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80

GREENDALE SECONDARY SCHOOL
End-of-Year Examination 2014

MATHEMATICS **4042/01**

Paper 1 10 October 2014

Secondary Three Normal Academic **2 hours**

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 or blue pen.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, 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 may result in loss of marks.
You are expected to use a scientific calculator to evaluate explicit numerical expressions.
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 required 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 80.

Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Strand	N	N	A	S	N	G	N	N	N	G	S	G	M
Marks	2	2	2	2	4	2	2	3	3	4	3	4	4

Question	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	
Strand	N	A	A	N	G	S	G	M	A	M	A	
Marks	3	3	4	4	5	3	3	4	5	4	5	

This document consists of 18 printed pages, including this cover page.

For Examiner's Use Only

Answer all the questions.

1. (a) Express 25% as a fraction in its lowest terms.

Answer (a) _____ [1]

(b) Express $\frac{1}{40}$ as a decimal.

Answer (b) _____ [1]

2. By writing each number correct to 1 significant figure, **estimate** the value of

$$\frac{58.4 \times 0.46}{13.2}.$$

You need to show your working.

Answer _____ [2]

3. Simplify $\frac{2x+3}{3} - \frac{x}{2}$.

Answer _____ [2]

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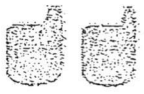
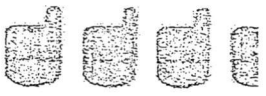
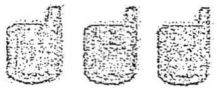
4. The pictogram below shows the sales of mobile phones of a company from January 2008 to May 2008.

January	
February	
March	
April	
May	
 represents 10 mobile phones	

(a) How many mobile phones were sold in the month of April?

Answer (a) _____ mobile phones [1]

(b) Which month registered the highest sales of mobile phones?

Answer (b) _____ [1]

For Examiner's Use Only

5. The numbers p, q, r, and s are represented on a number line.

The values of p, q, r and s are listed below.

$$\frac{7}{5} \qquad 0.75 \qquad \frac{3}{5} \qquad \frac{\pi}{2}$$

Find p, q, r and s.

Answer (a) $p =$ _____ [1]

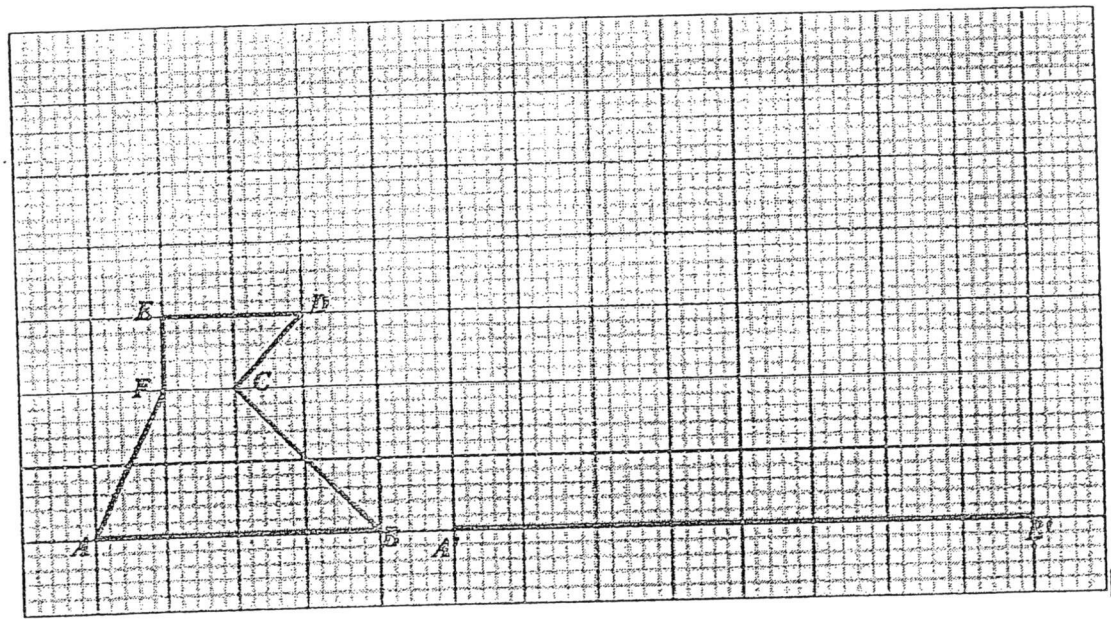
$q =$ _____ [1]

$r =$ _____ [1]

$s =$ _____ [1]

6. Enlarge the given figure in the grid below by a scale factor of 2 and draw the enlarged figure within the grid.

$A'B'$ of the enlarged figure has been drawn for you.



[2]

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7. In January 2014, the rate of exchange of Singapore dollar to Japanese yen was S$1 = ¥250.

(a) Ali exchanged S$850 to Japanese yen for his business trip.
How much Japanese yen did he receive?

Answer(a) ¥_____ [1]

(b) He spent ¥24 600 in Japan, and exchanged the remaining yen into dollars when the exchange rate was $1 = ¥260.

How much dollars did he receive? Give your answer to the nearest dollar.

Answer (b) S$_____ [1]

8. Melvin leaves home at 7:45am, and arrives at work at 9:10am.

(a) How long did Melvin take to go to work? Leave your answer in hours and minutes.

Answer (a) _____hours _____ minutes [1]

(b) Given that Melvin travelled 15km to work, find his average speed, in kilometres per hour.

Answer (b) _____km/h [2]

For Examiner's Use Only

9. (a) Express the ratio of 8 months to 2 years 4 months as a ratio in its simplest form

Answer (a) _____ : _____ [1]

(b) \$40 is divided in the ratio of $p : q$ where $p < q$.
Write down an expression in terms of p and q, for the smaller amount.

Answer (b) \$_____ [2]

10. (a) Show that the sum of interior angles of a 7-sided polygon is 900^0.

