 The diagram shows a regular hexagon with length of side of 6 cm. The hexagon consists of six equilateral triangles.



- (a) Find the sum of interior angles of the hexagon.

Answer ° [1]

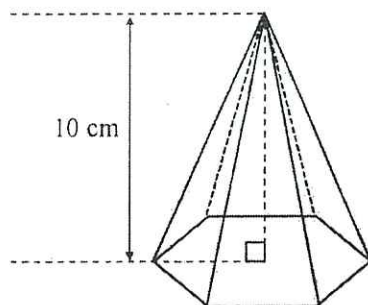
- (b) Find the value of h .

Answer [2]

- (c) Find the area of the hexagon.

Answer cm² [2]

The hexagon forms the base of a pyramid with a height of 10 cm.

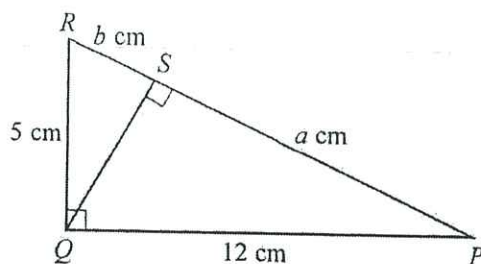


(d) Find the total surface area of the pyramid.

Answer cm² [3]

[Turn over

- 4 Triangle PQR is a right angled triangle and S is a point on PR such that QS is perpendicular to PR . It is given that $PQ = 12$ cm, $QR = 5$ cm, $PS = a$ cm and $RS = b$ cm.



- (a) Find the length of PR .

Answer cm [1]

- (b) By forming two equations for QS , show that $a^2 - b^2 = 119$.

Answer

[2]

- (c) Hence, find the value of $a - b$, giving your answer as a fraction.

Answer [3]

5 Given that $\sqrt{\frac{y}{x^2}} = 5$,

(a) explain why y is directly proportional to x^2 ,

Answer

.....

..... [2]

(b) find the value of y when $x = 7$.

Answer [2]

[Turn over

- 6 A tote bag store makes a profit of \$ y when it sells x tote bags, where $y = 32x - 200 - \frac{3}{10}x^2$ for $0 \leq x \leq 80$. The table shows the profit which the store makes when selling different number of tote bags.

x	0	10	20	30	40	50	60	70	80
y	-200	90	p	490	600	650	640	570	440

- (a) Find the value of p .

Answer $p =$ [1]

- (b) Plot the points given in the table on the grid on page 9 and join them with a smooth curve. [2]

- (c) Use your graph in part (b) to find

- (i) the profit made when 45 tote bags are sold,

Answer \$ [1]

