1.	$\frac{1}{2}x\,{}^{7}/_{2}+\frac{3}{2}\left(\frac{11}{6}\right)$ ${}^{7}/_{4}+\frac{33}{12}=\frac{55}{12}$ $\frac{3}{4}x\,{}^{5}/_{2}\div\frac{1}{4}=\frac{60}{8}$ $\frac{55}{12}x\frac{8}{60}=\frac{11}{18}$	M1 M1 A1

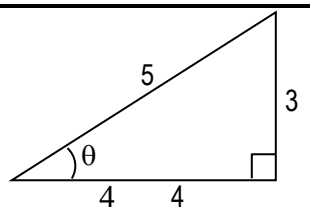
2.	$\frac{3x^2 - 3xy - xy + y^2}{(3x - y)(3x + y)}$ $\frac{(3x - y)(x - y)}{(3x - y)(3x + y)}$ $= \frac{x - y}{3x + y}$	M1 M1 A1

3.	2 | 12 | 18 | 24 | 36 3 | 6 | 9 | 12 | 18 | 2 | 3 | 4 | 6 = 2 x 3 = 6	 M1 A1

4.	(i) 19,171,311	M1 A1
	(ii) 100,000	

5.	$5 \times \frac{1}{(2.93 \times 10)^2} - (4.125)^{3/2}$ $= 5 \times 1 \times \frac{1}{8.585} \times \frac{1}{10^2} - (70.19)^{1/2}$ $= 5 \times 0.116 \times 10^2 - 8.3780$ $= 58.35 - 8.378$ $= 49.97$	M1 M1 A1

6.	$L_1 \Rightarrow x \geq 0$ $L_2 \Rightarrow$ Grad $= -1/2$ $\frac{y-0}{x-6} = -1/2$ $2y = -x+6$ $L_2 \Rightarrow 2y \leq -x+6$ $L_3 \Rightarrow$ Grad $= 1$ $\frac{y-0}{x-2} = 1 \Rightarrow y = x-2$ $y \geq x - 2$	B1 B1 B1

7.	 Cos A $= \frac{4}{5}$ Sin A $= \frac{3}{5}$ $\frac{1 + Cos\ A}{1 - Sin\ A} = \frac{1 + \frac{4}{5}}{1 - \frac{3}{5}}$ $= \frac{1\frac{4}{5}}{\frac{2}{5}}$ $= \frac{9}{5} \times \frac{5}{2}$ = 4.5 or $4\frac{1}{2}$	

8.	$3^{\chi - 2} = 3^{2\chi - 1}$ $\chi - 2 = 2\chi - 1$ $\chi = -1$	M1 M1 A1

9.	$1000\chi = 9.009009$ $\chi = 0.009009$ $999\chi = 9$ $\chi = \frac{9}{999}$ $= \frac{1}{111}$	M1 A1

10.	No | Log 47.81 | 1.6795 0.7499 $\bar{1}.8750$ + 1.5545 823 | 2.9154 72.46 | 1.8601+ 4.7755 - 2 2.3878 1.468×10^{-1} $\bar{1}.1667$ = 0.1468	M1 M1 M1 A1