Answer (a) _____ ° [1]

(b) Four of the angles of a 7-sided polygon are 120^0, and the others are x^0, $(x+92)^0$ and $(2x-20)^0$. Find the largest angle.

Answer (b) _____ ° [3]

For Examiner's Use Only

11. The stem and leaf diagram below shows the waiting times (in minutes) of some patients in a clinic.

Stem	Leaves
1	5 6
2	0 1 3 7 8
3	0 0 2 4 6
4	1 2 4
5	3
6	1

Key : 4 | 1 represent 41 minutes

Find

(a) the maximum waiting time,

Answer (a) _____minutes [1]

(b) the total number of patients,

Answer (b) _____patients [1]

(c) the modal waiting time.

Answer (c) _____minutes [1]

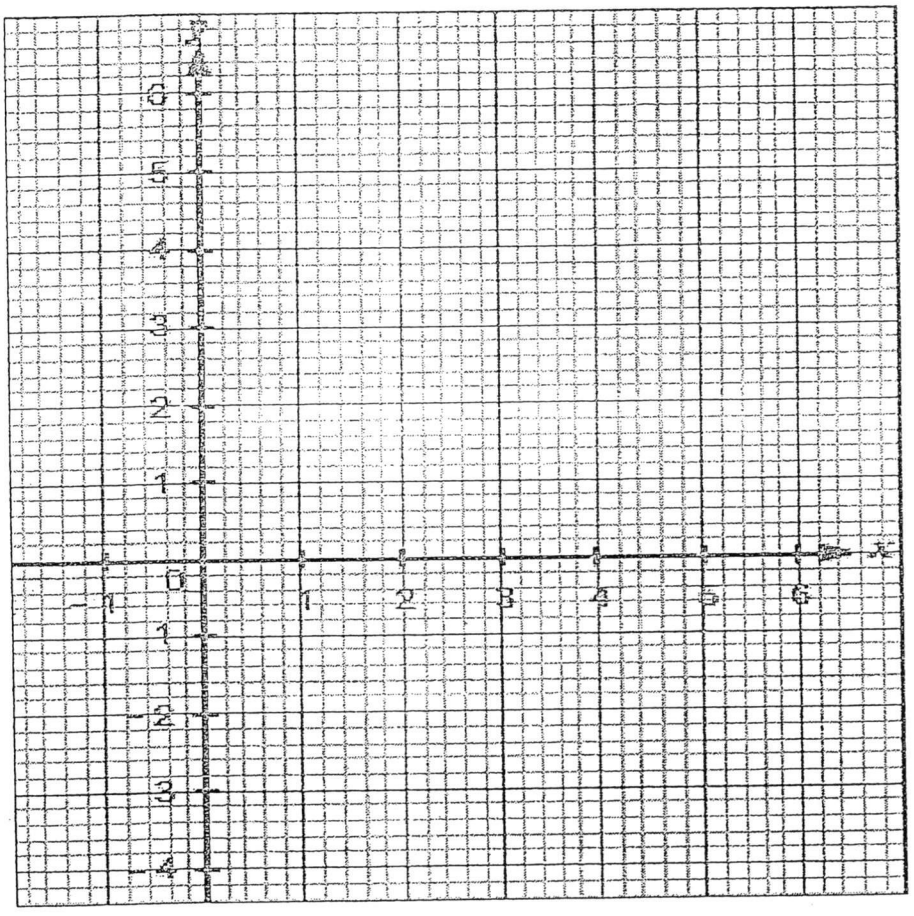
For Examiner's Use Only

12. (a) Complete the table of values for $y = 2x + 1$.

x	-1	0	2
y		1	

[2]

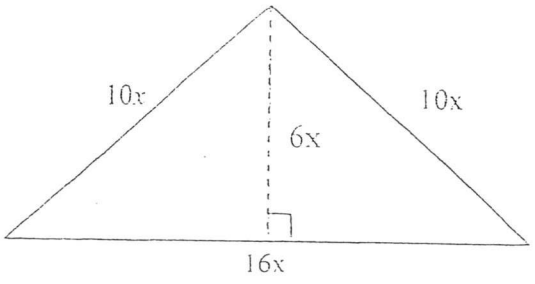
(b) On the grid below, draw the graph of $y = 2x + 1$.



[2]

For Examiner's Use Only

13. The perimeter of the triangle as shown below is 360 cm.
It has a base of $16x$ cm and height of $6x$ cm.



Find
(a) the value of x,

Answer (a) _____ [2]

(b) the area of the triangle.

Answer (b) _____ [2]

14. y is directly proportional to x^2.
Given that $y = 27$ when $x = 9$, find

(a) an expression for y in terms of x,

Answer (a) $y =$ _____ [2]

(b) Hence, find the value of x when $y = \frac{1}{12}$.

Answer(b) $x =$ _____ [1]

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15. (a) Evaluate 4^{-2}.

Answer (a) _____ [1]

(b) Given that $27^{\frac{2}{3}} = 3^x$, find x.

Answer (b) _____ [2]

16. (a) Given that $x^2 - 4x + 7 = (x - p)^2 + q$, find p and q.

Answer (a) $p =$ _____ [1]

$q =$ _____ [1]

(b) Hence, or otherwise, solve $x^2 - 4x + 7 = 3$.

Answer (b) _____ [2]

For Examiner's Use Only

17. The figures below show a sequence of patterns consisting of circles and triangles joined by the lines. The first three patterns are shown below.

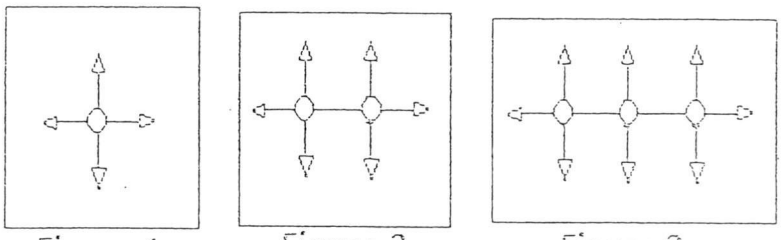

Figure 1 Figure 2 Figure 3

(a) Draw the next figure in the space provided. [1]

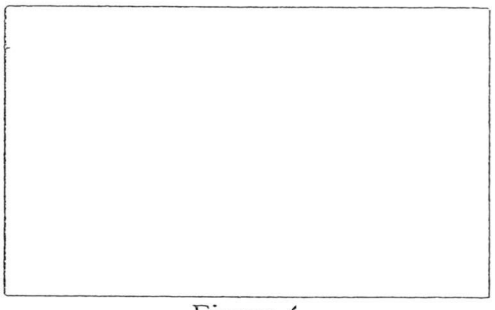

Figure 4

(b) The table below shows the tabulation of the number of ○ and △ for each figure.

