Name:	Index Number:	Class:

YIO CHU KANG SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2018
SECONDARY ONE EXPRESS

MATHEMATICS
Paper 1

1 hour

8 October 2018 (Monday)

READ THESE INSTRUCTIONS FIRST

Candidates answer on the Question Paper.

Write your index number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a 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 the marks for this paper is 40.

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
40

Setter: Miss Chia Yi Ying

1 **(a)** Using a calculator, evaluate $1\frac{2}{3}-\frac{5}{6}\div\left(-3\frac{1}{7}\right)$ and correct your answer to 2 decimal places.

Answer ..... [1]

(b) Using a calculator, evaluate $\sqrt{\frac{15.9-3.1^2}{4.9\times 0.2}}$ and correct your answer to 4 significant figures.

Answer ..... [1]

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2 Lucas bought 8 bottles of fresh milk and 6 cartons of soft drinks from a shop. The price of a bottle of fresh milk is \$2.95 and that of a carton of soft drink is \$19.50.

Without using a calculator, estimate the total price of Lucas's purchase to the nearest dollar.

Answer \$ ..... [2]

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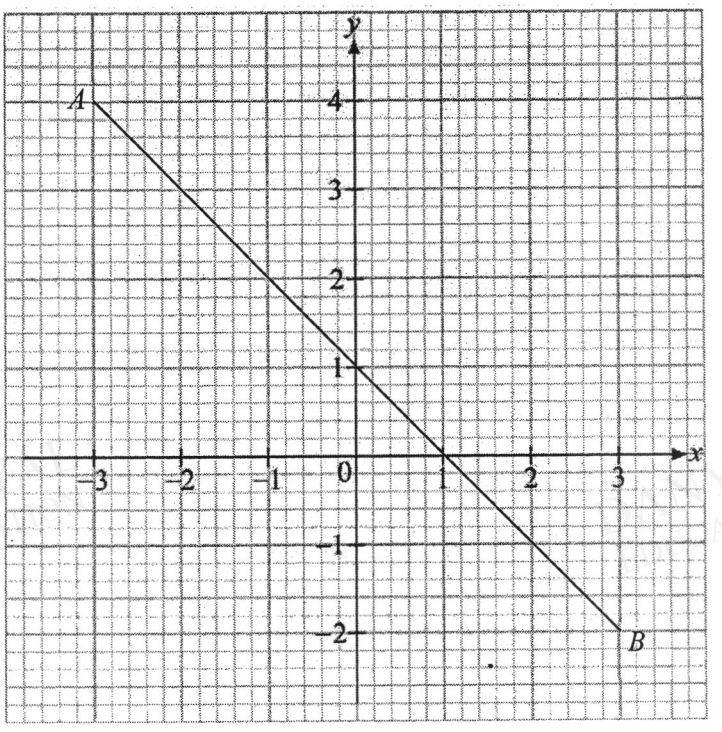
3 Solve the equation $10s-\frac{5s+4}{3}=7$.

Answer ..... [2]

4



Find the gradient of the line AB.

Answer ..... [2]

5 Jane travelled from City P to City Q. She covered $\frac{5}{9}$ of her journey by train, 0.75 of her remaining journey by bus and the rest of the journey on foot.

(a) Find the fraction of the journey that she covered on foot.

Answer ..... [2]

(b) If she travelled 35 km by train, how far apart are the 2 cities?

Answer ..... km [1]

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6 **(a)** Factorise $ab - ac$.

Answer ..... [1]

(b) Hence find the exact value of $16\,249 \times 769 - 16\,249 \times 759$.

Answer ..... [2]

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7 Alan's height is 1.6 m. Daniel's height is 115% of Alan's height and 98% of Calvin's height.

Find Calvin's height.

Answer ..... m [3]

---

8 **(a)** Express 216 as a product of its prime factors.

Answer ..... [1]

(b) Hence without the use of a calculator, evaluate $\sqrt[3]{216}$.