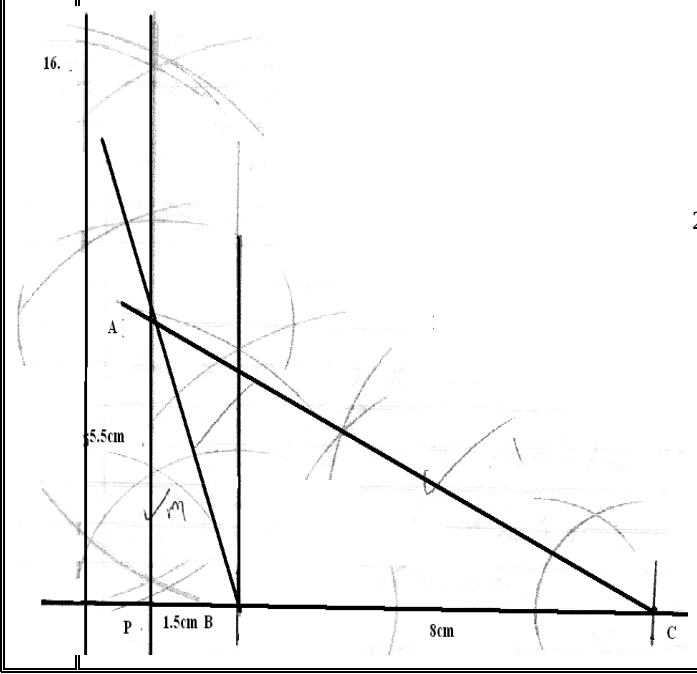
11.	Let table be x Chairs will be (x + 10) $\left(\frac{3}{100}\ x\ 600\right)\ (x + 10)$ $+\ \left(\frac{4}{100}\ x\ 1500\right)\ x = 7200$ 18x + 180 + 60x = 7200 78x = 7020 x = 90 ∴ chairs = 100 Tables = 90	M1 M1 M1 A1

12.	$\angle AFD = 180^0 - (30^0 + 63^0)$ $= 87^0$	B3

13.	Cross section Area $= \left(\frac{22}{7} \times 3.5 \times 3.5\right) + (2 \times 7)$ = 38.5 + 14 = 52.5 Volume = 52.5 x 300 = 15750cm^3 Mass = 15750 x 8.87 = 139702.5g = 139.7kg	M1 M1 A1
14.	x = ti + 2j y = 2i + 3j z = 3i + 4j xy = $\begin{pmatrix} 2 & -t \\ 3 & -2 \end{pmatrix} = \begin{pmatrix} 2-t \\ 1 \end{pmatrix}$ y – z = $\begin{pmatrix} 3 & -2 \\ 4 & -3 \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ collinear points K$\begin{pmatrix} 2-t \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ k (2 - t) = 1 $\Rightarrow$ K = 1 t = 1	M1 B1 A1

15.

16.



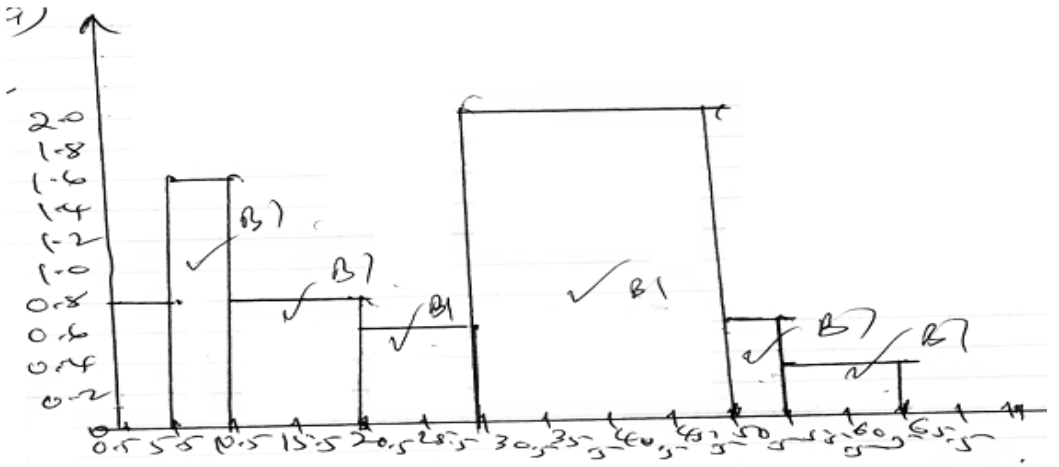
½ x 9.5cm x 5.5cm = ½ x 8 x 5x√
26.125cm^2√ – ½ x 5.5cm x 1.5cm = 2.2cm^2√
26.125 cm^2 – 4.125 = 22cm^2 √