- (ii) the number of tote bags to be sold for a profit of \$550,

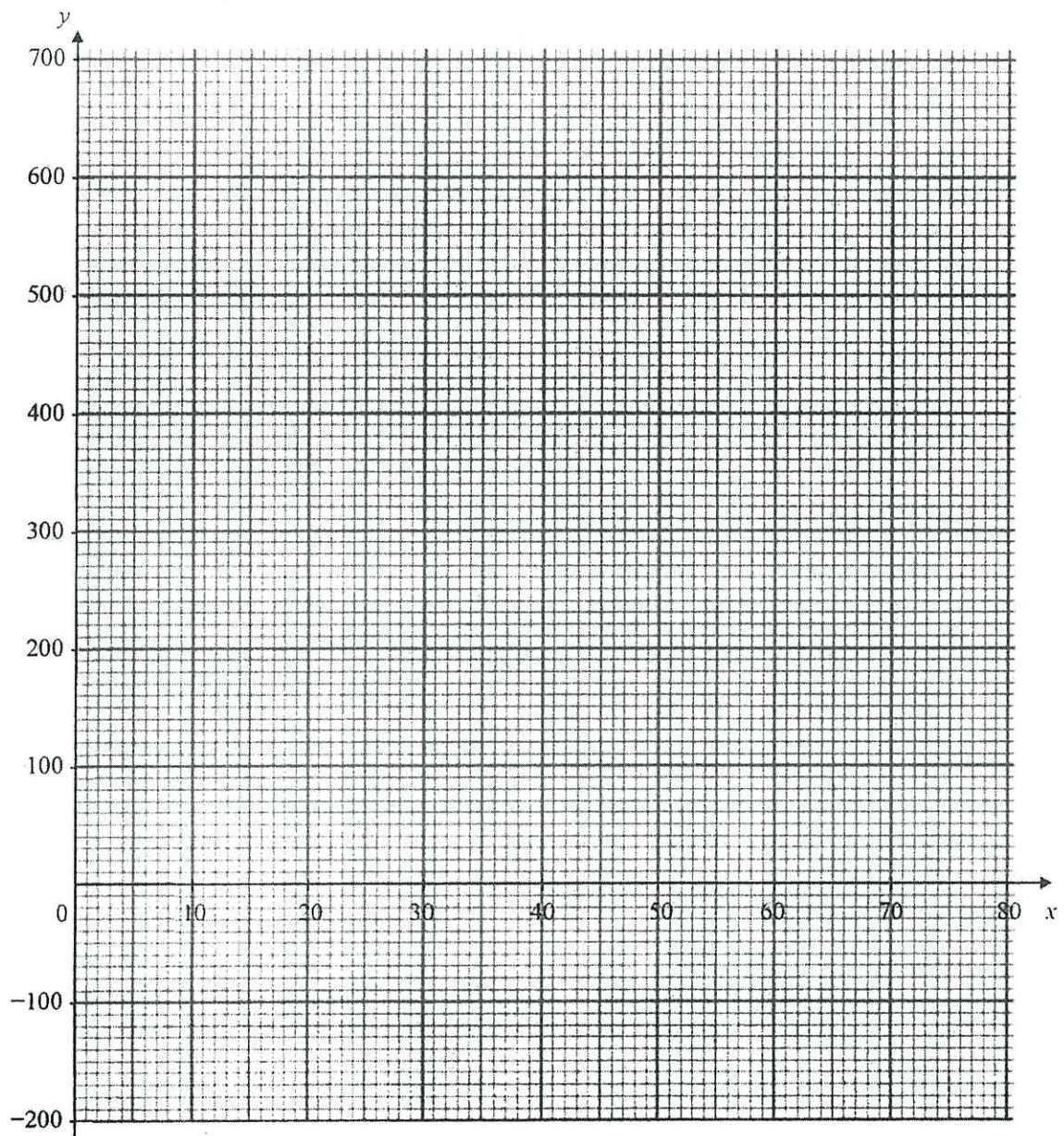
Answer [1]

- (iii) the number of tote bags to be sold for maximum profit, and the profit per tote bag (correct to the nearest dollar), when this number of tote bags is sold,

Answer tote bags at \$ profit per tote bag [2]

- (iv) the value of y when $x = 5$. Hence, explain what the answer represents.

Answer The value of y is and this means [2]



[Turn over

- 7 Andre's car can travel x km for every litre of petrol used. Steffi's car can travel $(x - 2)$ km for every litre of petrol used. Each of them drove 480 km to Malaysia.

- (a) Write an expression, in terms of x , for the number of litres of petrol Andre used to travel 480 km.

Answer [1]

- (b) Write an expression, in terms of x , for the number of litres of petrol Steffi used to travel 480 km.

Answer [1]

- (c) Steffi's car uses 8 litres of petrol more than Andre's car in this particular journey. Form an equation in x and show that it reduces to $x^2 - 2x - 120 = 0$.

Answer [3]

- (d) Solve the equation $x^2 - 2x - 120 = 0$ and find the number of litres of petrol used by Steffi.

Answer litres [2]

8 Given that $p = \sqrt{\frac{2}{q-3r}}$,

(a) find the value of r when $p = -2$ and $q = 2$,

Answer [2]

(b) express q in terms of p and r .

