1E

2022 End of Year Examination

Secondary One Express

MATHEMATICS
Paper 1

7 Oct 2022
1 hour 15 minutes
0800h – 0915h

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

READ THESE INSTRUCTIONS FIRST

Write your full name, class and index number on all work you hand in.
Write in dark blue or black pen.
You may use a 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.

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

FOR MARKER'S USE		
	Marks Awarded	Max Marks
Total		50

This question paper consists of 11 printed pages including the cover page.

Setter: Mr Muhamad Lathif

1 **(a)** Express 540 as a product of its prime factors, giving your answer in index notation.

Answer ..... [1]

(b) Hence find the smallest integer m such that $540m$ is a perfect cube.

Answer ..... [1]

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2 Factorise the following expressions.

(a) $2bc - 4b^2 + 2b$

Answer ..... [1]

(b) $n(m+3) - 6(m+3)$

Answer ..... [1]

3 **(a)** Round off the following numbers correct to 2 significant figures.

(i) 1.952

Answer ..... [1]

(ii) 3.015

Answer ..... [1]

(b) Hence, estimate the value of $\frac{1.952+3.015}{\sqrt[3]{126}}$.

Answer ..... [2]

4 Simplify the following expressions

(a) $\frac{1}{2}a+\frac{1}{2}b-\frac{1}{4}a+\frac{1}{4}b$

Answer ..... [2]

(b) $2(3p-5q)-(2p-4q)$.

Answer ..... [2]

5 The temperature of both liquid A and liquid B in a Science Laboratory were at $-5°C$.

(a) Liquid A was heated so that its temperature rose by $23°C$.

Write down its new temperature.

Answer ..... °C [1]

(b) Liquid B was cooled so that its temperature fell by $8°C$.

Write down its new temperature.

Answer ..... °C [1]

(c) Find the average of the final temperatures of the two liquids.

Answer ..... °C [2]

6(a) Solve the equation $4x+8=2x-20$

Answer ..... [2]

6(b) Evaluate $-3(5-2)+\left[2-(3\times5)\right]$, showing your working clearly.

Answer ..... [3]

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7 John bought 30 red and blue pens.

(a) If there are x red pens, write down in terms of x, the numbers of blue pens.

Answer .....blue pens [1]

The red pens are sold at 50¢ each and the blue pens are sold at 40¢ each.
The total bill for the pens was $13.00.

(b) Write down an expression in x for,

(i) the cost of the red pens,

Answer $..... [1]

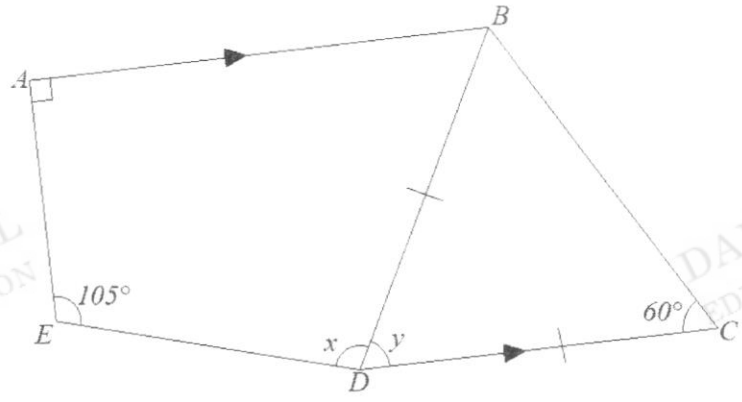
(ii) the cost of the blue pens.

Answer $..... [1]

(c) Form an equation in x and solve it to find the number of blue pens.

Answer .....blue pens [3]

8 Triangle BCD is an isosceles triangle and AB is parallel to DC.
Given that $\angle BCD = 60°$, $\angle AED = 105°$ and $\angle EAB$ is a right angle.



Find the values of

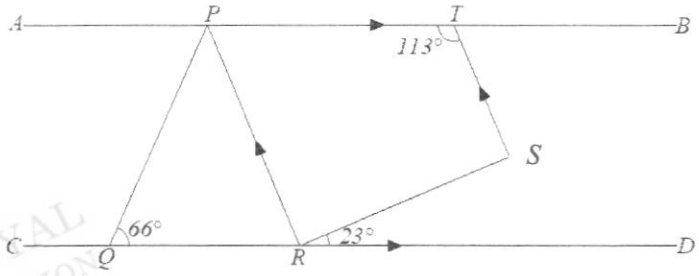
(a) y,

Answer .....° [2]

(b) x.