Answer ..... [2]

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9 At a carnival, the ratio of the number of adults to the number of children was 5 : 13. The ratio of the number of women to the number of men is 8 : 7.

(a) Find the ratio of the number of children to the number of men.

Answer ..... [1]

(b) If there are 896 more children than men, how many people attended the carnival?

Answer ..... [2]

---

10 Adrian wants to plan for a dinner gathering for his friends. He has a budget of $600 for the dinner gathering. The cost per person is $22.80.

(a) Write down an inequality for the number of people Adrian can invite with his budget. Let x be the number of people he can invite.

Answer ..... [1]

(b) Solve the inequality, in part **(a)**, to find the maximum number of people Adrian can invite.

Answer ..... [2]

11 It is given that $180 = 2^2 \times 3^2 \times 5$ and $300 = 2^2 \times 3 \times 5^2$.

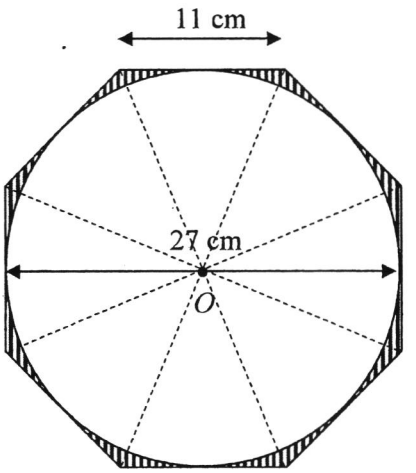
(a) Find the largest integer that is a factor of both 180 and 300.

Answer ..... [1]

(b) Find the smallest integer value of x such that the lowest common multiple of 180, 300 and x is 1800.

Answer ..... [2]

12 The figure below is made up of a regular octagon with sides 11 cm and a circle with centre O and diameter 27 cm.



Find the area of the shaded region.
Correct your answer to 3 significant figures.

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

13 **(a)** Construct triangle ABC where $BC = 7.5$ cm and $AC = 8$ cm. AB has already been drawn for you.

[1]

(b) Construct the

(i) bisector of angle ABC, [1]

(ii) perpendicular bisector of AB. [1]

(c) The two bisectors in **part (b)** meet at a point P.

Measure and write down the length AP.

Answer ..... cm [1]

14 A group of 30 people was asked to state the type of fruits they prefer. Their responses are given below.

M	G	M	A	W	W	M	W	G	G
A	W	A	M	W	W	W	M	G	A
G	M	A	W	M	M	G	W	M	A

Key: A – Apple, G – Grape, M – Mango, W – Watermelon

(a) Complete the table below.

Type of Fruits	Tally	Number of people
Apple	𝍸 //	6
Grape	𝍸 //	6
Mango		
Watermelon		
	Total	30

[1]

(b) Express the number of people who prefer mango as a percentage of the number of people who prefer apple.

Answer ..... % [2]

(c) This distribution is to be shown in a pie chart.

Calculate the angle representing the number of people who prefer grape.

Answer ..... ° [1]

Name:	Index Number:	Class:

YIO CHU KANG SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2018
SECONDARY ONE EXPRESS

MATHEMATICS
Paper 2

1 hour 30 minutes

Additional Materials:
Writing Paper
Graph Paper (1 Sheet)

9 October 2018 (Tuesday)

READ THESE INSTRUCTIONS FIRST

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

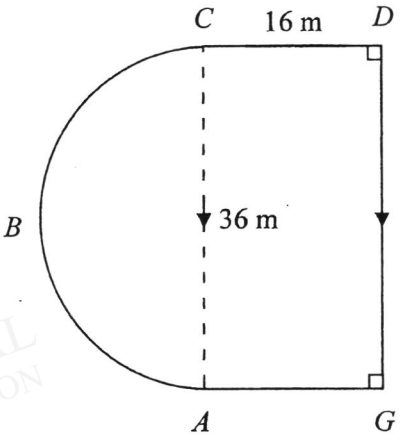
The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value 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 number of marks for this paper is 60.

