Name………………………………………………………. Index No………………../…….

School…………………………………………………… Date ………………………….

Candidate's Signature……………………..

REVISION KIT 2019

121 /1
MATHEMATICS
PAPER 1
2 ½ HRS
APRIL-2019

INSTRUCTIONS TO CANDIDATES

(a) Write your name and index number in the spaces provided above.
(b) This paper consists of TWO sections. Section I and Section IL
(c) Answer ALL the questions in section 1 and only FIVE questions from Section 1]
(d) All answers and working must be written on the question paper in the spaces provided below each question.
(e) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
(f) Marks may be given for correct working even if the answer is wrong.
(g) Non- programmable silent calculators and KNEC mathematical tables may be used except where stated otherwise.
(h) This paper consists 16 printed papers
(i) Candidates should check the question paper to ascertain that all the papers are printed as indicated and that no questions are missing..

FOR EXAMINERS USE ONLY

Section I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Section II

17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL	

This paper consists of 16 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

SECTION 1 (50 MARKS)Answer all the Questions)

1. Evaluate without using mathematical table or calculator.

$$\frac{0.021 \times 0.246 \times 1.75}{11.48 \times 0.014}$$

Expressing the answer as a fraction in it's simplest form. (2 marks)

2. The sum of all but one of the internal angles of pentagon is 400^0. Find the number of degrees in the remaining angle. (2 marks)

3. (a) Find the L.C.M of (x—1), $x^2 - 1$ and $x^2 + 2x + 1$ (1 mark')

(b) Hence or otherwise simplify (2mks)

$$\frac{1}{x-1}+\frac{x-1}{x^2+2x+1}$$

4. Mariga on arrival to Kenya to play for the country against Sychelles converted 6000 Euros into Kenya shillings. During his three day's stay he spent Ksh. 260,000.He converted the remaining amount into US dollars. How many US dollars did he get?
(Use the exchange rate below)

	Buying	Selling
1 US dollar $	96.20	96.90
1 Euro C	112.32	112.83

(3mks)

5. The gradient of the of the curve $y = ax^2 + bx$ at the origin is equal to 8. Find the value of a and b if the curve has a maximum turning point at x = 4 (4mks)

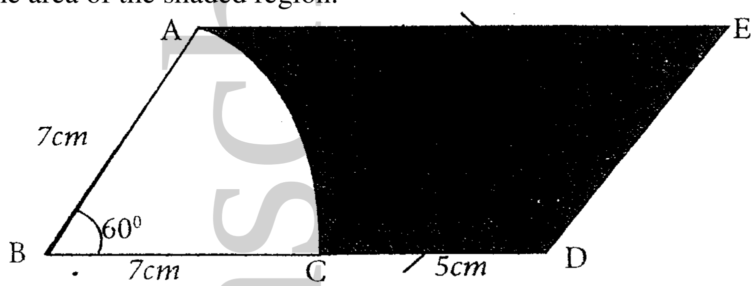
6. Find the value of (3 marks)

$\sqrt[4]{2}$ **X** $\sqrt{32x\sqrt{2}}$

7. A cylindrical iron pipe is 2.lm long and 12cm in external diameter, the metal is 1cm thick and its density is 7.8g,/cm^3. Taking pie as 3 ½ find its mass. (3 ½ Marks)

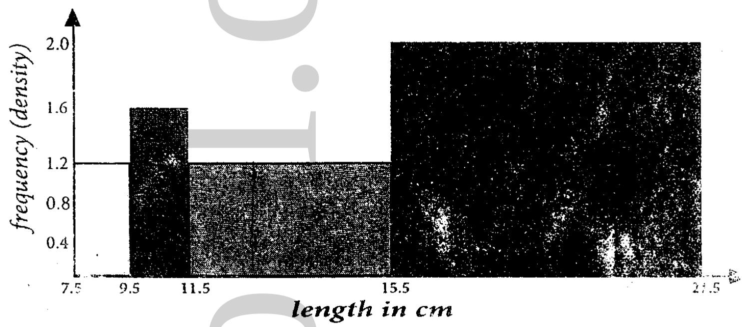
8. A right angled isosceles triangle has area of 4 square units. Find he perimeter of the triangle leaving your answer in surd form. (3 marks)