Answer .....° [2]

9 In the diagram given below, AB is parallel to CD and PR is parallel to ST.
Given that $\angle PQR = 66°$, $\angle DRS = 23°$ and $\angle PTS = 113°$.



Stating your reasons clearly, find
(a) $\angle RST$,

Answer .....° [2]

(b) $\angle PRS$,

Answer .....° [1]

(c) $\angle QPR$.

Answer .....° [2]

10 The first four terms of a sequence are $-4, -1, 2, 5, ...$

(a) Write down the next term in the sequence.

Answer ..... [1]

(b) Write down an expression for the n^{th} term.

Answer ..... [2]

(c) Hence, find the 25^{th} term in the sequence.

Answer ..... [1]

(d) Explain why 255 is not a term of the sequence.

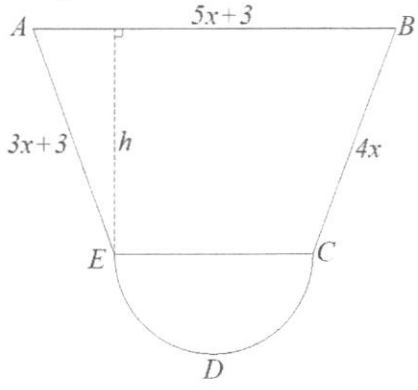
Answer .....

.....

.....

..... [2]

11 The composite figure below shows a trapezium $ABCE$ and a semicircle CDE.
Expressions for the lengths of three sides of a trapezium are shown on the diagram below.
All lengths are given in centimetres.



(a) The perimeter of this trapezium is given by the expression $(20x - 3)$ cm.

Show that the length of EC is $(8x - 9)$ cm.

Answer .....

.....

.....

.....

..... [2]

(b) Given that $AE = BC$, find the value of x and hence, calculate the perimeter of the trapezium.

Answer .....cm [2]

(c) Given that the area of the trapezium is 264 cm^2, find

(i) the height, h, of the trapezium.

Answer .....cm [2]

(ii) area of the composite figure.

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

End of Paper

1E

2022 End of Year Examination

Secondary One Express

MATHEMATICS
Paper 2

12 October 2022
1 hour 15 minutes
0800h – 0915h

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

READ THESE INSTRUCTIONS FIRST

Write your full name, class and index number on all the work you hand in.
Write in dark blue or black ink pen on both sides of the paper.
You may use a 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.

FOR MARKER'S USE		
	Marks Awarded	Max Marks
Total		**50**

1 **(a)** Express 58.6% as a decimal.

Answer ..... [1]

(b) Express 55 seconds as a percentage of 4 minutes.

Answer ..... % [1]

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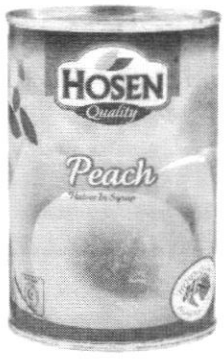
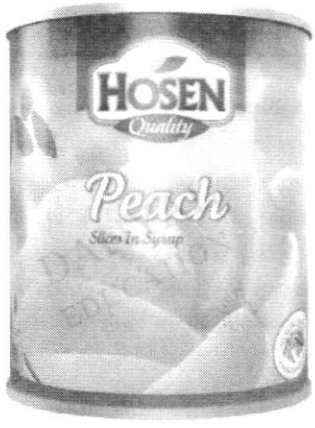
2 Peaches are sold in either small or large tins.



Small: 420g, $2.65



Large: 825g, $4.20

(a) Calculate the cost per 100 g of peaches in a small tin.

Answer $ ...../ 100g [1]

(b) State which tin gives you a better value. Explain.

Answer .....

..... [1]

3 **(a)** Find the HCF of $2^4 \times 3 \times 5^3$ and $2^4 \times 3^2 \times 5 \times 7$.

Answer HCF = ... [1]

(b) If $A : B = 3 : 4$ and $B : C = 3 : 5$, find the ratio $A : B : C$.

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

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4 Three shuttle bus services leave from a terminal station.
For a complete loop, the first service takes 15 minutes,
the second takes 21 minutes and the third takes 25 minutes.
All three services leave the terminal station together at 0800.
Find the time when the three services next leave the terminal station together.