Complete the table below by filling in the blanks for figures 4. [1]

Figure	Number of ○	Number of △
1	1	4
2	2	6
3	3	8
4		

(c) Write down in terms of n, the number of △ in the n^{th} figure.

Answer (c) _____ [2]

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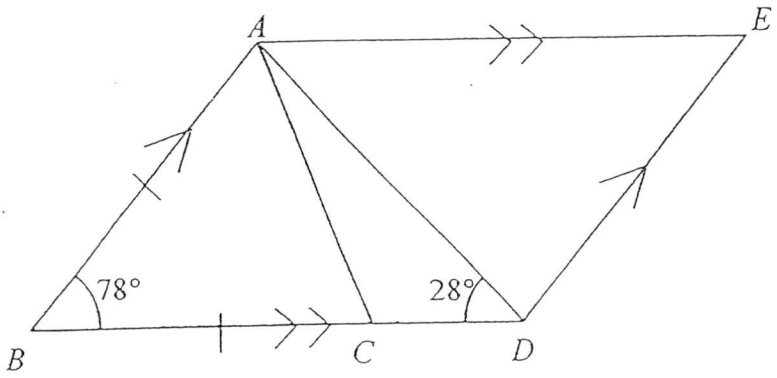
18. In the figure below, $ABDE$ is a parallelogram.
$AB = BC$, $\angle ABC = 78^0$ and $\angle ADC = 28^0$.



Writing down the reasons clearly, find the value of

(a) $\angle AED$,

Answer (a) $\angle AED =$ _____ ^{0} [1]

(b) $\angle DAE$,

Answer (b) $\angle DAE =$ _____ ^{0} [1]

(c) $\angle BAE$,

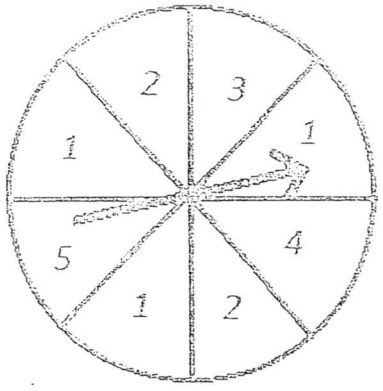
Answer (c) $\angle BAE =$ _____ ^{0} [1]

(d) $\angle ACD$,

Answer (d) $\angle ACD =$ _____ ^{0} [2]

For Examiner's Use Only

19. The diagram shows a wheel.



Joel spins the wheel once. What is the probability that Joel obtains

(a) a score of 1,

Answer (a) _____ [1]

(b) a score of an even number,

Answer (b) _____ [1]

(c) a score that is not a 2?

Answer (c) _____ [1]

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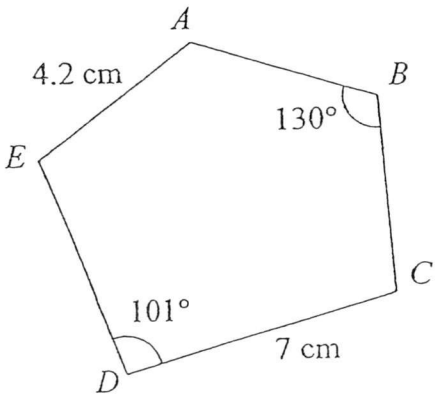
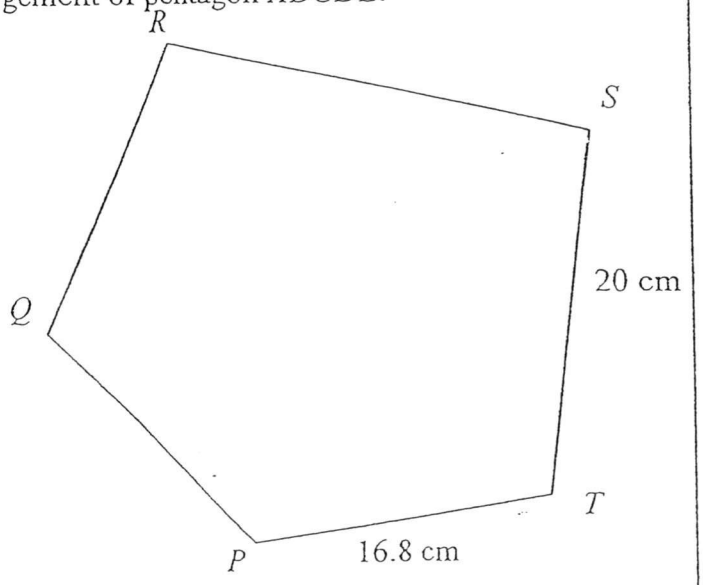
20. Pentagon $PQRST$ is an enlargement of pentagon $ABCDE$.





Find

(a) the scale factor of the enlargement,

Answer (a) _____ [1]

(b) $\angle RST$,

Answer (b) _____ °[1]

(c) RS.

Answer (c) _____ cm [1]

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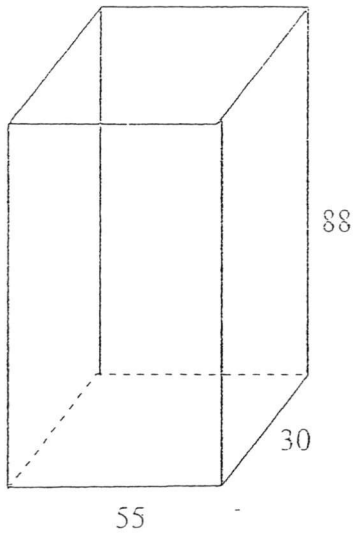
21. The diagram below shows a brick in the form of a rectangular cuboid.



