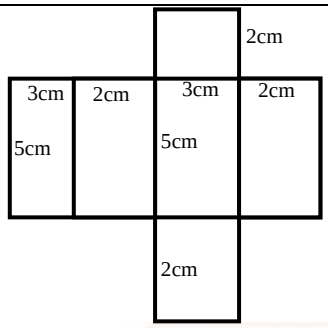
121/1 - MATHEMATICS ALT A - PAPER 1

MARKING SCHEME

END TERM EXAMINATIONS

Kenya Certificate of Secondary Education (KCSE)

	CALCULATIONS	MARKS	RE
1.	$\frac{133X0.51X1000000}{0.19X0.0017X1000000}$ $\frac{133X51X100}{19X17}$ 2100	M1 M1 A1	Mu Co CA
		03	
2.	2 | 48 | 72 | 100 2 | 24 | 36 | 50 2 | 12 | 18 | 25 2 | 6 | 9 | 25 3 | 3 | 9 | 25 3 | 1 | 3 | 25 5 | 1 | 1 | 25 5 | 1 | 1 | 5 | 1 | 1 | 1 L.C.M = $2^4 \times 3^2 \times 5^2$ = 3600 Number =3600 + 3 = 3603	M1 M1 A1	Co Ad CA
		03	
3.	$\frac{20 - x > 5+2x}{15 > 3x}$ $\frac{x < 5}{5 + 2x \geq x + 5}$ $\frac{2x - x \geq 0}{3x \geq 0}$ $\frac{x \geq 0}{5 > x \geq 0}$ Integral values are 0, 1, 2, 3 and 4	M1 M1 A1	

4.	5000 x 84.15 = 420,750 420 750 289 850 130 900 $\frac{130900}{80.43}$ = 1627.50 ≈ 1628	**M1** **M1** **1 CAO**	
		03	
5	 Surface area = 3 x 5 x 2 = 30 2 x 5 x 2 = 20 2 x 3 x 2 = 12 = 62cm^2	**04**	**B2** **oth** **alte** **M1** **A1**
6.	2x - 1 - x² = 0 x² - 2x + 1 = 0 (x - 1) (x-1) = 0 x = 1	**M1** **M1** **A1**	**Equ** **det** **to z** **Fac**
		03	
7.	Diagram	**B3**	**Hic** **visi**
		03	
8.	G+c=45 4g+2c= 100 G=45-c 4(45 – c) + 2c=100 180 – 4c +2c=100 C=40 g=5	**M1** **M1** **A1**	**For** **two** **Att** **elir** **var** **For**

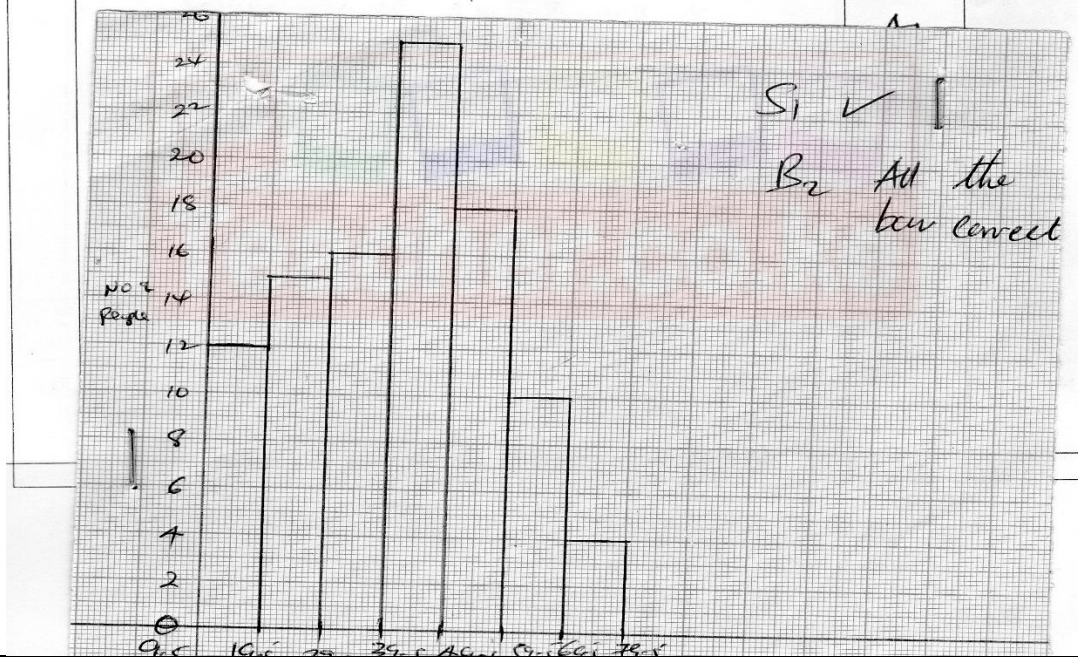
		03	
9.	a) boys = 900 – 600= 300 ratio 3000:600 1:2 b) 300/900 x 100 331/3%	**M1** **M1** **A1**	**Ge nu boy Sh sim**
		03	
10.	4(t-1) – 3(4+t)=0 4t-3t – 4 – 12=0 t- 16 = 0 t= 16	**M1** **M1** **A1**	**Att ren fra Re bra cor**
		03	
11.	$\frac{1}{0.432} = 1x\frac{1}{4.32x10^{-1}}$ (3marks) = 0.2375 x 10^1 = 2.315 $\frac{\sqrt{0.1225}}{0.432} = 2.315x\sqrt{0.12225}$ = 0.35 x 2.315 = 0.81025	**M1** **M1** **A1**	**Co rec** **Mu** **CA**
		03	
12.	7y = 3x – 20 y = $\frac{3}{7}$x - $\frac{20}{7}$ g = $\frac{3}{7}$ Gradient of tar = $\frac{-7}{3}$ Δy/Δx = $\frac{-7}{3}$ $\frac{y-2}{x-5} = \frac{-7}{3}$ 3y – 6 = -7x + 35 3y = -7x + 41 y = $\frac{-7}{3}$x + $\frac{41}{3}$	**M1** **M1** **A1**	rev y = or or 3y 7x 0
		M1	