Answer $q =$ [3]

[Turn over]

- 9 The table shows the sizes of shoes sold in Mike's sports store in a month.

Shoe size	7	7.5	8	8.5	9	9.5	10
Number of pairs sold	15	25	12	n	16	14	8

- (a) If the mode is 7.5, write an inequality for n .

Answer [1]

- (b) If the median is 8, find the largest possible value of n .

Answer [1]

- (c) If $n = 11$, calculate the mean shoe size sold in the store.

Answer [1]

- (d) Mike wants to stock up the shoes inventory in his store. Should he base his decision on the mode, median or mean of the shoe sizes? State a reason to justify your answer.

Answer

Mike should base his decision on the of the shoe sizes because

..... [2]

END OF PAPER

Bedok View Secondary School

Mathematics Department

Marking Scheme

Year	2024	Level & Stream	S2E
Type of Exam	EOY	Subject	Math P1

No.	Working		Remarks
1	(a)	$-5.12, -\sqrt{25}, 5.3\dot{2}, 5\frac{1}{3}$ [B2]	Deduct 1 mark for every error
	(b)	$\frac{\sqrt[3]{63.25} - \sqrt{4.2}}{36 - 3.5^2 \times 0.95} - \frac{2}{3} = -0.58724$ [M1] $= -0.59$ (2 s.f.) [A1] or [B2]	-0.6 no mark awarded

[Total : 4m]

2	$\frac{2x}{5} \leq \frac{3(5-3x)}{-4}$ $-8x \geq 15(5-3x) \quad [\text{M1}]$ $-8x \geq 75 - 45x$ $45x - 8x \geq 75$ $37x \geq 75$ $x \geq \frac{75}{37}$ $x \geq 2\frac{1}{37} \quad [\text{M1}]$ Smallest possible x is 3. [A1]	1 mark change of sign 1 mark simplify to singular x [Total : 5m]
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[Total : 3m]

3	$2x - 3y = 8 \text{ -----(1)}$ $x + 11 = 5y \text{ -----(2)}$ $(2): x = 5y - 11 \text{ -----(3)}$ <i>Sub (3) into (1):</i> $2(5y - 11) - 3y = 8 \quad \text{[M1]}$ $10y - 22 - 3y = 8$ $7y = 30$ $y = \frac{30}{7}$ $y = 4\frac{2}{7}$ <i>Sub $y = \frac{30}{7}$ into (3):</i> $x = -11 + 5\left(\frac{30}{7}\right) \quad \text{[M1 substitution]}$ $x = 10\frac{3}{7} \quad \text{[A1 for accurate x and y ans]}$	or $(2) \times 2: 2x - 10y = -22 \text{ -----(3)}$ $(1) - (2): 2x - 3y - (2x - 10y) = 8 - (-22)$ $7y = 30$ $y = 4\frac{2}{7}$ [M1]
---	--	--

[Total : 3m]

4	$-(2a - 3)^2 + (2 - a)(a + 2)$ $= -(4a^2 - 12a + 9) + 4 - a^2 \quad \text{[M1 correct expansion]}$ $= -4a^2 + 12a - 9 + 4 - a^2 \quad \text{[M1 correct expansion]}$ $= -5a^2 + 12a - 5 \quad \text{[A1]}$	
---	--	--

[Total : 3m]

5	$\frac{3b}{5a} - \frac{ab+2}{a^2b} \div \frac{a}{b}$ $= \frac{3b}{5a} - \frac{ab+2}{a^2b} \times \frac{b}{a} \quad [\text{M1-BODMAS and inversion}]$ $= \frac{3b}{5a} - \frac{ab+2}{a^3} \quad [\text{M1-common denominator}]$ $= \frac{3a^2b - 5(ab+2)}{5a^3}$ $= \frac{3a^2b - 5ab - 10}{5a^3} \quad [\text{A1}]$	
---	---	--

[Total : 3m]