(a) Calculate

(i) the volume of the brick.

Answer (a)(i) _____ cm^3 [1]

(ii) the total surface area of the brick.

Answer(a)(ii) _____ cm^2 [2]

(b) The brick will be painted with a special layer of water-proof material. It cost \$0.02 per square centimetre to paint it.

Calculate the cost of painting the brick.

Answer(b) \$_____ [1]

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22. (a) Solve $\frac{1}{4}x-3=1$

Answer (a) $x=$_____ [1]

(b) Solve $3(x-2)(x+4)=0$

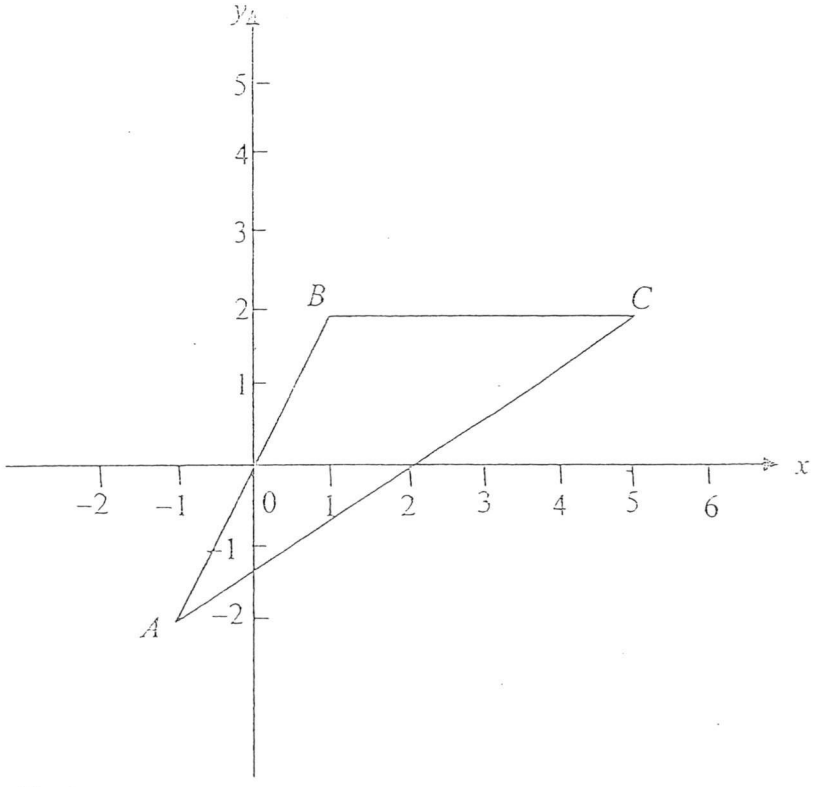
Answer (b) $x=$_____ *or* $x=$_____ [2]

(c) Solve $3y^2-5y-4=0$, giving each answer correct to 2 decimal places.

(b) $y=$_____ or $y=$_____ [2]

For Examiner's Use Only

23. The points $A(1, 2)$, $B(5, 2)$, $C(-1, -2)$ and D are vertices of parallelogram $ABCD$.



Find

(a) the gradient of BC,

Answer (a) _____ [1]

(b) the length of AC,

Answer (b) _____ units [1]

(c) the area of triangle ABC.

Answer (c) _____ cm^2 [1]

(d) State the co-ordinates of D.

Answer (d) (,) [1]

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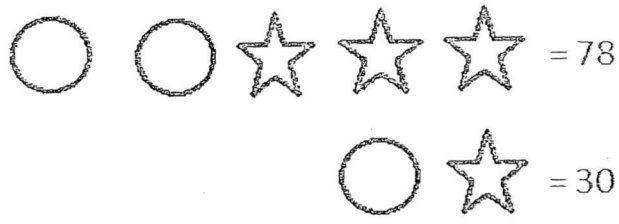
24. Given that



(a) Let x be ◯ and y be ☆, write down two simultaneous equations in x and y.

Answer (a) _____

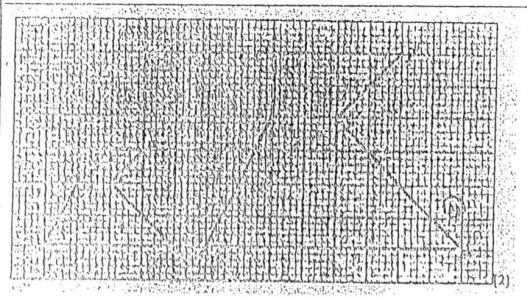
_____ [2]

(b) Solve these equations to find the value of one ◯ .

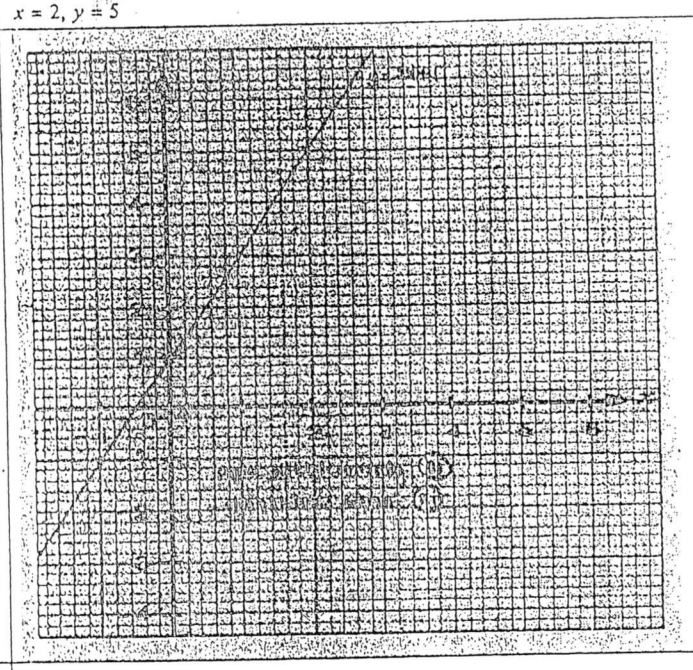
Answer (b) _____ [3]