9. In the figure below, AC is an arc of a circle centre B, angle ABD = 60^0, AB =BC=7cm and CD=5cm. If AE is parallel to BD and AB is parallel to ED.
Calculate the area of the shaded region. (3 marks)



10. A two digit number is such that the difference between the ones digit and the tens digit is 2. If the two digits are interchanged, the sum of the new and the original number is 132. Find the original number. (3 marks)

11. The figure below shows a histogram.



Complete the frequency distribution table below. (4mks)

Length x cm	Class width	Frequency density	Frequency
$7.5 \leq x < 9.5$		1.2	24
$9.5 \leq x < 11.5$			
$11.5 \leq x < 15.5$			
$15.5 \leq x < 21.5$			

12. Construct a line PQ 7.5cm. Using a line inclined 30° at point P to line PQ, locate point R which divides line PQ in the ratio 2:3. (3 marks)

13. A father was three time as old as his son fifteen years ago and four times as old as his son nineteen years ago. When was the father twice as old as the Son? (4 Marks)

14. Calculate the area of the segment cut off from a circle of radius 10cm by a chord which subtends an angle of 2.1c at the centre. (4 marks)

15. A submarine sails due North from point A for 170km to a point B. 1 changes its course to N 52^0 W and sails to a point c If C is N 18° W of A., calculate the distance from C to A. (3 Marks)

16. The position vector S of points A and B are **a** and **b** respectively. Determine the modulus Of **AB** if **a** = 2**i** + 4**j** ± 3**k** and **b**= 2**i**÷3**j** (3marks)

SECTION II

17. Ruhu, Toru, and Lwamawa contributed a total of Kshs. 8041950.00 for their joint campaigns ahead of 2012 general elections. The ratios of their contributions were Ruhu to Toru 5:4 and Lwamawa to Toru 2:3.

a) How much did each contribute? (4 Marks)

b) Ruhu further contributed Kshs. 875,000.00 towards the campaigns kitty. in response, Toru and Lwamawa increased their contributions in the ratios 10:9 and 11:6 respectively. How much did Toru and Lwamawa further contribute (3 marks)

c) The three agreed that if they win elections they would share the 15 cabinet positions amongst them in the ratio of their contributions. How many cabinets positions did Lwamawa get? (3 Marks)

18, Use ruler and a compass only for all constructions in this questions.

a) Construct a triangle ABC such that angle BAC $\frac{7^\circ}{75^0}$, AB 7cm and BC= 8cm. (2 marks)

b) Construct a perpendicular from B to meet AC at M. Measure BM and hence calculate the area of triangle AC. (3 marks)

c) Construct a line DE parallels to AC and mid-way between AC and B to meet BM at D. With DM and MC as sides, construct a rectangle DECM (2 marks)

d) A point P lies inside the rectangle and close to M than E. It is also nearer side AC than AB. Shade the region in which P lies. (3 mark)

19. A rectangular tank whose internal dimensions are 2.04m by 1.68m by 26.4 m is seven – eighth full of milk

a) If the tank is made of metal of thickness 3mm. Calculate the external volume of the tank in m^3 when closed. (3 Marks)

b) Calculate the volume of milk in the tank in cubic metres. (2 marks)

c) The milk is to he packed in small packets. Each packet is in the shape of a right - Pyramid on an equilateral triangular base of side 19.2cm. The height of each packet is 13.6 cm. Full packets obtained are sold at Kshs. 35 Per packet. **Calculate;**

i) The volume of milk, in cubic centimeters contained in each packet to 4 significance figures. Hence find the number of full packets. (4 marks)

ii) The exact amount that will he realized from the sale of all the packets of milk. (3 marks)

20. a) If P,Q and R are the points (2,-4), (4,0) and (1,6) respectively. Use the vector method to find the co-ordinates of points S given that PQRS is a Parallelogram (3 marks)

b) The positions vectors of point A and B are a and b respectively. C is another point with Positions vector **c** = $^{3}/_{2}$ **b** – ½ **a.** (1mk)

Express in terms of **a** and **b**

i) $\overrightarrow{AC}$

ii) $\overrightarrow{AB}$. Hence show that A,B and C are collinear (3marks)

jjj) Determine the ratio A B:BC (1 mark)

c) Find the co—ordinates of the point Q which divides the line PR in ratio 3 :2 given the co – ordinates of P and Q are (3,-1) and (4,3) respectively.