Answer ..... [3]

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5 A polygon has n sides.
Three of its exterior angles are $21°, 43°$ and $56°$.
The other $(n-3)$ exterior angles are $12°$ each.
Find the value of n.

Answer n = ... [3]

6 A train started a journey from A and travelled for 2 hours 12 minutes to B.
It stopped for 15 minutes and then continued its journey to C for another 1 hour.
The distance between A and C is 280 km.

(a) Find the time taken for the journey from A to C, in hours.

Answer ..... h [1]

(b) Find the average speed of the whole journey in km/h.

Answer ..... km/h [1]

(c) After resting at C for 15 minutes, the train continued its journey to D, at an average speed of 110 km/h for 50 minutes.

(i) Convert 110 km/h to m/s.

Answer ..... m/s [1]

(ii) Find the distance between C and D, in km.

Answer ..... km [1]

7 During a warehouse sale, cloths are being sold at a flat rate regardless of the type.
A tailor bought 100 m^2 of Cotton, Dry-fit and Stretchy cloth in the ratio of 6 : 15 : 4 respectively.
She paid a total sum of $800 for the cloths.
The tailor proceeded to create shirts using the cloth purchased.
Each shirt requires 0.5 m^2 of cloth.

Calculate
(a) the amount she paid for the Cotton cloth.

Answer $..... [1]

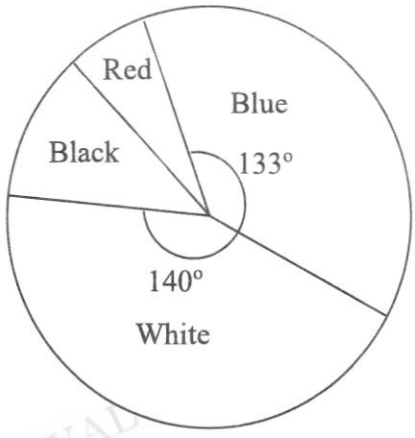
(b) the amount of Cotton cloth bought, in m^2.

Answer ..... m^2 [1]

(c) Calculate the selling price for each Cotton shirt, given that the tailor intends to make a profit of 30% on all the Cotton shirts.

Answer $..... [2]

8 Nicolette recorded the colour of cars travelling through Sun Plaza taxi stand one day. Her results are shown on a pie chart (diagram is not drawn to scale).



(a) Find the fraction of cars that were white.

Answer ..... [1]

(b) Calculate the percentage of cars that were blue.

Answer ..... % [1]

(c) There were twice as many black cars as red cars.
Find the angle representing red cars.

Answer ..... ° [1]

(d) Given that there were 145 red cars, find the total number of cars in the survey.

Answer ..... [1]

9 In triangle ABC, $AB = 9$ cm, $BC = 7$ cm and $AC = 6$ cm.

(a) Construct the triangle ABC. [1]

Line AB has already been drawn in the answer space provided.

Answer

(b) Find the value of $\angle ABC$.

Answer ..... ° [1]

(c) Using a compass, construct the perpendicular bisector of AB. [1]

(d) Construct the angle bisector of $\angle BAC$. [1]

(e) The perpendicular bisector of AB intersects the angle bisector of $\angle BAC$ at point P. Measure and write down the value of PA.

Answer ..... cm [1]