6	$\frac{2x^2 - 19x}{2} = -21$ $2x^2 - 19x = -42$ $2x^2 - 19x + 42 = 0 \quad [\text{M1}]$ $(2x-7)(x-6) = 0 \quad [\text{M1- fraction factorization not accepted}]$ $x = 3\frac{1}{2}$ or $x = 6$ [A1]	Accept $x = \frac{7}{2}$ or $x = 6$
---	--	---

[Total : 3m]

7	Sum of interior angles of hexagon = $(6-2) \times 180$ $= 720^\circ \quad [\text{M1}]$ $2x = 720 - 4(130)$ $x = 100 \quad [\text{A1}]$	1 exterior angle of the other 2 angles $= \frac{360 - 4(180 - 130)}{2} \quad [\text{M1}]$ $= 80^\circ$ $x = 180 - 80$ $x = 100 \quad [\text{A1}]$
---	--	--

[Total : 2m]

8	Total before discount $= 2 \times 49 + 20 + 49 + 34 \quad \text{[M1 summation]}$ $= \$201$ Total after discount and GST $= \underline{201 \times 0.85 \times 1.09} \quad \text{[M1 for both 0.85 and 1.09]}$ $= \$186.23 \quad \text{[A1]}$ (2 d.p)	
---	--	--

[Total : 3m]

9	<table><tr><td>2</td><td>72</td><td>66</td><td>36</td></tr><tr><td>3</td><td>36</td><td>33</td><td>18</td></tr><tr><td></td><td>12</td><td>11</td><td>6</td></tr></table> Minimum cubes $= 12 \times 11 \times 6$ $= 792$ [B1]	2	72	66	36	3	36	33	18		12	11	6	Accept other ways of getting H.C.F
2	72	66	36											
3	36	33	18											
	12	11	6											

[Total : 1m]

10	(a) P (yellow) $= 1 - \frac{3}{5} - \frac{4}{15}$ $= \frac{2}{15}$ [B1]	
	(b) Number of blue counters $= \frac{3}{5} \times 15$ $= 9$ [M1] Let y be number of counters after adding red counters. $\frac{9}{y} = \frac{1}{2}$ [M1] $y = 18$ Number of red counters added $= 18 - 9$ $= 9$ [A1]	or Let x be number of red counters added. $\frac{9}{x+9} = \frac{1}{2}$ [M1] $x+9 = 18$ $x = 9$ [A1]

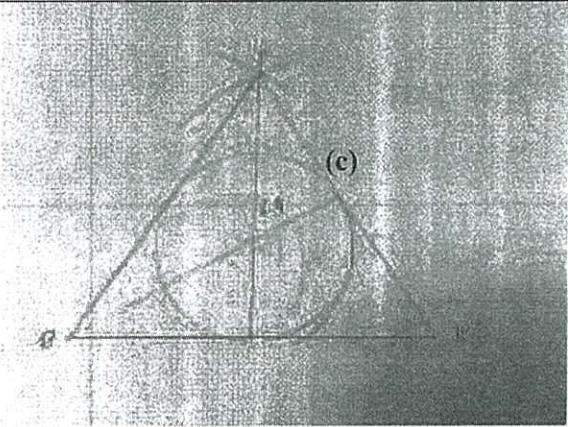
[Total : 4m]

11	(a)	Percentage failed to meet recommendation $= \frac{21}{32} \times 100\%$ [M1] $= 62.625\%$ [A1]	Exact answer only not 3 s.f.
	(b)	Majority of the teenagers survey did not meet the <u>minimum recommendations of 2.5 hours</u> of exercise per week. [B1]	Accept other forms of answers that implies understand of more than 50% are not meeting the 2.5 hour minimum recommendation.
	(c)	Inaccurate data presentations as its not clear how to categorize the hours that are not integers. [B1] Use histogram. [B1]	1 mark for 1 correct criticism. 1 mark for 1 correct recommendation.