16.	(a) 19.5250 Chinese Yuan into Kenya shillings = 195250 x 12.34 = 2409385 (b) Balance = 2409385 – 1258000 = 1151385 Balance in S.A. Rand $= {}^{1151385}/_{11.37}$ = 101265	 B M M A 4

SECTION II

17	(a) Let the constant amount be x Jane – $({}^{3}/_{8}x)$ /= Jepchoge's – $^{2}/_{5}$ $({}^{5}/_{8}x)$ /= = ¼ x /= Remaining $^{3}/_{5}x$ – 18,000 x = 48,000/= Therefore the original amount is 48,000. (b) Jepchoge received (¼ x 48,000) = 12,000/ (c) Business maintenance = $({}^{1}/_{3}$ x 12,000) = 4,000/= Balance = 8,000/= Ratios: Jane = $({}^{3}/_{8}$ x 48,000) = Kshs. 18,000/= Jepchoge – (¼ x 48,000/=) = Kshs. 12,000/= Chepkemboi – $({}^{1}/_{3}$ x 18,000/=) = Kshs. 6,000/= Ratio: 18,000 : 12,000 : 6,000 3 : 2 : 1 Jane got $^{3}/_{6}$ x 8,000 + 18,000 = Kshs. 22,000/= Jepchoge got $^{2}/_{6}$ x 8,000 = Kshs. 2,677/= Chepkemboi got $^{1}/_{6}$ x 8,000 + 18,000 = Kshs. 1,337/=	M1 M1 A1 M1 A1 M1 M1 M1 A1 B1 B1

18



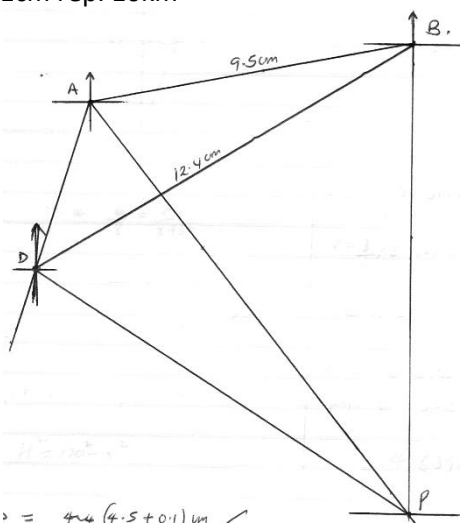
Age (years)

(b)

Class	x	f	fx
1 – 5	3	4	12
6 – 10	8	8	64
11 – 20	15.5	8	124
21 – 30	25.5	6	153
31 – 50	40.5	40	1620
51 – 55	53	3	159
56 – 65	60.5	3	181.5
		72	2313.5

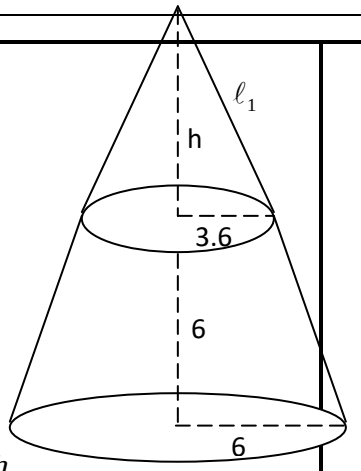
Mean = $\frac{\Sigma fx}{\Sigma f}$

= $\frac{2313.5}{72}$ = 32.13

19.	1cm rep. 10km  (i) AD = (4.5 + 0.1)cm√ = (450 + 0.1)km (ii) Bearing of D from B = 240 + 0.10 √ (iii) Bearing of P from D = 1200 + 0.1 √ (iv) Distance P to D = 13.6cm x 10 = 136km + 0.1√