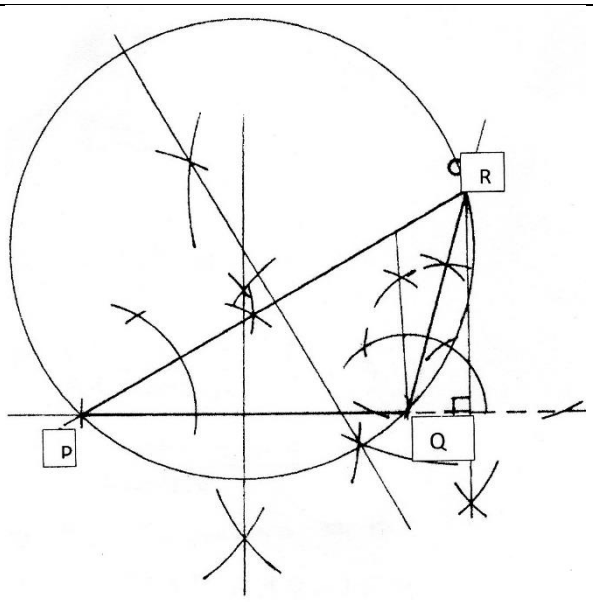
13.	diagram $x = \frac{h}{\tan 52}$ $x = \frac{h}{\tan 45} - 15$ $\frac{h}{\tan 52} = \frac{h}{\tan 45} - 15$ $\frac{h}{\tan 45} - \frac{h}{\tan 52} = 15$ $h\left(\frac{1}{1} - \frac{1}{1.2799}\right) = 15$ $h(1-0.7813) = 15 \quad h = \frac{15}{0.2187}$ $h = 68.58m$	**M1** **M1** **A1**	
		04	
14.	$= \begin{pmatrix} & & \\ 10 & 7 & 5 \\ 9 & 11 & 12 \end{pmatrix} \begin{pmatrix} 3 & 4 \\ 1 & 6 \\ 0 & 3 \end{pmatrix}$ $= \begin{pmatrix} 30+7 & 40+42+15 \\ 27+11 & 36+66+36 \end{pmatrix}$ $= \begin{pmatrix} 37 & 97 \\ 38 & 138 \end{pmatrix}$	**M1** **M1** **A1**	
		03	
15.	Time taken 1600 h – 830 h = 7hrs 30 min $= 7\frac{1}{2}$ hrs Av. speed = $\frac{300}{7\frac{1}{2}}$ = 40km/h	**M1** **M1** **A1**	
		03	
16.	$3^{4(x+1)} + 3^{4x} = 246$ $3^{4x+4} + 3^{4x} = 246$ $3^{4x}(3^4+1)=246$ $3^{4x}=\underline{246}$	**M1**	**Acc** **alte** **Fac**