For Examiner's Use
60

Setter: Mdm Ng Lee Kiang

1 The figure shows the floor plan of a ballroom at a hotel made up of a semicircle ABC and a rectangle $ACDG$. $CA = 36$ m and $CD = 16$ m.



Taking $\pi = 3.142$, calculate

(a) the area of the ballroom, giving your answer correct to the nearest m^2, [3]

(b) the cost of carpeting the entire ballroom if the price of the carpet is \$7.80 per m^2, giving your answer correct to the nearest dollar. [2]

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2 The charges for photocopy and binding services by two printers are given in the table below.

	Printer A	**Printer B**
Photocopy service	2 cents per page	1.8 cents per page
Binding service	\$1 per book	\$1.50 per book

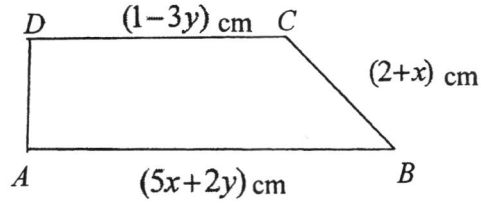
(a) Calculate

(i) the amount that you need to pay if you go to printer A to photocopy 410 pages. [1]

(ii) the number of pages you can photocopy with printer B for \$8.10. [1]

(b) You want to photocopy 2500 pages and bind them into a booklet. Which printer will you go to? Explain your choice clearly with workings. [3]

3



$ABCD$ is a trapezium. CD and AB are the two parallel sides. $AB = (5x+2y)$ cm, $BC = (2+x)$ cm, $CD = (1-3y)$ cm and the perimeter of the trapezium is $(5x-2y+9)$ cm.

(a) Find the length of AD in terms of x and y. [2]

(b) Given $x = 5$ and $y = -3$, find

(i) the perimeter of trapezium $ABCD$, [1]

(ii) the area of the trapezium $ABCD$. [3]

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4 The Oriental Express train leaves Singapore at 0945 hours and arrives at Kuala Lumpur station 4 hours and 45 minutes later. Calculate

(a) the time at which the train reaches Kuala Lumpur. Give your answer in 24-hour notation. [1]

On the return trip, the train travels 10 km/h faster.

(b) How long will the train take to reach Singapore, assuming that the distance between Singapore and Kuala Lumpur is 356.25 km? Give your answer in hours and minutes. [3]

(c) If the train stops at Kuala Lumpur for 3 hours, calculate the average speed of the train as it travels from Singapore to Kuala Lumpur and back. [3]

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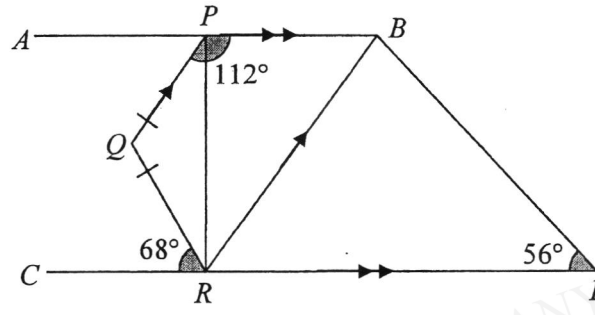
5 In the diagram below, AB is parallel to CD and PQ is parallel to BR and triangle PQR is an isosceles triangle. PR is perpendicular to CD. It is given that angle $QPB = 112°$, angle $CRQ = 68°$, angle $BDR = 56°$.