12	(a)	$AD^2 + CD^2 = 12^2 + 9^2$ $= 225$ $AC^2 = 15^2$ $= 225$ } [M1] Since $AD^2 + CD^2 = AC^2$, by converse of Pythagoras theorem, Triangle ACD is a right-angled triangle. [A1]	Converse to be in answer
	(b)	$\sin 35^\circ = \frac{AB}{15}$ $AB = 15 \sin 35^\circ$ [M1] $AB = 8.6036$ $\cos 35^\circ = \frac{BC}{15}$ $BC = 15 \cos 35^\circ$ [M1] $BC = 12.287$ $AB = 8.60 \text{ cm (3 s.f)}$ $BC = 12.3 \text{ cm (3 s.f)}$ } [A1]	
	(c)	$\text{Area} = \frac{1}{2}(8.6036)(12.287) + \frac{1}{2}(9)(12)$ [M1] $= 107 \text{ cm}^2 \text{ (3 s.f)}$ [A1]	
[Total : 7m]			

13	(a)	$1 \text{ cm} : 3\,000\,000 \text{ cm}$ $1 \text{ cm} : 30 \text{ km} \quad [\text{M1}]$ $\text{Dist on map} = \frac{306}{30}$ $= 10.2 \text{ cm} \quad [\text{A1}]$	
	(b)	$(1 \text{ cm})^2 : (30 \text{ km})^2$ $1 \text{ cm}^2 : 900 \text{ km}^2 \quad [\text{M1}]$ Area of Malaysia $= 367.5 \times 900$ $= 330750 \text{ km}^2 \quad [\text{A1}]$	

[Total : 4m]

14	(a)	 [B1]	1m for accurate archs at P Accept use of 60° to find P 1m for labelling P 1m for being able to find center of circle and drawing the circle accurately.
	(b)	Accept 6.8 to 7 cm	Calculated value is 6.92
	(d)	$\text{Area} = \pi (2.3)^2$ $= 16.6 \text{ cm}^2 \quad [\text{B1}]$	Accept answers range from 15.2 to 18.1

[Total : 5m]

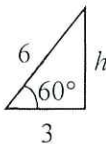
Year	2024	Level & Stream	Sec 2E
Type of Exam	End of Year Exam	Subject	Maths 4052

No.	Working		Remarks
1	(a)	$\cos^{-1}\left(\frac{16^2+10^2-24^2}{2(16)(10)}\right) = 133.4^\circ$ (1 d.p.) [B1]	
	(b)	11890 Rp $\approx$ 12000, 10000, or 11900 Rp [M1] Round first Price in S\$ $\frac{840000}{12000} = \text{S\\$}70$ or S\$84 [A1] Then calculate Do not accept calculate first then round. Do not accept \$70.65 (2 d.p.) as this is calculated.	[B1] if S\$70 but no working.

[Total : 3m]

2	$(4x+1)^2 - (2x-1)^2$ $= (4x+1+2x-1)(4x+1-2x+1)$ [M1] factorise $a^2 - b^2$ cao $= (6x)(2x+2)$ $= 2(6x)(x+1)$ [A1] show 2/6/12 as a factor Since $(4x+1)^2 - (2x-1)^2$ is a multiple of 2/6/12, it is always even. [B1] $(4x+1)^2 - (2x-1)^2$ $= 16x^2 + 8x + 1 - (4x^2 - 4x + 1)$ [M1] expand $(a \pm b)^2$ cao $= 12x^2 + 12x$ [A1] Since $12x^2$ and $12x$ are even, it is always even. [B1] ✓ All the <u>terms</u> are even / all the <u>coefficients</u> are even.	
---	---	--

[Total : 3m]