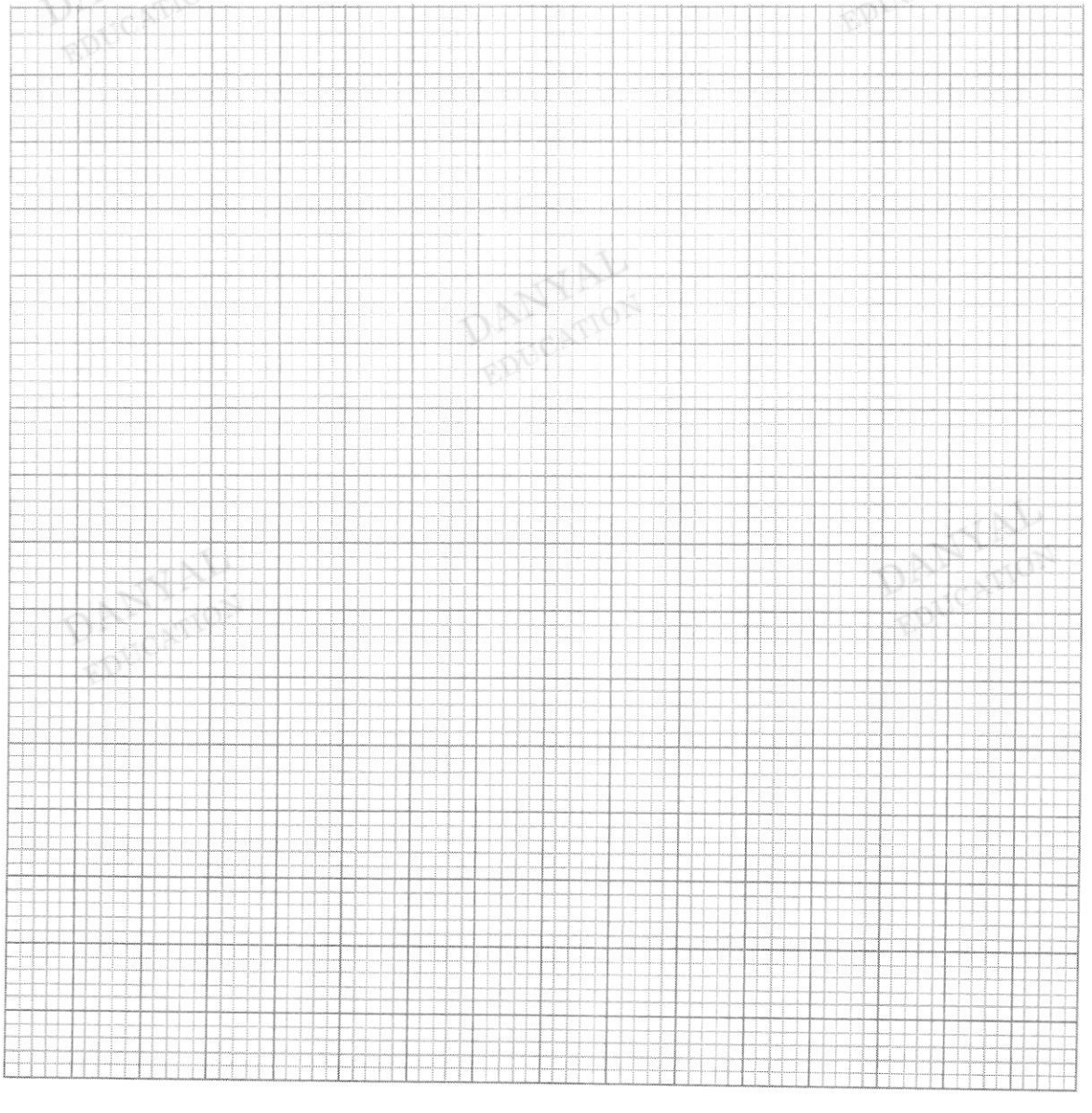
10 The following table shows some corresponding values of x and y for the equation $y = 4x + 8$.

x	-4	-2	0	2
y	-8	0	8	m

(a) Calculate the value of m.

Answer m = ... [1]

(b) Using a scale of 2 cm to 1 unit for the x-axis and 1 cm to 2 units for the y-axis, plot the graph of $y = 4x + 8$ for $-4 \leq x \leq 2$. [2]



(c) From the graph, find the value of

(i) x when $y = 2$,

Answer x = ... [1]

(ii) y when $x = -1$.

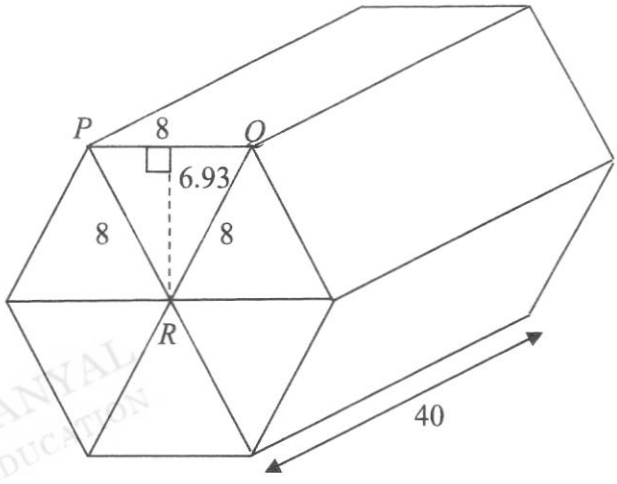
Answer y = ... [1]

(d) On the same axes in **(b)**, draw the line of $y = 6$. [1]

(e) Hence, write down the coordinates of the point of intersection where the line $y = 4x + 8$ meets the line $y = 6$.