21.	a) Length PQ $\text{Sin } 35^0 = \frac{x}{8} \Rightarrow x = 8 \sin 35$ PQ = 2 (8sin 35^0) = 9.18cm b) $\text{Sin } 20^0 = \frac{4.5886}{PB}$ $PB = \frac{4.5886}{\sin 20^0} = 13.42$ cm c) Minor segment circle centre A $= \frac{70}{360}\ x\ \frac{22}{7}\ x\ 8x8 - \frac{1}{2}\ x\ 8^2 \sin 70^0$ = 39.11 – 30.07 = 9.04cm^2 d) Area of segment centre B $= \left(\frac{40}{360}\ x\ \frac{22}{7}\ x\ 13.42\ x\ 13.42\right) -$ $\left(\frac{1}{2}\ x\ 13.42^2 \sin 40^0\right)$ = 62.89 – 57.88 = 5.01 cm^2 Area of shaded region = (30.07 + 57.88) – (5.01 + 9.04) = 87.95 – 14.05 = 73.90cm^2	M1 A1 M1 A1 M1 M1 A1 M1 M1 A1

20.



$$\frac{6}{3.6} = \frac{6+h}{h}$$

$6h = 3.6 \times 6 + 3.6h$ M1

$h = 3.6 + 0.6h$

$0.4h = 3.6$

$h = \frac{3.6}{0.4} = \frac{36}{4} \sim 9\text{cm}$

$\ell_1^2 = 9^2 + 3.6^2$ M1

$\ell_1^2 = 81 + 12.96 = 93.96$

$\ell_1 = 9.69$

$L^2 = 6^2 + 15^2$

$L = \sqrt{36 + 225}$ M1

$L = \sqrt{261} = 16.12$

S.A of frustum = $\left(\frac{22}{7} \times 6 \times 16.12 - \frac{22}{7} \times 3.6 \times 9.69\right)$

$+ \frac{22}{7} \times 3.6 \times 3.6\Big)$ A1

$= 303.98 - 109.64 + 40.73$

$= 235.07$

S.A of cylinder $= 2\prod Rh + \prod R^2$ M1

$= 377.14 + 113.14$

(S.A of cylinder)

$= 490.28$ A1

Total S.A$= 490.28 + 235.07$

$= 725.35\text{cm}^2$ M1

(b) Volume of frustu= M1

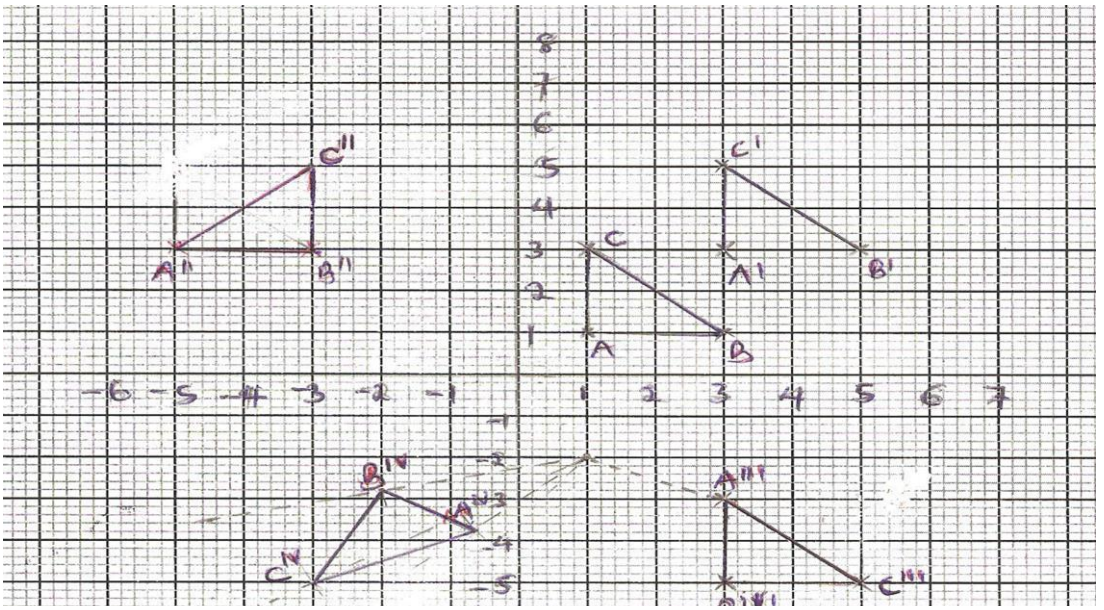
$\left(\frac{1}{3} \times 6 \times 15 \times \frac{22}{7} \times 6 - \frac{1}{3} \times \frac{22}{7} \times 3.6 \times 3.6 \times 9\right)$