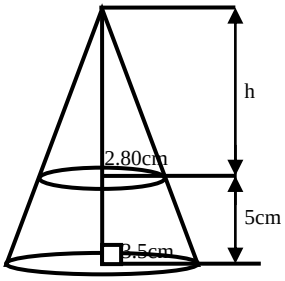
	81 $3^{4x}=3^1$ $4x= 1$ $X=^1/_4$	**M1** **M1** **A1**	**3^{4x}** **Equ pov** **Acc**
17.	(a) Original contribution $= \frac{3600}{n}$ New contribution $= \frac{3600}{n-5}$ Increase $= \frac{3600}{n-5} = \frac{3600}{n}$ $= \frac{3600n-3600n+18000}{n(n-5)}$ $= \frac{18000}{n(n-5)}$ (b) $\frac{18000}{n(n-5)} = 24$ $18000 = 24n^2 - 120n$ $n^2 - 5n - 750 = 0$ $n^2 - 30n + 25n - 750 = 0$ $n(n - 30) + (25(n - 30) = 0$ $(n - 30)(n + 25) = 0$ $n - 30 = 0$ $n + 25 = 0$ but n cannot be –ve $\therefore n = 30$ (c) $\frac{3600}{n} = 120$ original $\frac{3600}{25} = 144$ new increase $= \frac{24}{100} x100\% = 20\%$ (10 mks)	**M1** **M1** **M1** **A1** **M1** **M1** **A1** **M1** **M1** **A1**	
		10mks	

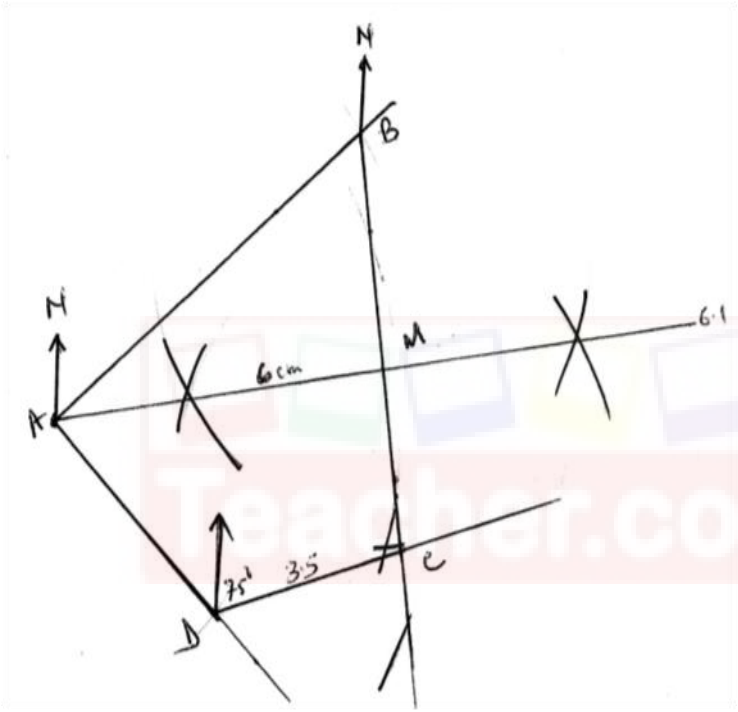
18.	CALCULATIONS	MARKS	REMARKS		
	(a) 40 – 49	B1		**M1**	
	(b)	B1	✓ fx	**M1**	Mi
				M1	∑f
				M1	fx
				M1	cf
	$\bar{x} = \frac{\sum fx}{\sum f} = \frac{4130}{100}$	M1		**M1**	Me
	$= 41.30$	A1			
	(c) Median $= 39.5 + \left(\frac{100}{2} - 43\right) \times 10$	B1	✓ cf	**M1**	Exp
		M1			mec
					mec
	$= 39.5 + 2.8$			**M1**	
.				**10mks**	

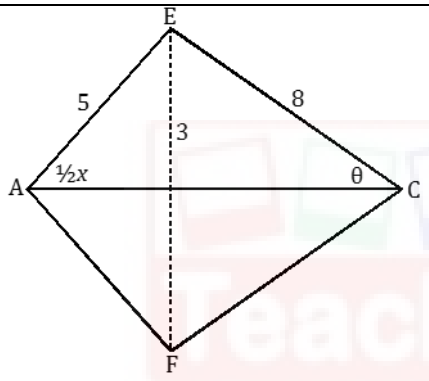
x	f	fx	cf
14.5	12	174	12
24.5	15	367.5	27
34.5	16	552	43
44.5	25	1112.5	68
54.5	18	981	86
64.5	10	645	96
74.5	4	298	100
	$\sum f = 100$	$\sum fx = 4130$	