21. The distance between town Manchester and Barcelona is 60 km.A car and a lorry travel from Manchester to Barcelona. The average speed of the Lorry is 20 km/h, less than that of the takes the car. The Lorry takes $1\ ^1/_6$ hrs more than the car to travel from Manchester to Barcelona.

a) If the speed of lorry is x km/h, find x. (5mks)

b) The lorry left Manchester town at 7:15 am. The car left Manchester town later and overtook the lorry at 11:15 am.

i) Calculate the time the car left town Manchester (3 marks)

ii) Distance yet to he covered by y lorry as the car arrives at Barcelona. (3 marks)

22. The vertices of triangle PQR are P(O,O), Q(6 0) and R(2,4)

a) Plot these points on the grid provided below. (1 mark)

b) Triangle $P^1Q\,^1R^1$ is the image of a triangle PQR under an enlargement scale factor ½ and centre (2,2). Write down the coordinates of triangle $P^1Q\,^1R^1$ and plot on the same grid. (2 marks)

c) Draw triangle $P^{11}Q^{11}R^{111}$ the image of triangle $P^{11}Q^1R^1$ under a positive quarter turn about the point (1,1)

d) Draw a triangle $P^{111}Q^{111}R^{111}$ the image of triangle $P^{1}Q^{11}R^{11}$ under reflection in the line y = l. (3 marks)

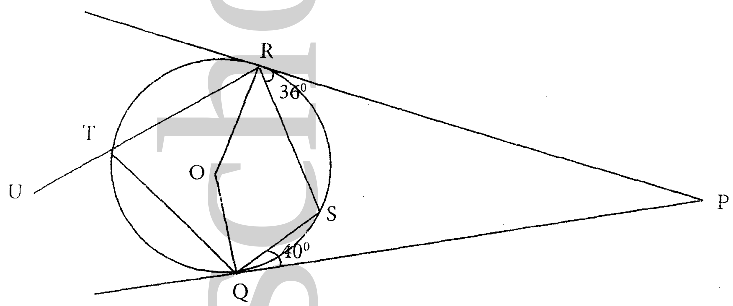
e) Describe fully a single transformation which maps triangle $P^{11}\ Q^{11}R^{11}$ onto triangle $P^{1}\ Q^{1}\ R^{1}$

23. a) Find the equation of the perpendicular bisector of the line AB where A is (3,9) and B is (7,5) in the form ax + by ± c = 0. (4 marks)

b) The perpendicular bisector of line AB in (a) above intersects the line joining the points (2,4) and (-3,1) at C. Find the co-ordinates of C.

c) The line through (2,4) and (-3,1) makes an angle θ with the positive X-axis. find the value of $6.\theta$ (3mks)

24. In the figure below, 0 is the centre of the circle. PQ and PR are tangents to the circle at P and R respectively Angle PQS = 40^0 and angle PRS 30° RTU is a straight line. (3mks)



Find with reasons the angles

1) QRS (2marks)

ii) RTQ (2 marks)

iii) RPQ (2 marks)

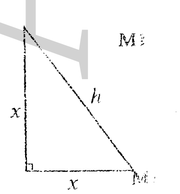
iv) Reflex angle QOR (2 marks)

v) TRO given that TR =TQ (2 marks)