Find

(a) angle RBD, [2]

(b) angle BRQ, [2]

(c) angle QRP, [1]

(d) angle PQR. [1]

---

6 **Answer the whole of this question on a sheet of graph paper.**

During a science practical lesson, a hot test tube is left to cool. The temperature y°C of the test tube after x minute can be represented by the equation $y = ax + b$. The table below gives some values of x and the corresponding values of y.

x (minutes)	0	4	8	14
y (°C)	140	108	76	28

(a) Using a scale of 1 cm to represent 1 unit on the x-axis and 2 cm to represent 20 units on the y-axis, draw the graph of $y = ax + b$ for $0 \le x \le 14$. [2]

(b) Use your graph to find

(i) the temperature of the test tube after 11 minutes, [1]

(ii) the value of b, [1]

(iii) the value of a. Describe briefly what this value of a represents. [2]

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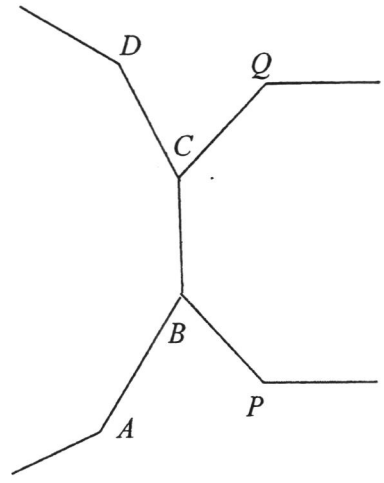
7 The diagram shows part of a regular 12-sided polygon $ABCD$ and part of a regular octagon $PBCQ$ which are drawn on opposite sides of the common line BC.



Calculate

(a) angle ABC, [3]

(b) angle BPQ, [2]

(c) angle ABP. [3]

---

8 **(a)** Andy bought an antique watch for \$480.
Ten years later, he sold the watch at a profit of 250% of what he paid.

Calculate the selling price. [2]

(b) The original value of a car is \$80 000.
The value of the car decreases by 15% of its value at the end of each year.

Calculate the value of the car at the end of the third year. [3]

(c) Berlin invests \$25 000 in a savings plan with a bank that pays simple interest rate of 5% per annum.

Find the length of time, in years, for her investment to grow to \$32 500. [3]

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9 The diagrams below show patterns consisting of grey and white squares.

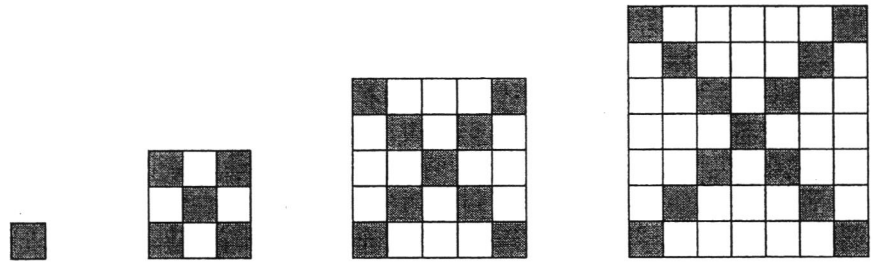

Diagram 1 Diagram 2 Diagram 3 Diagram 4

Diagram	Number of grey squares (G)	Number of white squares (W)	Total number of squares (T)
1	1	0	1
2	5	4	9
3	9	16	25
4	13	36	49
5	⋮	⋮	⋮
6	21	x	y

(a) Find the values of x and of y. [2]

(b) Write down an expression, in terms of n, for the number of grey squares (G) in Diagram n. [1]

(c) Calculate the number of grey squares in Diagram 123. [1]

(d) **(i)** Write down an expression, in terms of n, for the total number of squares (T) in Diagram n. [1]

(ii) Explain why there is no diagram with a total number of 530 squares. [1]

(e) Write down an equation connecting G, W and T. [1]

(f) If there are 89 grey squares in Diagram 23, calculate the number of white squares. [2]

Yio Chu Kang Secondary School
2018 End-of-Year Examination Sec 1 Express Maths
Paper 1 Marking Scheme

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1 **(a)** 1.93 [A1]

(b) 2.533 [A1]

---

2 Estimated amount $= (8\times\$3.00)+(6\times\$20.00)$ [M1]

$=\$24+\$120$

$=\$144$ [A1]