3	(a)	720° [B1]	
	(b)	 $\frac{h}{6} = \sin 60^\circ \text{ or } \frac{h}{3} = \tan 60^\circ \text{ or } h = \sqrt{6^2 - 3^2} \text{ [M1] sin/tan/Pythagoras}$ $h = 5.1961 \text{ or } \sqrt{27}$ $h = 5.20 \text{ (3 s.f.) [A1] cao}$	
	(c)	Area of hexagon $= 6 \times \frac{1}{2} \times 6 \times \sqrt{27} \text{ or their } h \text{ [M1FT] 6 equilateral triangles}$ $= 93.5307$ $= 93.5 \text{ cm}^2 \text{ (3 s.f.) [A1] cao}$ OR Area of equilateral triangle $= \frac{1}{2} \times 6 \times \sqrt{27} \text{ or their } h \text{ [B1FT] partial mark}$	
	(d)	Slant height $= \sqrt{10^2 + 27} \quad \text{[M1FT] their } h$ $= \sqrt{127} \text{ or } 11.2694 \text{ cm}$ Area of one lateral side $= \frac{1}{2} \times 6 \times \sqrt{127} \quad \text{[M1FT] only with their slant height}$ zero if without slant height $= 3\sqrt{127} \text{ or } 33.8082 \text{ cm}^2$ Total surface area of pyramid $= \text{Area of hexagon} + 6 \text{ lateral sides}$ $= 93.5307 + 6 \times 33.8082$ $= 296.3799$ $= 296 \text{ cm}^2 \text{ (3 s.f.) [A1] cao}$	

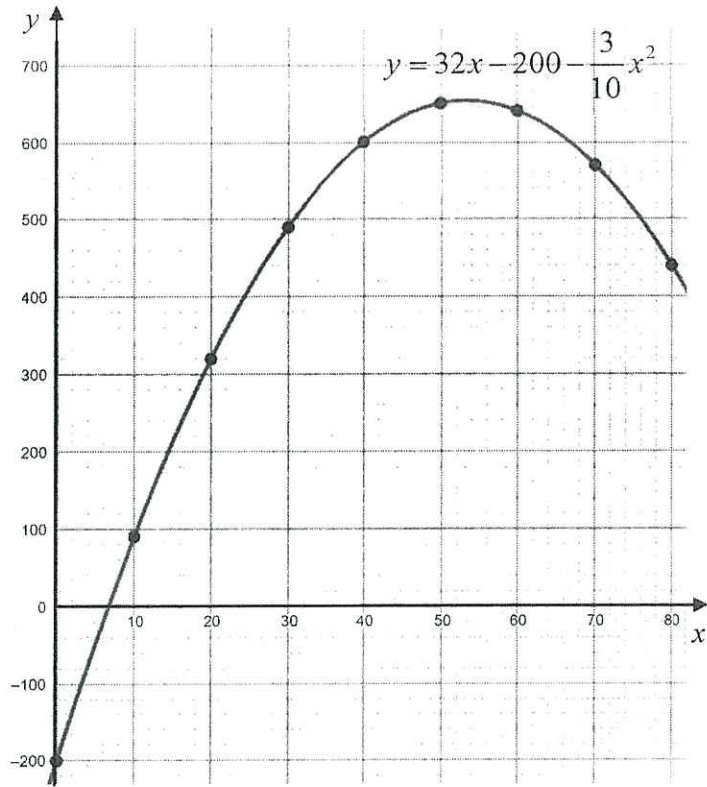
[Total : 8m]

4	(a)	$PR^2 = 5^2 + 12^2$ $PR = 13 \text{ cm}$ [B1]	
	(b)	$QS^2 = 5^2 - b^2$ from $\triangle QRS$ $QS^2 = 12^2 - a^2$ from $\triangle PQS$ } [B1] must have both equations of $25 - b^2 = 144 - a^2$ [B1] equate QS or QS^2 or solve simultaneously $a^2 - b^2 = 119$ (shown)	
	(c)	$a^2 - b^2 = 119$ $(a+b)(a-b) = 119$ [M1] factorise $a^2 - b^2$ $13(a-b) = 119$ [M1FT] sub from their (a) $a-b = 9\frac{2}{13}$ [A1] fraction only but not improper	