BURETI DISTRICT JOINT EVALUATION – 2012

121 /1
MATHEMATICS
PAPER 1
JULY/AUGUST 2012

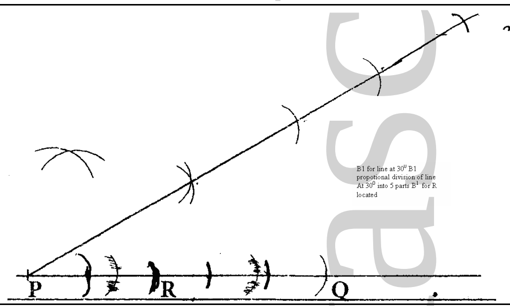
1.	$\dfrac{\cancel{21}^{\cancel{3}} \times \cancel{246}^{\cancel{3}} \times \cancel{175}^{\cancel{7}\,1}}{\cancel{1148}_{\cancel{164}\,4} \times \cancel{14}_{\cancel{2}} \times \cancel{1000}_{\cancel{40}}}$ ✓ = 9/160✓	M1 A1	
2.	Sum of internal angles (2 x 5 – 4) $90^0 = 540^0$✓ 540 – 400 = 140^0 ✓	M1 A1	
3.	a) (x- 1), (x – 1) (x +1) ,$(x +1)^2$ LCM $(x-1)^2$✓ b) $\dfrac{x^2+2x+1+(x-1)(x-1)+1}{(x-1)(x+1)^2}$✓ $= \dfrac{x^2+2x+x^2-2x+1}{(x-1)(x+1)^2}$ $= \dfrac{2x^2+2}{(x-1)(x+1)^2}$ ✓	A1 M1 A1	
4.	6000 euros = Kshs. 6000 x 112.32 = Kshs.673,920.00✓ Balance = Kshs. (673,920 – 260,000) = Kshs. 412,920 = US dollar $\dfrac{413{,}920}{96.90}$✓ = Us dollar 4,271.62✓	M1 M1 A1	
5.	a) $\dfrac{dy}{dx} = 2ax + b$ ✓ at x = 0, 2a (0), 2a (0) + b = 8 b = 8✓ at x = 4 , 2a (4) + 8 = 0✓ a = -1✓	M1 A1 M1 A1	
6.	$(2)^{¼} \times (2^5(2^{½}))^{½}$ $= 2^{¼} \times 2^{5/2} \times 2^{¼} = 2^{1/4}\ 2^{5/2} \times 2^{¼}$ -= 2 (¼ + 5/2 + ¼) = $2^{12/4} = 2^3 = 8$✓	M1 M1 A1	
7.	Vol. of metal = $22/7\ x(6^2-5^2)x2.1x100cm^3$ ✓ = 7260 cm^3 Mass = 7260 x 7.8✓ = 56,628✓	M1 M1 A1	
8.	$½x^2 = 4$ X = $\sqrt{8} = 2\sqrt{2}$ ✓	M1	



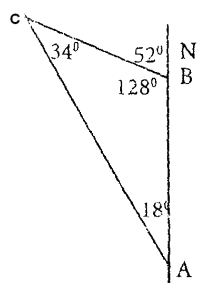
<table>
<tr><td></td><td>$h = \sqrt{(\sqrt{8})^2 + \sqrt{8})^2}$
Perimeter $4 + 2\sqrt{2 + 2\sqrt{2}}$ ✓
$= 4 + 4\sqrt{2}$ *units* ✓</td><td>M1

A1</td><td></td></tr>
<tr><td>9.</td><td>Sin 60^0 $h/7$
H = 7 sin 60^0
Area of ABDE = ½ (12 + 12) 7 sin 60^0 = 72.75 cm✓
Area of sector BAC = $60/360 \; x \, 22/7 \; x 7 \; x 7$
72.75 – 25.67✓
Shaded area 47.08 cm^2 ✓</td><td></td><td></td></tr>
<tr><td>10.</td><td>Original number = 10 x +y
New number = 10y + x
$\left.\begin{array}{r} Y - x = 2 \\ 11x + 11y = 132 \end{array}\right\}$
x +y = 12
1+2
2y = 14✓
y = 7x = 5
xy = 57✓</td><td>Both equations)
M1