$= 565.71 - 122.19$

$= 443.52\text{cm}^3$

	Volume of cylinder $\prod^2 h$ $= \frac{22}{7} \times 6 \times 6 \times 10$ $= 1131.43$ Total volume = 443.52 + 1131.43 M1 = 1574.95A1	

22.

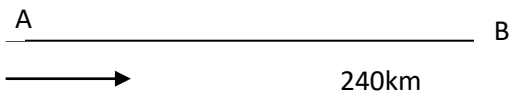


Triangles that are congruent $A^1B^1C^1$ and $A^{111}B^{111}C^{111}$

$A^1 = \begin{pmatrix}1\\1\end{pmatrix} + \begin{pmatrix}2\\2\end{pmatrix} = \begin{pmatrix}3\\3\end{pmatrix}$

$B^1 = \begin{pmatrix}3\\1\end{pmatrix} + \begin{pmatrix}2\\2\end{pmatrix} = \begin{pmatrix}5\\3\end{pmatrix}$

$C^1 = \begin{pmatrix}1\\3\end{pmatrix} + \begin{pmatrix}2\\2\end{pmatrix} = \begin{pmatrix}3\\5\end{pmatrix}$

23.	(a) 90km/h  120km/h After 20 min $\frac{20}{60} \times 120 = 40km$ $\frac{20}{60} \times 90 = 30km$ $\frac{30}{60} \times 90 = 45km$ 45km = 10 km = 35km R. speed (120 – 90) km/h = 30km/h Time taken $\frac{35}{60} = 1\frac{1}{6}\ hrs$ $40 + \frac{35}{30} \times 120 = 140 + 40 = 180km$ (b) 0850 + 0150 hrs = 1000hrs c) $\frac{240}{90} = 2\frac{2}{3}\ hrs$ 2 hrs 40 min 0800 hrs + 0240 hrs = 1040 hrs = 10.40 AM	M1 M1 M1 M1 A1 B1 M1 M1 A1

24.	a. $7y = 3x - 30$ $Y = \frac{3x}{7} - \frac{30}{7}$	M1

Y intercept = $\frac{-30}{7}$ X intercept = 10 A is (10, 0) Based on line y = -x Y = $\frac{3x}{7} - \frac{30}{7} = \frac{3(-y)}{7} - \frac{30}{7}$ Y = -3y – 30 $\frac{10y}{7} = \frac{-30}{7}$ Y = -3 ∴ x =3 B (3, -3)	M1 M1 A1

b.	$\frac{8-k}{} = -3$	
	$k-3$	
	$8-k = -3k + 9$	
	$2k = 1$	M1
	$\therefore k = ½$	
	Taking a general point (x, y)	
	$\frac{Y-8}{} = -3$	M1
	$X - ½$	
	$y - 8 = -3x + {}^{3}/_{2}$	
	$3x + y = 9$ ½ or $6x + 2x + 2y = 19$	A1
c.	$\frac{6+2}{2}$ $\frac{1+3}{2}$ = (4,2)	
		M1
	$\frac{1-3}{6-2}$ x u_2 = -1 (M_2 = 2	
	Y – 2 = 2	M1
	X – 4	
	$\therefore 2x - y = 6$	A1