Answer (..... , ...) [1]

11 The diagram shows a solid hexagonal prism.
The cross-section of the prism is a regular hexagon made up of six equilateral triangles, with sides of length 8 cm and height 6.93 cm.
The length of the prism is 40 cm.



Calculate

(a) the area of triangle PQR,

Answer ..... cm^2 [1]

(b) the volume of the prism,

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

(c) the total surface area of the prism.

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

12 Solve the following equations.

(a) $\dfrac{x-7}{4}=9$

Answer x = ... [2]

(b) $\dfrac{y}{2}-\dfrac{3y+1}{4}=5$

Answer y = ... [3]

(c) $6(z+3)-7(2z-5)=3(5z-4)-4$

Answer z = ... [3]

End of Paper

2022 Final Year Examinations

Sec 1E Mathematics Paper 1 Marking Scheme

1a)	$2^2 \times 3^3 \times 5$	B1
1b)	50	B1
2a)	$2b(c-2b+1)$	B1
2b)	$(m+3)(n-6)$	B1
3ai)	2.0	B1
3aii)	3.0	B1
3b)	$\frac{2.0+3.0}{\sqrt[3]{125}}$	M1
	1	A1
4a)	$\frac{1}{2}a-\frac{1}{4}a+\frac{1}{2}b+\frac{1}{4}b$	M1
	$\frac{1}{4}a+\frac{3}{4}b$	A1
4b)	$6p-10q-2p+4q$	M1
	$4p-6q$	A1
5a)	18	B1
5b)	- 13	B1
5c)	$\frac{18+(-13)}{2}$	M1
	2.5	A1

6a)	$4x-2x=-20-8$	M1
	$x=-14$	A1
6b)	$-3(3)+[2-(15)]$	M1
	$-9+[-13]$	M1
	-22	A1
7a)	$30-x$	B1
7bi)	$0.5x$	B1
7bii)	$0.4(30-x)$ o.e	B1
7c)	$0.5x+0.4(30-x)=13$	M1
	$x=10$	M1
	20	A1
8a)	$180-2(60)$	M1
	60	A1
8b)	$360-90-105-60$	M1
	105	A1
9a)	$67+23$ (alt. angles)	M1
	90	A1
9b)	90 (int. angles)	B1
9c)	$\angle QRP=180-90-23=67$	M1
	47 (sum of angles in Δ)	A1

10a)	8	B1
10b)	3n-7	B1 (for 3) B1 (for -7)
10c)	68	B1
10d)	$3n-7=255$	M1
	n does not give a positive integer	A1
11a)	$(20x-3)-(3x+3)-4x-(5x+3)$	M1
	$8x-9$ (SHOWN)	A1
11b)	$3x+3=4x$ or $x=3$	M1
	57	A1
11ci)	$\frac{1}{2}(15+18)h=264$	M1
	16	A1
11cii)	$\frac{1}{2}\pi\left(\frac{15}{2}\right)^2$	M1
	352	A1

2022 Final Year Examination

Sec 1E Mathematics Paper 2 Marking Scheme

1(a) $\frac{58.6}{100} = \mathbf{0.586}$ [A1]

(b) $\frac{55}{240} \times 100\% = \mathbf{22.9}\%$ [A1]

2(a) $\frac{\$2.65}{420} \times 100 = \mathbf{\$0.63}$ / 100g [A1]

(b) $\frac{\$4.20}{825} \times 100 = \mathbf{\$0.51}$ / 100g

The **large tin** is a better deal as the **cost per 100g is cheaper** [A1]

3(a) HCF = $2^4 \times 3 \times 5 = \mathbf{240}$ [A1]

(b) A : B : C
3 : 4
3 : 5
9: 12 : **20**
[A1] [A1]

4) $15 = 3*5$
$21 = 3*7$
$25 = 5^2$
LCM = $3*5^2*7 = 525$ min [M1]
$= 8$h 45min [M1]
Required Time = **4.45pm** [A1]

5) Remaining angles = $360° - 21° - 43° - 56° = 240°$
$n - 3 = \frac{240}{12} = 20$ [M1]
$n = 23$ [A1]