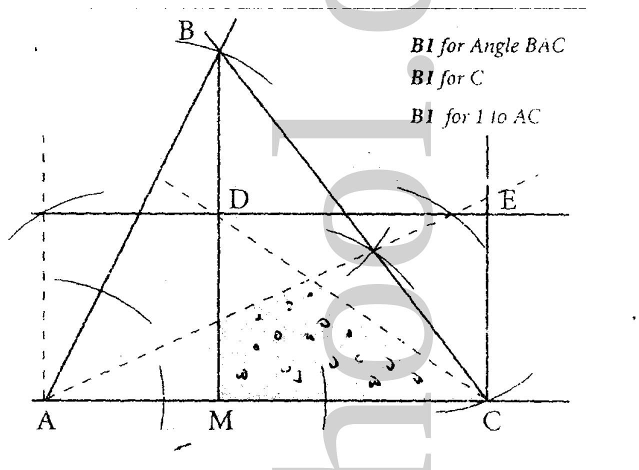
M1

A1</td><td></td></tr>
<tr><td>11.</td><td><table><tr><th>Class Width</th><th>Frequency Density</th><th>Frequency</th></tr><tr><td>2</td><td>1.2</td><td>2 x1.2 x = 24</td></tr><tr><td>2</td><td>1.6</td><td>2 x 1.6 x 10 = 32</td></tr><tr><td>4</td><td>0.8</td><td>32</td></tr><tr><td>6</td><td>2.0</td><td>120</td></tr></table></td><td>B1 for 10
B1 for dodinte val
B1 for F.D
B1 for freq all correct.</td><td></td></tr>
<tr><td>12.</td><td></td><td></td><td></td></tr>
<tr><td>13.</td><td>Age now: son x
Father –y
15 years age: Son x – 15
Father y - 15
3 (x – 15) = y – 15
3x – y = 30 ……………….1✓
19 years ago: Son x 19
Father y – 19
4(x – 19) = y = 19
4x – y = 57……..(2)
2 - 1 x = 27, y =51
2 (27 –p) = 51 –p
54 – 2p = 51 – p</td><td></td><td></td></tr>
</table>

	$3 = p$✓ 3 years ago		
14.	Area of sector $= \frac{2.10}{2\Pi} x \Pi x 10 x 10$✓ $= 105 \text{ cm}^2$ Area of Triangle $= ½ \times 10 \times 10 \times \sin \left(\frac{2.10 x 360}{2\Pi} \right)$✓ $= 43.18 \text{ cm}^2$	M1 M1	
	Area of segment = 105 – 43.18✓ $= 61.82 \text{ cm}^2$ ✓	M1 A1	

15.	$< ACB = 180^0 - (128 + 18)^0 = 34^0$✓  $\frac{AC}{Sin\ 128^0} = \frac{170}{Sin 34^0}$ AC = $\frac{170 \sin 128^0}{Sin 34^0}$ ✓ 239.6 km ✓	B1 B1 A1	
16.	$\overrightarrow{AB} = (2\mathbf{i} + 3\mathbf{j}) - (2\mathbf{i} + 4\mathbf{j} + 3\mathbf{k})$ $= -j - 3\mathbf{kcm}$ ✓ $\overrightarrow{AB} = \sqrt{(-1)^2 + (-3)^2}$ ✓ = 3.162 units ✓	M1 M1 A1	
17.	a) Ruhu to Toru = (5: 4) 3 = 15: 12 Lwamawa to Toru = (2:3) 4 8: 12✓ Ruhu: Toru : Lwamawa = 15:12:8 Ruhu = $\frac{15}{35} x 8{,}041950 = shs. 3{,}446{,}550$✓ Toru = $\frac{12}{35} x 8{,}041950 = Shs. 2{,}757240$ Lwamawa = $\frac{8}{35} x 8{,}041{,}950 = shs. 1{,}838{,}160$ b) Toru = $\frac{(10) - 1) 2{,}757{,}240}{9}$ ✓ = Shs. 306,360✓ Lwamawa = $\frac{(11-1)}{6}$ = Shs. 1838160 = Kshs. 1,531, 800.00✓ c) Total Contributions. = 8,041,950 + 875000 +306360+ 531800 = Kshs.10,755,110.00	M1 A1 A1 A1 M1 A1 A1 M1 A1	