[Total : 6m]

5	(a)	$\sqrt{\frac{y}{x^2}} = 5$ $\frac{y}{x^2} = 25$ [M1] manipulate to $\frac{Y}{X} = k$ or $Y = kX$ form Since $\frac{y}{x^2}$ is a <u>constant</u> , y is directly proportional to x^2 . [A1] “When one increases, the other also increases” does not imply direct proportion.	Relate k with 25.
	(b)	$\sqrt{\frac{y}{7^2}} = 5$ [M1] $\frac{y}{49} = 25$ $y = 1225$ [A1]	

[Total : 4m]

6	(a)	$p = 320$ [B1]	
	(b)	 [B1] All 9 points plotted correctly [B1] Curve is smooth cutting through all points	
	(c)	(i) \$630, 635, or 640 [B1] Do not accept 632.50.	
		(ii) 35 or 72 [B1] must have both values	
		(iii) <u>53 or 54</u> [B1] tote bags at <u>\$12</u> [B1] profit per tote bag <u>52</u> [B1] tote bags at <u>\$13</u> [B1] profit per tote bag 50 is not acceptable as the table of values shows that the graph is not symmetrical at $x = 50$, ie. 50 cannot be the maximum point.	$x = 53$ or 54 , $y = 655$ or 660
		(iv) The value of y is <u>-40, -45, -50, -55, -60</u> [B1] Do not accept -47.50 as it is calculated. ... means the store makes a <u>loss</u> of \$40(resp.) [B1] if only 5 tote bags are sold. Do not accept "no profit", "lose profit" (?) as these could still mean break even.	

[Total : 9m]

7	(a)	$\frac{480}{x}$ [B1] oe	
	(b)	$\frac{480}{x-2}$ [B1] oe	
	(c)	$\frac{480}{x-2} - \frac{480}{x} = 8$ [M1] form equation oe $\frac{480x - 480(x-2)}{x(x-2)} = 8$ [M1FT] single fraction or multiply eqn by denominators $480x - 480x + 960 = 8x^2 - 16x$ $8x^2 - 16x - 960 = 0$ [A1] quadratic form $x^2 - 2x - 120 = 0$ (shown)	
	(d)	$x^2 - 2x - 120 = 0$ $(x-12)(x+10) = 0$ $x-12=0$ or $x+10=0$ $x=12$ or $x=-10$ (reject) } [M1] solve by factorisation No. of litres of petrol used by Steffi $= \frac{480}{12-2} = 48$ litres [A1]	Allow M1 for multiplication frame

[Total : 7m]

8	(a)	$-2 = \sqrt{\frac{2}{2-3r}}$ $4 = \frac{2}{2-3r}$ $2-3r = \frac{1}{2} \quad [\text{M1}] \text{ cross multiply} \quad 8-12r = 2$ $-3r = -1\frac{1}{2} \quad -12r = -6$ $r = \frac{1}{2} \quad [\text{A1}] \quad r = \frac{1}{2}$	
	(b)	$p = \sqrt{\frac{2}{q-3r}}$ $p^2 = \frac{2}{q-3r} \quad [\text{M1}] \text{ square}$ $q-3r = \frac{2}{p^2} \quad [\text{M1}] \text{ cross multiply} \quad p^2q - 3p^2r = 2$ $p^2q = 2 + 3p^2r$ $q = \frac{2}{p^2} + 3r \quad [\text{A1}] \text{ oe} \quad q = \frac{2+3p^2r}{p^2}$	

[Total : 5m]

9	(a)	$0 \leq n < 25$ or $0 \leq n \leq 24$ [B1] n cannot be negative ie. must have lower limit	
	(b)	13 [B1]	
	(c)	8.31 (3 s.f.) or $8\frac{31}{101}$ [B1]	
	(d)	Mike should base his decision on the <u>mode</u> [B1] of the shoe sizes because mode represents <u>the most common / popular shoe size that was sold.</u> [B1]	

[Total : 5m]