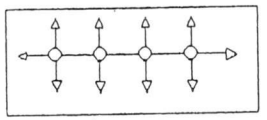
End – of - Paper

Marking Scheme

1(a)	$25\% = \frac{1}{4}$	B1
1(b)	$\frac{1}{40} = 0.025$	B1
2	$\frac{58.4 \times 0.46}{13.2} \approx \frac{60 \times 0.5}{10}$ $= 3$	M1 A1
3	$\frac{2x+3}{3} - \frac{x}{2}$ $= \frac{2(2x+3)-3(x)}{6}$ $= \frac{4x+6-3x}{6}$ $= \frac{x+6}{6}$	M1 A1
4(a)	30 mobile phones	B1
4(b)	January	B1
5	$p = \frac{3}{5}$ $q = 0.75$ $r = \frac{7}{5}$ $s = \frac{x}{2}$	B1 B1 B1 B1
6		B2 – for all lines drawn correctly B1 – for 1 to 2 lines drawn incorrectly.

7(i)	S$850 = ¥212 500	B1
7(ii)	Remaining ¥ = ¥212 500 - ¥24600 = ¥187 900 S$1 = ¥260 S$ x =¥187 900 $\therefore x = S\$723$(nearest dollar)	A1
8(a)	1 hour 25 minutes	B1
8(b)	$Average Speed = \frac{15km}{1\frac{5}{12}hr}$ (ecf) $= 10\frac{10}{17}\ km/h$ $or\ 10.6km/h$	M1 A1
9(a)	$8months : 2years4months$ 8 : 28 2 : 7	B1
9(b)	$smaller\ amount = \frac{p}{p+q} \times 40$ $= \$\frac{40p}{p+q}$	M1 A1
10(a)	$sum\ of\ \text{int}\angle s = (n-2) \times 180^0$ $= (7-2) \times 180^0$ $= 900^0 (shown)$	B1
10(b)	$sum\ of\ \text{int}\angle s = 900^0$ $4(120) + x + (x+92) + (2x-20) = 900^0$ $552^0 + 4x^0 = 900^0$ $4x^0 = 348^0$ $x^0 = 87^0$ $\therefore largest\angle = x + 92$ $= 87 + 92$ $= 179^0$	M1 M1 A1
11(a)	Maximum waiting time = 61 mins	B1
11(b)	Total no of patients = 17	B1

11(c)	Modal waiting time = 30 minutes	B1
12(a)	$x = -1,\ y = -1$ $x = 2,\ y = 5$	B1 B1
12(b)		
13(a)	$10x + 16x + 10x = 360$ $36x = 360$ $x = 10$	M1 A1
13(b)	$16x = 16(10) = 160$ *(ecf)* $6x = 6(10) = 60$ $Area\ of\ \Delta = \frac{1}{2}(160)(60) = 4800cm^2$	M1 A1
14(a)	$y = kx^2$ $27 = k(9)^2$ $k = \frac{27}{81} = \frac{1}{3}$ $y = \frac{1}{3}x^2$	M1 A1

14(b)	$\frac{1}{12} = \frac{1}{3}x^2$ $x^2 = \frac{1}{4}$ $x = \frac{1}{2}$ *(ecf)*	A1
15(a)	$4^{-2} = \frac{1}{16}$ / 0.0625	B1
15(b)	$27^{\frac{2}{3}} = 3^x$ $\left(3^3\right)^{\frac{2}{3}} = 3^x$ $3^2 = 3^x$ $x = 2$	M1 A1
16(a)	$x^2 - 4x + 7 = x^2 - 2px + q$ $\therefore -4 = -2p$ $p = 2$ $7 = p^2 + q$ $7 = (2)^2 + q$ $q = 3$	B1 B1
16(b)	<u>Hence (method)</u> $x^2 - 4x + 7 = 3$ $(x-2)^2 + 3 = 3$ $(x-2)^2 = 0$ $x = 2$ <u>Otherwise (method)</u> $x^2 - 4x + 7 = 3$ $x^2 - 4x + 4 = 0$ $a = 1,\ b = -4,\ c = 4$ $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(4)}}{2(1)}$ $x = 2$ <u>Otherwise (method)</u> $x^2 - 4x + 7 = 3$ $x^2 - 4x + 4 = 0$ $(x-2)^2 = 0$ $x = 2$	M1 A1
17(a)	 *Figure 4*	B1
17(b)	Number of circles = 4 Number of triangles = 10	B1 (award marks only when both answers correct)

17(c)	$Tn = a + (n-1)d$ $= 4 + (n-1)(2)$ $= 4 + 2n - 2$ $= 2 + 2n$	M1 A1
18(a)	$\angle AED = 78^0$ (*opp $\angle$s of //– gram*)	B1
18(b)	$\angle DAE = 28^0$ (*alt. $\angle$s*)	B1
18(c)	$\angle BAE = 180^0 - 78^0$ $= 102^0$ (int $\angle$s)	B1
18(d)	$\angle ACB = \frac{180^0 - 78^0}{2} = 51^0$ (*base $\angle$s isos Δ*) $\angle ACD = 180^0 - 51^0 = 129^0$ (*adj $\angle$s on str line*)	M1 A1
19(a)	P(score of 1) $= \frac{3}{8}$	B1
19(b)	P(even no) $= \frac{3}{8}$	B1
19(c)	P(not a 2) $= \frac{6}{8} = \frac{3}{4}$	B1
20(a)	*Scale factor* $= \frac{PT}{AE} = \frac{16.8}{4.2} = 4$	B1
20(b)	$\angle RST = \angle CDE = 101^0$	B1
20(c)	$\frac{RS}{CD} : \frac{PT}{AE}$ $\frac{RS}{7} : \frac{4}{1}$ $RS = 2 \times 7 = 28$ *cm*	B1
21(ai)	*Vol of brick* $= 55 \times 30 \times 88$ $= 145\,200$ *cm*^{3}	A1
21(aii)	*Total SA* $= 2(55 \times 30) + 2(30 \times 88) + 2(55 \times 88)$ $= 18\,260$ *cm*^{2}	M1 A1
21(b)	*Cost* $= \$0.02 \times 18\,260 = \$365.20$ *(ecf)*	A1