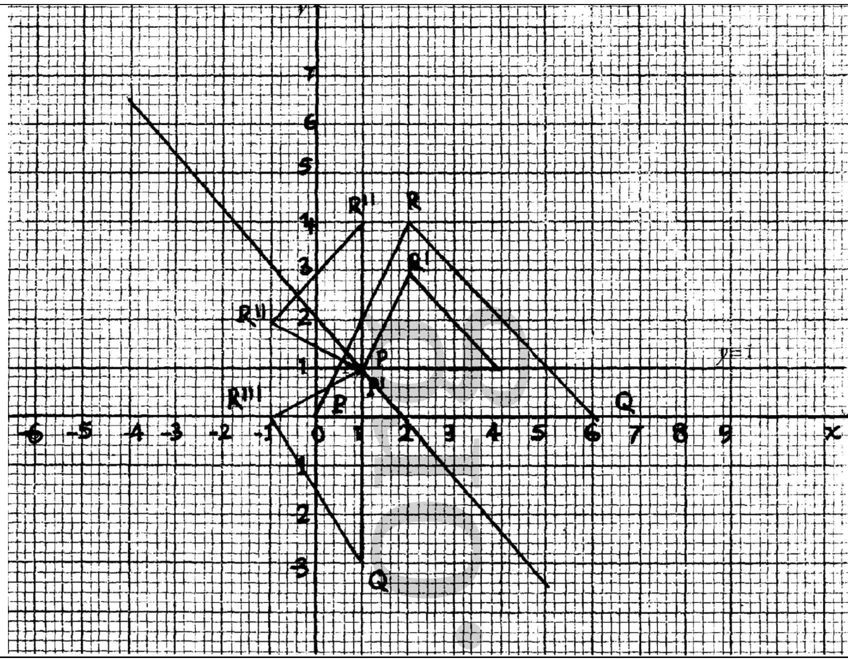
	$\frac{1,838,160+1,531,800}{10,755,110} x15 = 15 = 5\,Positions$		

18.	 b) BM = 7.2 cm✓ Area of triangle ABC = ½ x 7.2 x 6.5 = 23.4 cm^2✓ c) Line DE✓ Rectangle✓ d) Dotted bisector of angle BAC✓ Dotted diagonal DC✓ Shaded region✓	B1 A1 B1 B1 B1 B1 B1	
19.	a) External volume = 2.046 x 1.686 x 2.646 = 9.12 m^3 b) 1.68 x 2.04 x 2.64 m^3 = 9.047808 m^3 Vol of packet = ½ 19^2.2 x sin 60^0 x 13.6 = 2,171 cm^3 Number of packets = $\frac{9047808}{2,171}$ = 4,167✓ ii) 4,167 x 35 = shs. 145,845✓	M1 A1 M1 A1 M1 A1 A1 A1	

20.	a) 5 (a,b) $\overrightarrow{PQ} = \overrightarrow{SR}$ $\begin{pmatrix}4\\0\end{pmatrix} - \begin{pmatrix}2\\-4\end{pmatrix} = \begin{pmatrix}1\\6\end{pmatrix} - \begin{pmatrix}a\\b\end{pmatrix}$ $\begin{pmatrix}2\\4\end{pmatrix} = \begin{pmatrix}1-a\\6-b\end{pmatrix}$ - a + 1 = 2 a = -1 - b+ 6 = 4✓ b = 2 s(-1,2)✓ b) $\overrightarrow{AC} = {}^3/_2 b = ½ a – a = {}^3/_2 a + {}^3/_2 b$ $\overrightarrow{AB}$ = b-**a** **= -a + b** $\overrightarrow{\mathbf{AC}} = {}^3/_2 \overrightarrow{\mathbf{AB}}$ **AC//AB**	M1 M1 A1	