3

$$10s-\frac{5s+4}{3}=7$$

$$\frac{5s+4}{3}=10s-7$$

$$5s+4=3(10s-7)$$

$$5s+4=30s-21$$ [M1]

$$30s-5s=21+4$$

$$25s=25$$

$$s=\frac{25}{25}$$

$$s=1$$ [A1]

---

4 $\text{gradient}=\frac{-6}{6}$ [M1]

$=-1$ [A1]

---

5 **(a)** $\left(1-\frac{5}{9}\right)\times(1-0.75)$ [M1]

$=\frac{1}{9}$ [A1]

(b) $\frac{9}{5}\times 35$ [M1]

$=63$ km [A1]

---

6 **(a)** $ab-ac=a(b-c)$ [B1]

(b) $16\,249\times 769-16\,249\times 759$

$=16\,249(769-759)$ [M1]

$=162\,490$ [A1]

---

7 Daniel's height $= \frac{115}{100} \times 1.6$ [M1]

$= 1.84$

Calvin's height $= \frac{100}{98} \times 1.84$ [M1]

$= 1.8775$ (5 s.f.)

$= 1.88$ m (3 s.f.) [A1]

8 **(a)** $216 = 2^3 \times 3^3$ [A1]

(b) $\sqrt[3]{216} = \sqrt[3]{2^3 \times 3^3}$

$= 2 \times 3$ [M1]

$= 6$ [A1]

9 **(a)** $8 + 7 = 15$ u

Ratio of adult to children $= 5 : 13$

$= 15 : 39$

Ratio of children to men $= 39 : 7$ [A1]

(b) Total number of people $= \frac{15 + 39}{39 - 7} \times 896$ [M1]

$= 1512$ [A1]

10 **(a)** $22.8x \leq 600$ [A1]

(b) $22.8x \leq 600$

$x \leq \frac{600}{22.8}$

$x \leq 26\frac{6}{19}$ [M1]

Maximum number of people that can be invited is 26. [A1]

11 **(a)** $2^2 \times 3 \times 5 = 60$ [A1]

(b) $1800 = 2^3 \times 3^2 \times 5^2$ [M1]

$180 = 2^2 \times 3^2 \times 5$

$300 = 2^2 \times 3 \times 5^2$

Smallest integer $= 2^3$

$= 8$ [A1]

12

$$\text{Area of octagon} = 8\times\left(\frac{1}{2}\times 11\times\frac{27}{2}\right) \quad \text{[M1]}$$

$$= 594$$

$$\text{Area of circle} = \pi\times\left(\frac{27}{2}\right)^2 \quad \text{[M1]}$$

$$= 572.55 \text{ (5 s.f.)}$$

$$\text{Area of shaded region} = 594 - 572.55$$

$$= 21.45$$

$$= 21.5 \text{ cm}^2 \text{ (3 s.f.)} \quad \text{[A1]}$$

---

13 **(a)** triangle ABC where $BC = 7.5$ cm and $AC = 8$ cm [C1]
C must be labelled

(b) **(i)** bisector of angle ABC [B1]

(ii) perpendicular bisector of AB [B1]

(c) $AP = 5.4 \pm 0.1$ cm [B1]

---

14 **(a)**

Type of Fruits	Tally	Number of people
Apple	𝍸 //	6
Grape	𝍸 //	6
Mango	𝍸 𝍸	9
Watermelon	𝍸 𝍸	9
	Total	30

[B1] – table filled in correctly

(b) $\frac{9}{6}\times 100\%$ [M1]

$= 150\%$ [A1]

(c) $\frac{6}{30}\times 360$ [M1]