22(a)	$\frac{1}{4}x - 3 = 1$ $\frac{1}{4}x = 4$ $x = 16$	A1
22(b)	$3(x-2)(x+4) = 0$ $x - 2 = 0$, $x + 4 = 0$ $x = 2$, $x = -4$	B1 , B1
22(c)	$3y^2 - 5y - 4 = 0$ $a = 3$, $b = -5$, $c = -4$ $y = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(-4)}}{2(3)}$ $y = 2.26$ (2*dp*) $y = -0.59$ (2*dp*)	B1, B1 (-1 mark if answer is not in 2 dp)
23(a)	*gradient of BC* $= \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{2-2}{5-1} = 0$	A1
23(b)	*length of BC* $= \sqrt{(5+1)^2 + (2+2)^2}$ $= \sqrt{52} = 7.21$ *units*	A1
23(c)	*Area of* $\Delta ABC = \frac{1}{2}(4)(4)$ $= 8$ *units*^{2}	A1
23(d)	$D(3, -2)$	B1
24(a)	$2x + 3y = 78$ $x + y = 30$	B1 B1
24(b)	$2x + 3y = 78 - - - eq1$ $x + y = 30 - - - eq2$ $eq2 \times 2 : 2x + 2y = 60 - - - eq3$ $2x + 3y = 78 - - - eq1$ $eq3 - eq1 : -y = -18$ $y = 18$ *Subst into eq2* : $x + 18 = 30$ $x = 12$ *The value of x is* 12.	M1 M1 A1

Name: _____ ( )	Class: _____

SERVE-LEAD-EXCEL

GREENDALE SECONDARY SCHOOL
End-of-Year Examination 2014

MATHEMATICS 4042/02

Paper 2 8 October 2014

Secondary Three Normal Academic 2 hours

Candidates answer on the Writing Paper.

READ THESE INSTRUCTIONS FIRST

Write your index number and name on all the work you hand in.
Write in dark or blue pen.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A
Answer all questions.

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

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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.

This document consists of 8 printed pages, including this cover page.

Section A
Answer all the questions.

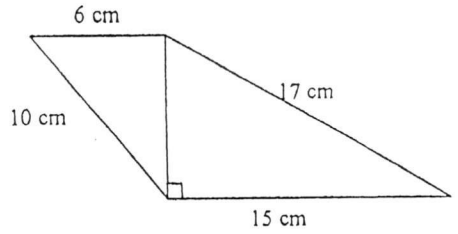
1. A car travelled for 3 hours 45 minutes at an average speed of 60 km/h.
   (a) Express 3 hours 30 minutes in hours. [1]
   (b) Find how far the car travelled. [1]
   Give your answer to the nearest kilometre.

2. The population of China is 3.67 billion.
   (a) Write 3.67 billion in standard form. [1]
   (b) Given that there are 8×10^5 children, what fraction of the whole population are children? Give your answer in its simplest form. [1]
   (c) The population doubles every 10 years.
   Find the population 40 years later.
   Write your answer in standard form. [2]

3. (a) Write the highest common factor of 30 and 40. [2]
   (b) The school bell in Spring School rings every 30 minutes while the school bell in Autumn School rings every 40 minutes. Both school bells ring at 8:15 am every day.
   At which time do both bells ring at the same time? [2]

4. Answer the whole of this question on the blank paper provided.
   In triangle ABC, $AB = 8$ cm, $AC = 6$ cm and $\angle BAC = 63^0$.
   (a) Construct an accurate drawing of triangle ABC. [2]
   (b) Draw the angle bisector of $\angle CBA$. [2]
   (c) The angle bisector $\angle CBA$ meets AC at point P.
   Mark P on the drawing and write down the length of AP. [2]

5. In the diagram, $\angle BAC = 90^\circ$. $AB = 15$ cm, $BC = 17$ cm, $AD = 10$ cm and $CD = 6$ cm.



Find
(a) the length of AC, [2]

(b) Show that $\angle ACD$ is a right angle. [2]

6. A survey conducted on 50 families in a block of flats regarding the number of children in each family is tabulated below.

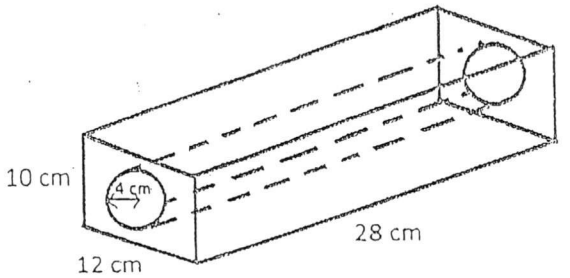
Number of children in the family	0	1	2	3	4
Frequency	1	10	x	16	5

(a) Find the value of x, [1]

(b) Find the mean number of children in a family. [3]

(c) If the results of the survey were represented by a pie chart, calculate the angle of the sector representing 3 children in the family. [2]

7. The diagram shows a solid formed by removing a cylinder from a rectangular cuboid.



(a) Given that the radius of cylinder is 4 cm, calculate the volume of the solid. [4]

(b) The solid is made from a material with density 1.1g/cm^3. Calculate the mass of the solid. [2]

8. (a) Peter sold his stamp collection for \$12 000. He made a profit of 20% on what he paid for. How much did he pay for his stamp collection. [2]

(b) Peter saved the \$12 000 in a bank at 4.8% per year simple interest. What was the value of his savings after 3 years? [3]

(c) Which was greater, the profit he made on the stamp collection or the interest in 3 years from the bank, and by how much? [2]

9. (a) Factorise completely $2x^2 - 50$. [2]

(b) Express as a single denominator $\frac{2x}{3} - \frac{3(x-2)}{5}$. [2]

(c) Simplify fully $\frac{3b^2}{4} \div \frac{12b}{5c}$. [1]

Section B

Answer any two questions. Each question carries 8 marks.