6(a) Time taken = 2h 12 min − 15 min + 1h = **3.45h** [A1]

(b) Average Speed = $\frac{280}{3.45}$ = **81.2 km/h** [A1]

(c)(i) $\frac{110000m}{3600s}$ = **30.6 m/s** [A1]

(ii) Distance = $110 \times \frac{50}{60}$ = **91.7 km** [A1]

7(a) Amount paid = $\frac{6}{25} \times \$800$ = **\$192** [A1]

(b) Amount of Cotton cloth = $\frac{6}{25} \times 100$ = **24 m²** [A1]

(c) Number of Cotton shirt = $\frac{24}{0.5}$ = 48 [M1]

Selling price per shirt = $\frac{192 \times 1.3}{48}$ = **\$5.20** [A1]

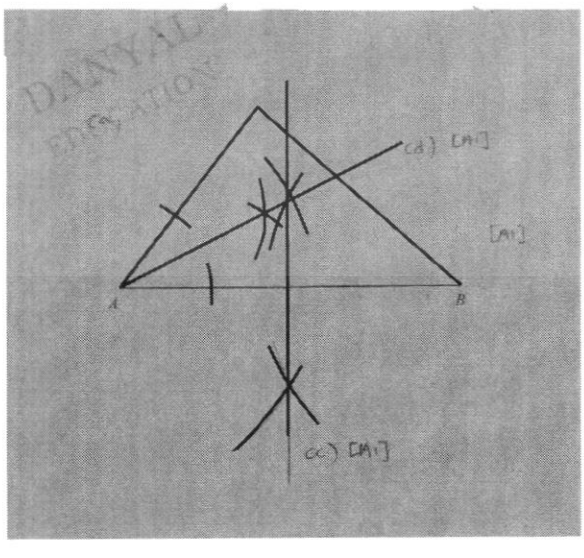
8(a) White → $\frac{140}{360} = \frac{7}{18}$ [A1]

(b) Blue → $\frac{133}{360} \times 100\% = 36.9\%$ [A1]

(c) Required angle = $\frac{360 - 140 - 133}{3}$ = **29°** [A1]

(d) 29° → 145 cars
360° → **1800 cars** [A1]

9

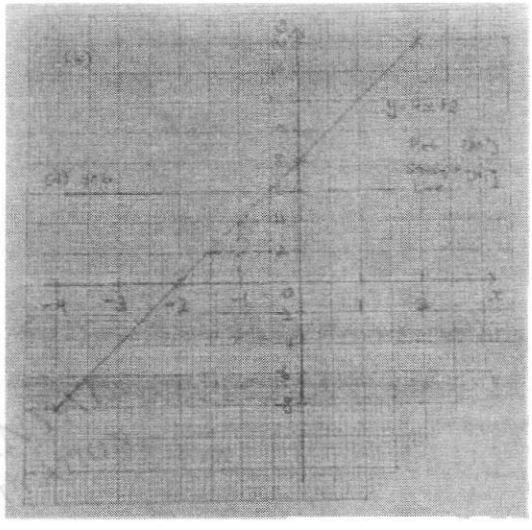


(b) **42°** ±1° [A1]

(e) **5cm** ±0.1cm [A1]

10(a) $m = 16$ [B1]

(b)&(d)



(c)(i) $x = -1.5$ [A1]

(ii) $y = 4$ [A1]

(e) **(-0.5, 6)** [A1]

11(a) Area $= \frac{1}{2}(8)(6.93) = 27.72\text{cm}^2$ [A1]

(b) Area of base = 27.72*6 = 166.32 cm^2 [M1]
Volume = 166.32*40 = **6652.8 cm^3** [A1]

(c) Curve Surface Area $= (8\times6)\times40$ [M1]
$= 1920\ \text{cm}^2$
Total Surface Area = 1920 + 166.32×2
= **2252.64 cm^2** [A1]

12(a) $x - 7 = 36$ [M1]
$x = \mathbf{43}$ [A1]

(b) $\frac{2y - 3y - 1}{4} = 5$ [M1]
$-y - 1 = 20$ [M1]
$y = -21$ [A1]

(c) $6z + 18 - 14z + 35 = 15z - 12 - 4$ [M1]
$6z - 14z - 15z = -12 - 4 - 18 - 35$ [M1]
$-23z = -69$
$z = \mathbf{3}$ [A1]