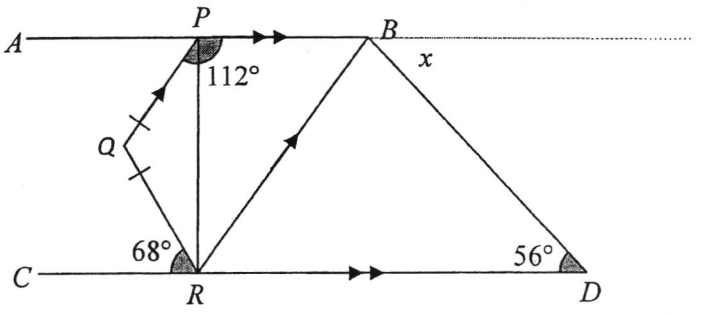
$= 72°$ [A1]

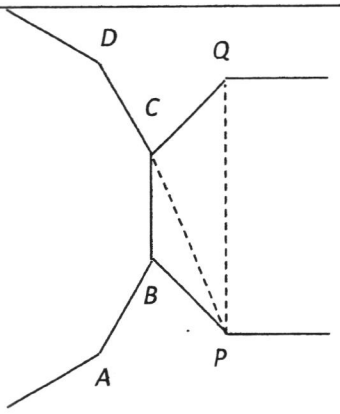
Sec One Express

EOY Exam Paper 2 2018 Marking Scheme

QN	Solution	Mark Allocation
1a	Radius of semicircle $ABC = CA \div 2$ $= 36 \div 2$ $= 18\,\text{m}$ Area of semicircle $ABC = \frac{1}{2} \times \pi r^2$ $= \frac{1}{2} \times \pi (18)^2$ $= 162\pi\,\text{m}^2$ Area of rectangle $ACDG$ = length × breadth $= 36 \times 16$ $= 576\,\text{m}^2$ Area of ballroom = 162(π) + 576 = 1085 m^2 (to the nearest m^2)	M1 M1 A1
1b	Cost = 1085.004 × \$7.80 = \$ 8463	M1 A1 √M1 ecf their answer (a)
2ai	Cost = $410 \times 0.02 = \$8.20$	B1
2aii	$\frac{8.10}{0.018} = 450$ pages	B1
2b	Printer A: Total amt. = $2500 \times 0.02 + 1$ = \$51 Printer B: Total amt. = $2500 \times 0.018 + 1.50$ = \$46.50 either Amt. saved = \$51 − \$46.50 = \$4.50 or Cost using printer B is less than cost using printer A Will choose printer B as it is cheaper	M1 M1 M1
3a	AD $= (5x - 2y + 9) - (5x + 2y) - (2 + x) - (1 - 3y)$ $= 5x - 2y + 9 - 5x - 2y - 2 - x - 1 + 3y$ $= -x - y + 6$ cm	M1 A1
3bi	When $x = 5, y = -3$,	

	Perimeter $= (5x - 2y + 9)$ $= 5(5) - 2(-3) + 9 = 40$ cm	B1
3bii	When $x = 5, y = -3$, $AD = -5 - (-3) + 6 = 4$ cm $CD = 1 - 3(-3) = 10$ cm $AB = 5(5) + 2(-3) = 19$ cm $\therefore$ Area of trapezium $= \frac{1}{2}(4)(10 + 19)$ $= 58$ cm^2	M1 All 3 are co calculated M1 A1 √M2 ecf their answer (a)
4a	0945 + 4 hours 45 mins = 1430 hours	B1
4b	Speed (SG to KL) $= \frac{356.25}{4.75}$ $= 75$ km/h Time (KL to SG $= \frac{356.25}{85}$ $= 4.19$ hours $= 4$ h ours 11.5 minutes	M1 M1 A1 Accept 11 min
4c	Total distance $= 356.25 \times 2$ $= 712.5$ km Total time taken $= 4.75 + 3 + 4.19$ $= 11.94$ hrs Average speed $= \frac{712.5}{11.94}$ $= 59.7$ km/h	M1 M1 A1 √M2 ecf their answer (b) Part (b) answered correctly. No marks will be awarded if calculate total time wrongly due to calculation error