19	 **ii) Radius = 3.5 ± 0.1** **iii) height construction** **height = 3.4±0.1** **b) area of circle outside triangle** **= $^{22}/_{7}$ x 3.5 – ½ x 3.4 x 5** **= 29.98**	**B1** **B1** **B1** **B1** **B1** **B1** **B1** **M1** **A1**	**Co** **of 3** **Co** **of 1** **Co** **ΔA** **1 b** **circ** **hei** **con**
		10mks	
20.	a) i) v=3.142 x 3^2 x 12+12+$^{2}/_{3}$ x 3.142 x 3^3 =339. 336 + 56.556 = 395.892 = 395.9 ii) v= 15 x 6 x6 – 395.892 = 144.108 =144.1 b) i) S.A = 3.142 x 3^2 +2 x3.142 x 3 x 12 + 2 x 3.14 2 x 3^2 = 28 .278 +226.224+56.556 311.058 = 311.1 ii) Cost = $\frac{311.058}{8x1000}$ x 900 = ksh. 34.99 = 35.0	**M1** **M1** **M1** **A1** **A1** **M1** **M1** **A1** **M1** **A1**	

		10mks	
21.	 (a) Linear scale factor (L.S.F) $\frac{2.8}{3.5} = \frac{4}{5}$ Area scale factor (A.S.F) $(\frac{4}{5})^2 = \frac{16}{25}$ Volume scale factor (V.S.F) $(\frac{4}{5})^3 = \frac{64}{125}$ From similar triangles $\frac{h}{h+5} = \frac{4}{5}$ 5h = 5h + 20 h = 20cm Length of larger cone $L^2 = 25^2 + 3.5^2 = 625 + 12.25$ $=637.25$ $L = \sqrt{637.25}$ $\therefore$ l = 25.24 Curved surface area larger cone $\pi rL = \frac{22}{7}$ x 3.5 x 25.24 = 277.64cm^2 Curved S.A of the small cone $\frac{16}{25}$ x 277.64 = 99.9cm^2 Total surface area of frustrum $\left\{\frac{22}{7} \times 2.8 \times 2.8\right\} + \left\{\frac{22}{7} \times 3.5 \times 3.5\right\} + 99.95$ cm^2 24.64 + 38.5 + 99.95 = 163.09cm^2 (b) Volume of small cone $\frac{1}{3}r^2h = \frac{1}{3}$ x $\frac{22}{7}$ x 2.8 x 2.8 x 20 = 164.3cm^3 Using volume scale factor (V.S.F) Volume of larger cone = $\frac{125}{64}$ x 164.3cm^3 $\therefore$ Volume of frustrum	**B1** **M1** **M1** **M1** **M1** **A1** **M1** **M1**	**Vsf** **Hei** **Cr** **Big** **Sm** **Vol** **fru**

	$= \left\{\frac{125}{64} - 1\right\}$ x 164.3 $\frac{61}{64}$ x 164.3 = 156.6cm3	**M1** **A1**	
		10mks	
22.	Dist. AB = 112 × $^5/_2$ = 280km BC = 75 × $^8/_3$ = 200km AB = 7cm, BC=5cm, AD=4cm  b) i) CD = 3.5 × 40 = 140KM ii) Bearing of C from D is 075° c) i) AM = 6 × 40 = 240km ii) Speed = $^{240}/_2$ = 120km/h	**B1** **B1** **B1** **B1** **B1** **B1** **B1** **B1** **M1** **A1**	**Pos** **Pos** **Pos** **Con** **rou** **Loc** **CD** **Bea** **AM** **Spe** **CA**
		10mks	
23.	(a) 64 x 0.5 = 32 km 384 -32 = 352 km Time = $\frac{Distance}{Relative\ speed}$	**M1**	

	$= \frac{352}{64x2}$ = 2.75 hrs = 2 hrs 45 min meeting time = 8.30 + 2.45 = 1075 = 1115 h or 11:15am (b) D = S x T = 64 x 2.75 = 176km c) At 10:30; time difference = 10.30 – 8.30 = 2 hrs 64 x 2 x 64 x 2 = 352 x = 352 – 256 = 96 km apart	**M1** **M1** **M1** **A1** **M1** **A1** **M1** **M1** **A1**
		10mks
24.	 $Sin\frac{1}{2}x = \frac{3}{5}$ $\frac{1}{2}x = Sin^{-1}\frac{3}{5} = 36.87$ $< EAT = 73.74°$ $Sin\frac{1}{2}\theta = \frac{3}{8}$ $\frac{1}{2}\theta = Sin^{-1}\left(\frac{3}{8}\right)$ $\therefore <= 22.02$ $< ECF = 44.05°$ $\frac{73.74}{360}\times\frac{22}{7}\times 5^2 - \frac{1}{2}\times 5\times 5Sin\,73.7$ $= 16.09 - 12$ $= 4.09cm$	**M1** **A1** **M1** **A1** **M1M1** **A1**

	$\frac{44.05}{360}\times\frac{22}{7}\times 8^2-\frac{1}{2}\times 64Sin44.05$ $=24.61-22.25$ $=2.36$ $Total\ area = 4.09+2.36$ $=6.45cm$	**M1** **M1** **A1**	
		10mks	