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

The table below is for $y = x^3 - 6x^2 + 3x + 11$.

x	-2	-1	0	1	2	4	6
y	-27	1	11	9	1	-9	q

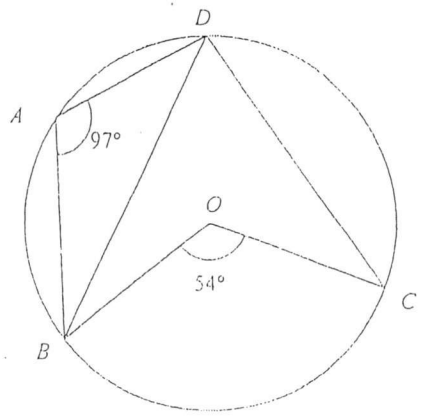
(a) Calculate the value of q. [1]

(b) Using a scale of 2 cm to 1 unit, draw a horizontal x-axis of $-2 \le x \le 6$.
Using a scale of 2cm to 10 units, draw a vertical y-axis of $-30 \le y \le 30$.
Plot the graph of $y = x^3 - 6x^2 + 3x + 11$ for $-2 \le x \le 6$. [3]

(c) Find the values of x when $y = 0$. [2]

(d) By drawing a tangent, find the gradient of the curve at $x = 3$. [2]

11. (a)

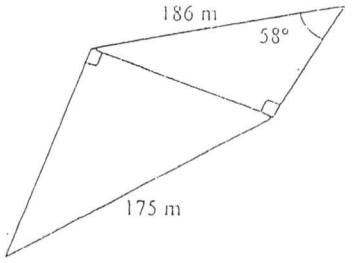


A, B, C and D are points on a circle with centre O.
$\angle BOC = 54^0$ and $\angle BAD = 97^0$.

Find
(i) $\angle BDC$, [1]
(ii) $\angle BCD$. [1]
(iii) $\angle OCD$ [2]

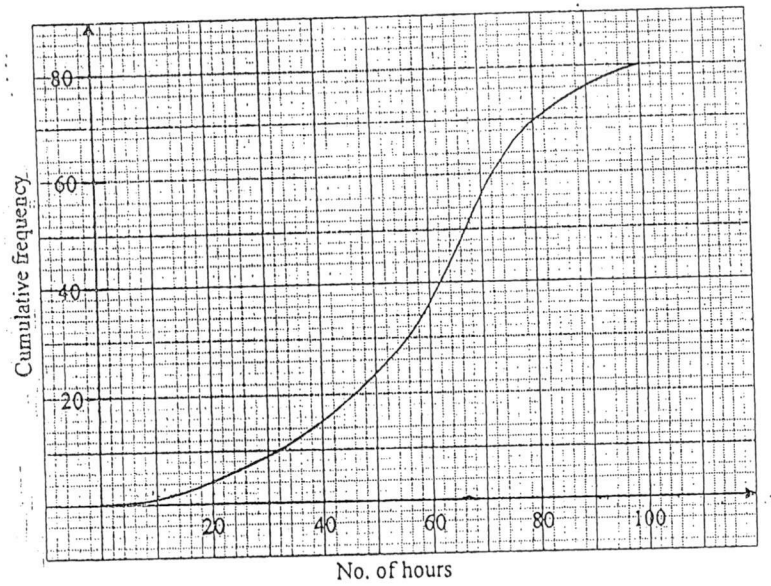
(b) The figure shows some footpaths in a park.

$AB = 175$ m, path $DC = 186$ m, $\angle BCD = 58^0$, $\angle ADB = \angle DBC = 90^0$.



Find
(i) the length of path DB. [2]
(ii) $\angle ABD$. [2]

12. (a) The cumulative frequency curve below illustrates the number of hours spent by 80 students to prepare for their Sports Day.



Use the graph to find

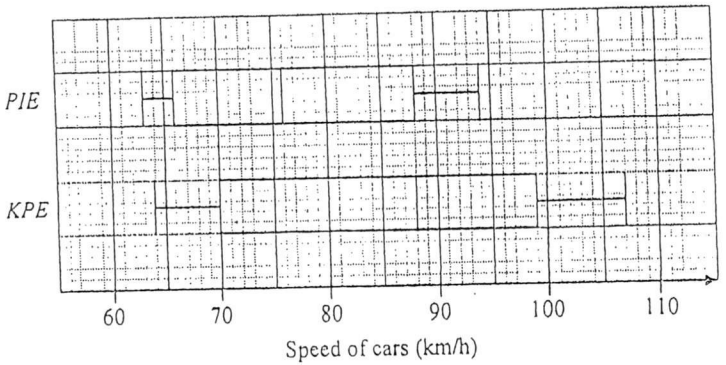
(i) the median number of hours spent on preparing for Sports Day. [1]

(ii) the interquartile range. [2]

(ii) Given that 12.5% of students spend at least x hours preparing for Sports Day, find the value of x. [1]

(b) The speeds of cars crossing a checkpoint along Pan Island Expressway (PIE) and Kallang Paya Lebar Expressway (KPE) were recorded.

The results are summarised in the box-and-whisker plots below.