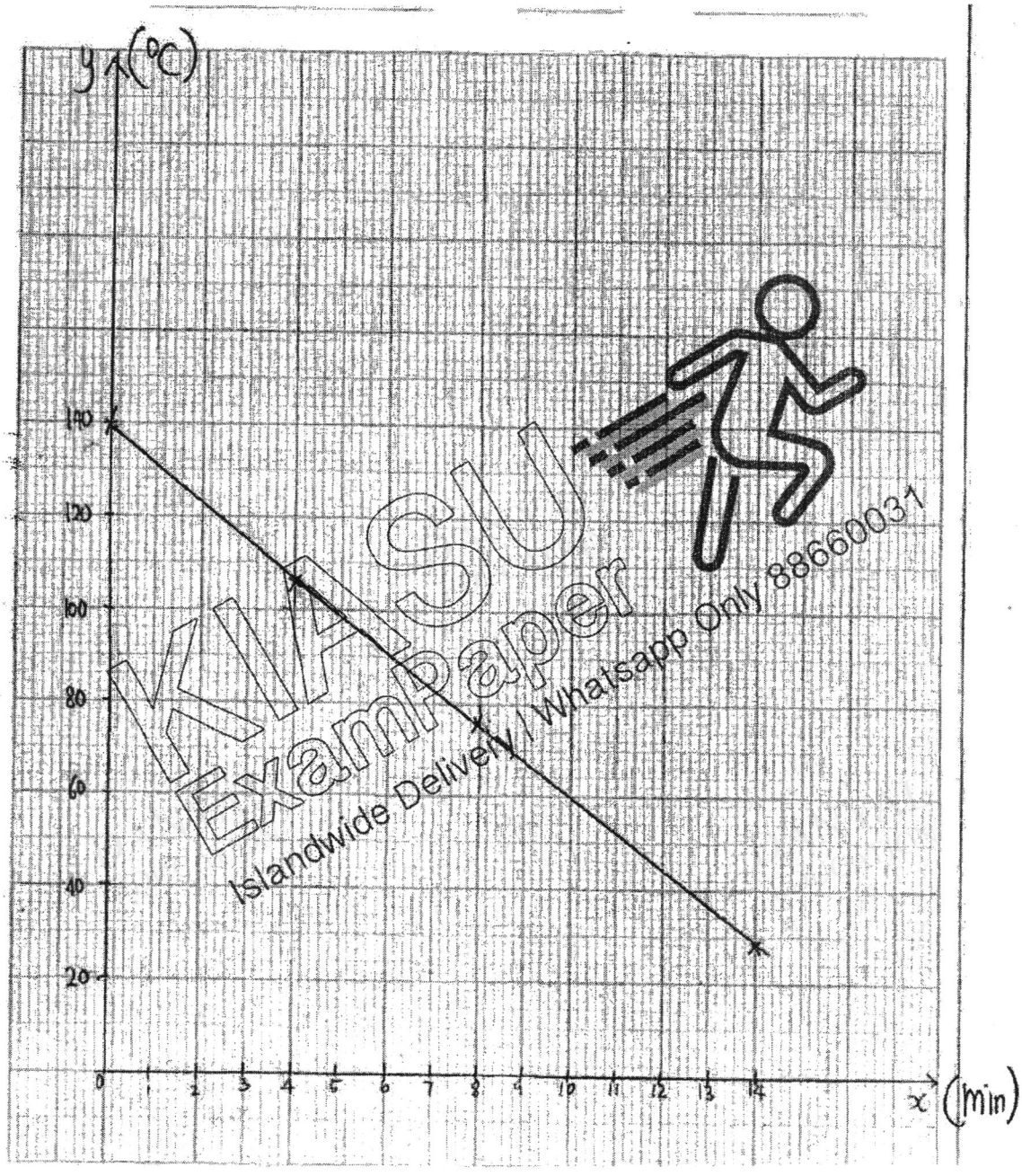
5a	 $\angle x = 56°$ (alt. $\angle$s, $AB \parallel CD$) ($\angle x$ is added in, extend line PB) $\angle RBD = 112° - 56°$ (corresponding angles) $= 56°$ Or $\angle DBR = 68°$ (interior angles) $\angle RBD = 180° - 56° - 68°$ $= 56°$ (interior angles)	M1 A1
5b	$\angle BRD = 180° - 56° - 56°$ ($\angle$ sum of Δ) $= 68°$ $\angle BRQ = 180° - 68° - 68°$ (adj. $\angle$ on a st. line) $= 44°$	M1 A1
5c	$\angle QRP = 90° - 68°$ $= 22°$	B1
5d	$\angle PQR = 180° - 22° \times 2$ $= 136°$	B1
6a	Refer to page 6	Correct scale and labelled axes 1 m Straight line passing through all correctly plotted points 1 m
6bi	52°C	B1
6bii	140	B1
6biii	$a = \frac{140 - 28}{0 - 14}$ $= -8$ a represents the rate of the temperature change per min.	B1 B1
7a	Sum of interior angles of 12 sided polygon $= (12 - 2) \times 180°$ $= 1800°$ $\angle ABC = \frac{1800°}{12}$ $= 150°$	M1 M1 A1