	But they cannot be parallel because they share a common point A. Therefore the points A,B and C collinear. ii) ${}^3/_2$ AB = AC $\frac{AB}{AC} = \frac{2}{3}$ Ab: BC 2:1 d) -2 $\begin{pmatrix}3\\-1\end{pmatrix} + 3\begin{pmatrix}4\\3\end{pmatrix}$✓ $= \begin{pmatrix}-6\\2\end{pmatrix} + \begin{pmatrix}12\\9\end{pmatrix} = \begin{pmatrix}6\\11\end{pmatrix}$ Q (6,11)✓	M1 A1	
21.	a) Speed of a car = (x + 20) km/h Time taken by lorry $\frac{560h}{x}$✓ Time taken by car $\frac{560h}{x+20}$ $\frac{560}{x}$ $\frac{560}{x+20}$ = 1 ${}^1/_6$ ✓ 560 (x + 20) x 6 5600 x 6x = 7x (x+20) = 560 x + 67200 – 3360 x = 7x^2 140 x = 7 x^2 + 140 x – 67200 = 0 = x^2 + 20x – 9600 = 0✓ X = $\sqrt{\frac{20+20^2-4(9600}{2}}$ $= \frac{-20+197}{2}$ ✓	B1 M1 M1 M1 M1	

	x = 88.5✓ b) Time taken = 11.15 - 7.15 5 hr Relative speed = 20km / hr Distance separating them = y km As at the time car started y/20 km/hr = 5hr y = 100 km✓ Time taken to cover 100 km by a lorry. $= \frac{100km}{88.5km/hr} = 1\frac{23}{77}$ = 1 hr 8min Time car started: 7: 15 1: 08 8:23 min✓ $\frac{560-5x88.5}{20+88.5} = \frac{47h}{708}$ Distance by lorry = 5 x 88.5 + $\frac{47}{708}$ x 88.5✓ = 448.375 km✓		
22.	a) for triangle PQR✓ b) P^1 (1,1) Q^1 (4,1) R^1 (2,3✓ c) P^{11} (1,1) Q^{11} (1,4) R^{11} (- 1,2)✓ d) L1 for graph of y = 1 D2 for Δ P^{111} Q^{111} R^{111} e) $\frac{y-2}{x-0} = \frac{0-2}{2-0} = -1$ ✓ y – 2 = x x + y 2 Reflection in X + y = 2✓	M1 B1 B1 B1 A1	

			
23.	a) Mid point of AB = $\frac{3+7}{2}, \frac{9+5}{2}$ = (5,7)✓ Gradient of AB = $\frac{9-5}{3-7}=\frac{4}{-4}-1$ Gradient of 1 to AB = 1 $\frac{y-5}{x-7}=1$✓ y – 5 + x -7 x – y – 2 = 0✓ b) $\frac{y-4}{x-2}=\frac{4-1}{2-3}=\frac{3}{5}$✓ 5 (y – 4) = 3 (x-2) 5y – 20 = 3x – 6 5y = 3x + 14✓ Y = x – 2 5 (x – 2) = 3x + 14✓ 5x – 10 = 3x + 14 2x = 24 x = 12 y = 10 C (12,1) ✓ c) tan 0 = $^3/_5$ ✓ 0+ tan -1 (3/5) = 30.960✓	M1 M1 A1 A1 A1 M1 A1 M1 A1	
24.	i) Angle QRS = 40^0✓ (Angles alternate segments)✓ ii) <RTQ $30^0 + 40^0=70^0$ (angles alienate segments)		

	iii) < RTQ 30^0 Angles in alternate segment 9< RPQ $= 180^0 – (70^0 + 70^0) = 40^0$ ✓ (Angle sum of a triangle)✓ iv) < RSQ = 2 (70^0) = 140^0 Opposite angle of cyclic quadrilateral) Reflex angle QOR = 2 (140^0 Angles subtended by same arc at centre and circumference)✓ v) < RTO = ½ (70^0 = 35^0✓ < TRO = 35^0 (Base Angle of isoscele triangle)✓		