(i) Write down the median speed of the cars at *PIE*. [1]

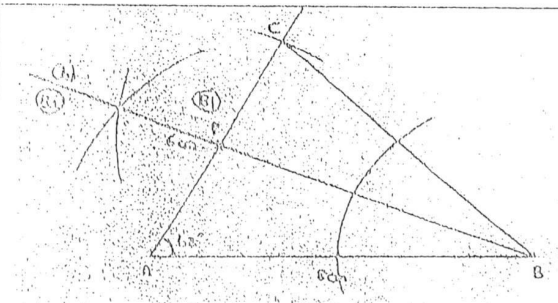
(ii) At which expressway do the cars travel at a faster speed?
Give a reason for your answer. [1]

(iii) Find the interquartile range of the speed of the cars at *KPE*. [1]

(iv) At which expressway do the cars travel at a more consistent speed.
Give a reason for your answer. [1]

End – of - Paper

Marking Scheme (Paper 2)

1(a)	$3hrs\ 30mins = 3\frac{1}{2}hr$ / $3.5hours$	B1
1(b)	$distance = speed \times time$ $= 60 \times 3\frac{1}{2}$ $= 210\ km$	A1
2(a)	$3.67\ billion = 3.67 \times 10^9$	B1
2(b)	$fraction = \frac{8 \times 10^5}{3.67 \times 10^9}$ $= \frac{2}{9175}$	M1 A1
2(c)	$Population = 2^4 \times 3.67 \times 10^9$ $= 5.872 \times 10^{10}\ people$	M1 A1
3(a)	$HCF = 2 \times 5$ $= 10$	M1 A1
3(b)	$LCM = 2 \times 5 \times 3 \times 4$ $= 120\ mins$ $120\ mins = 2hours$ $Next\ time\ flash\ together = 10:15am$	M1 A1
4	 (a) accurate drawing (a1) construction arcs & labelling (a1) (b) on diagram a1. $AP = 3.2\ cm$ (a1) total: 6 marks.	

5(a)	$Pythagoras\ theorem$ $17^2 = AC^2 + 15^2$ $AC^2 = 64$ $AC = 8$	M1 A1
5(b)	$10^2 = 100$ $8^2 + 6^2 = 100$ $\therefore 10^2 = 8^2 + 6^2$ $\therefore by\ converse\ of\ Pythagoras\ Thm.$ $\angle ACD = 90^0$	M1 A1
6(a)	$1 + 10 + x + 16 + 5 = 50$ $32 + x = 50$ $x = 18$	A1
6(b)	$mean = \frac{0(1) + 1(10) + 2(18) + 3(16) + 4(5)}{50}$ $= \frac{114}{50}$ $= 2.28\ children\ / 2\frac{7}{25}\ children$	M1 M1 A1
6(c)	$Angle\ rep\ 3children = \frac{16}{50} \times 360^0$ $= 115.2^0$	M1 A1
7(a)	$Vol\ of\ cuboid = 10 \times 12 \times 28$ $= 3360\ cm^3$ $Vol\ of\ cylinder = \pi r^2 h$ $= 3.142 \times 4^2 \times 28$ $= 1407.616\ cm^3$ $Vol\ of\ solid = 3360 - 1407.616$ $= 1952.384\ cm^3$ $= 1950\ cm^3\ (3sf)$	M1 M1 M1 A1
7(b)	$mass = Vol \times Density$ $= 1952.384 \times 1.1\ \ (ecf)$ $= 2147.6224g$ $= 2150g\ (3sf)$	M1 A1

B(a)	$120\% \rightarrow \$12000$ $100\% \rightarrow \$\left(\frac{12000}{120}\times 100\right)$ $= \$10\,000$	M1 A1
B(b)	$I = \frac{PRT}{100}$ $= \frac{12\,000\times 4.8\times 3}{100}$ $= \$1728$ $total savings = \$12\,000 + \$1728$ $= \$13\,728$	M1 M1 A1
B(c)	$profit = \$2000$ $interest = \$1728$ $Increase = \$2000 - \$1728 = \$272$ The profit is greater by \$272.	 B1 B1
9(a)	$2x^2 - 50$ $= 2(x^2 - 25)$ $= 2(x^2 - 5^2)$ $= 2(x+5)(x-5)$	M1 A1
9(bi)	$\frac{2x}{3} - \frac{3(x-2)}{5}$ $= \frac{5(2x) - 9(x-2)}{15}$ $= \frac{10x - 9x + 18}{15}$ $= \frac{x+18}{15}$	M1 A1
9(bii)	$\frac{3b^2}{4} + \frac{12b}{5c}$ $= \frac{3b^2}{4}\times\frac{5c}{12b}$ $= \frac{5bc}{16}$	 B1

	Section B	
10	On graph paper – Refer to attached.	
11(i)	$\angle BDC = \frac{54^0}{2}$ ($\angle$ at centre $= 2\angle$ at circumference) $= 27^0$	 B1
11(ii)	$\angle BCD = 180^0 - 97^0$ $= 83^0$ (opp $\angle$s of cyclic quad)	 B1
11(iii)	$\angle OCB = \frac{180^0 - 54^0}{2}$ $= 63^0$ (base $\angle$s of isos Δ) $\angle OCD = 83^0 - 63^0$ $= 20^0$	 M1 A1
11(bi)	$\sin 58^0 = \frac{DB}{186}$ $DB = 186\sin 58^0$ $= 157.7369459$ $\approx 158\,m$	M1 A1
11(bii)	$\cos ABD = \frac{157.7369459}{175}$ $\angle ABD = 25.6633839^0$ $\approx 25.7^0$ (1 dp)	M1 A1
12(ai)	median = 62 hours	B1
(aii)	$Q_1 = 46\,hrs$ $Q_3 = 72\,hrs$ $interquartile range = Q_3 - Q_1$ $= 72 - 46$ $= 26\,hrs$	M1 A1
(aiii)	$12.5\% \times 80 = 10$ students $\therefore x = 32\,hrs$	A1

12(bi)	Median (PIE) = 76 *km/h*	B1
(bii)	Median (KPE) = 88 *km/h* Cars travel at higher speeds at KPE; because it has a higher median speeds as compared to speeds on PIE.	B1
(biii)	$Q_1 = 70\ hrs$ $Q_3 = 99\ hrs$ $IQ_R(KPE) = Q_3 - Q_1$ $= 99 - 70$ $= 29 km/h$	B1
(biv)	$IQ_R(PIE) = Q_3 - Q_1$ $= 88 - 66$ $= 22 km/h$ Cars travel with a more consistent speed at PIE because it has a smaller IQ_R.	B1