7b	 Since $PBCQ$ is a regular octagon, $\angle PBC = \frac{(8-2)\times 180°}{8}$ $= 135°$ $\angle BPC = \angle CPQ$ $= \frac{135°}{6}$ $= 22.5°$ $\angle BPQ = 22.5° + 22.5°$ $= 45°$ Or $\angle BPQ + \angle CQP + 2(135°) = 360°$ $\angle BPQ + \angle CQP = 90°$ $\angle BPQ = 45°$ Or $\angle PBC = \frac{(8-2)\times 180°}{8}$ $= 135°$ $\angle BPQ = 135° - 90° = 45°$	M1 A1 M1 A1 M1 A1
7c	Size of exterior angle of 12 sided polygon $= 180° - 150°$ $= 30°$ Size of exterior angle of octagon $= 180° - 135°$ $= 45°$ $\angle ABP = 30° + 45°$ $= 75°$ Or $\angle ABP = 360° - 150° - 135°$ $= 75°$	M1 M1 A1 M2 A1

8a	Selling price $= \frac{350}{100} \times \$480$ $= \$1680$	M1 A1
8b	Value of car (end of 1st year) $= \frac{85}{100} \times \$80000$ $= \$68\,000$ Value of car (end of 2nd year) $= \frac{85}{100} \times \$68000$ $= \$57\,800$ $\therefore$ Value of car (end of 3rd year) $= \frac{85}{100} \times \$57800$ $= \$49\,130$	M1 M1 √M1 ecf their answer 1st step A1
8c	Let n be the number of years required. Amount of interest $= \$32500 - \$25000$ $= \$7500$ $25000 \times \frac{5}{100} \times n = 7500$ $1250n = 7500$ $n = 6$ $\therefore$ Required no. of years $= 6$ years Or Amount of interest $= \$32500 - \$25000$ $= \$7500$ $5\% \times \$25000 = \$1250$ Number of years $= \$75000 \div \$1250$ $= 6$	M1 M1 A1 M1 M1 A1
9a	$x = 100;\ y = 121$	B1, B1
9b	$G_n = -3 + 4n$	B1
9c	No. of grey squares in Diagram 123 $= -3 + 4(123)$ $= 489$	B1
9di	$T_n = (2n-1)^2$	B1
9dii	Column (T) consists of perfect squares only but 530 is not a perfect square. Or	B1

	530 cannot be square rooted to get an interger	
9e	$W + G = T$	B1
9f	$T_{23} = (2(23)-1)^2$ $= 2025$ No. of white squares $= 2025 - 89$ 1936	M1 A1

6 (a)



6a		Correct scale and labelled axes 1 m Straight line passing through all correctly plotted points 1 m
6bi	52°C	B1 No mark awarded for answer obtained by calculation

6bii	140	B1
6biii	$a = \frac{140-28}{0-14}$ $= -8$ a represents the rate of the temperature change per min.	B1 B1