KISII SCHOOL
MOCK EXAM 2025

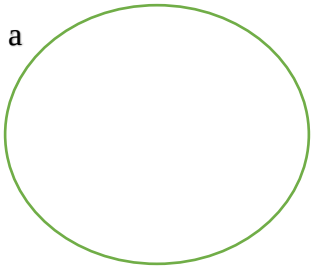
Kenya Certificate of Secondary Education (K.C.S.E)

MATHEMATICS FORM 4
PAPER 2
MARKING SCHEME

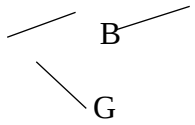
1. +1) +3(5x-1) =6 8x+4+15x-3=6 23x + 1=6 23x=5 X=5/23	M1 M1 A1	
2a. $1-4(2x)+6(2x)^2-4(2x)^3+(2x)^4$ $1-8x+24x^2-32x^3+16x^4$	B1	
2b. 1-2x =0.96 0.04=2x 0.02=x $1-8(0.02)+24(0.02)^2-32(0.02)^3+16(0.02)^4$ 1-0.16+0.00096-0.000256+0.00000256 =0.849858556 =0.8499	 M1 A1	
3.True value $\sqrt{1+n}=\sqrt{1.44}=1.2$ Approx. value $=1+\frac{n}{2}=1+\frac{0.044}{2}=1.22$ =1.22-1.2 =0.02 $=\frac{0.02}{1.2}\times100=1.67\%$	B1 M1 A1	
4. $3\log_8(x+6)-3\log_8(x-3)=2$ $\log_8(x+6)^3-\log_8(x-3)^3=\log_8 64$ $\log_8[\frac{(x+6)3}{(x-3)3}]=\log_8 64$ $\log_8[\frac{x+6}{x-3}]^3=\log_8 64$ $3\log_8(\frac{X+6}{X-3})=\log_8 64$ $\log_8(\frac{x-6}{x-3})=\frac{1}{3}\log_8 64$ $\log_8(\frac{x-6}{x-3})\log_8 64^{1/3}$ $\log_8[\frac{x+6}{x-3}]=\log_8 4$ $\frac{X+6}{X-3}=4$ x+6=4x-12 18=3x x=6	MI M1 M1 A1	

5. $E=\sqrt{\frac{p^2-3y}{y-3xp^2}}$ $E^2=\frac{p^2-3y}{y-3xp^2}$ $E^2y-3E^2xp^2=p^2-3y$ $E^2y+3y=p^2+3E^2xp^2$ $\frac{E^2y+3y}{1+3E^2X}=p^2$ $P=\pm\sqrt{\frac{E^2y+3y}{3E^2x+1}}$	M1 M1 A1	Squaring Collecting terms p If ± sign is missing 0
6. $x \geq 30$ $2x+3y \leq 75$ $Y \geq 10$	B1 B1 B1	
7. $AT \times BT = (PT)^2$ $12BT=9^2$ $BT=\frac{81}{12}$ $BT = 6.5$ $AB=12-6.75$ $AB=5.25$ Radius =2.6cm	M1 M1 A1	
8. $x^2+y^2-2x+4y=-1$ $X^2+2x+(\frac{-2}{2})^2+y^2+4y+(\frac{4}{2})^2=-1+(\frac{-2}{2})^2+(\frac{4}{2})^2$ $(x-1)^2+(y+2)^2=-1+1+4$ $(x-1)^2+(y+2)^2=4$ Centre (1,-2) radius 2	MI M1 A1	For completing the square For centre and radius
9. $\frac{\sqrt{3}}{1-\frac{\sqrt{3}}{2}} \times \frac{1+\frac{\sqrt{3}}{2}}{1+\frac{\sqrt{3}}{2}}$ $\frac{\sqrt{3}+\frac{3}{2}}{1-\frac{3}{4}}=\frac{\sqrt{3}+\frac{3}{2}}{\frac{1}{4}}$ $=4(\sqrt{3}+\frac{3}{2})$ $=4\sqrt{3}+6$	B1 M1 A1	

10a. Graph attached	P1 L1	
10 b. g= $\frac{52-30}{60-35} = \frac{22}{25}$ $\frac{y-30}{x-35} = \frac{22}{25}$ Y=$\frac{22}{25}$x -$\frac{20}{25}$	B1 B1	
11. Kathwana d=8000, a=40000 40000 +(5×8000) =80000 Siakago r=1.2 $40000(1.2)^5$=40000×2.488 =99533 Difference =99533-80000 =9533	M1 M1 A1	
12. $6(1-\cos^2 x)-\cos x-5=0$ $6-6\cos^2 x-\cos x-5=0$ $6a^2+a-1=0$ $6a^2+3a-2a-1=0$ $3a(2a+1)-1(2a+1)=0$ $3a=1$ $2a=-1$ $a=\frac{1}{3}$ $a=-\frac{1}{2}$ $a=\frac{1}{3}$ and $-\frac{1}{2}$ =120° and 240° 70.53° 289°	M1 M1 A1	
13.a A | R 90 | 75 2 | 3 180 | 225	A1	
13.b	M1 M1	

$\frac{180+225}{5}$ SH. 81 Per Kg $\frac{115}{100}\times 81$ = sh.93.00	A1	
14. $\frac{dy}{dx}$ =2x-1 Y= $\int(2x-1)dx$ $Y=x^2-x+c$ $5=1^2-1+C$ C=5 $Y=x^2-x+5$	M1 M1 A1	
15. a 	B1 B1	Locating centre Completed the circle
15.b A=πr^2 =$\frac{22}{7}\times 3^2$ =28.2857	M1 A1	
16. P = $\begin{pmatrix}0\\3\\2\end{pmatrix}-\begin{pmatrix}4\\0\\7\end{pmatrix}$ $\begin{pmatrix}-4\\9\\-1\end{pmatrix}$		
SECTION II		
17.a $\frac{x-5}{x-2}=\frac{x-2}{x+2}$ $(x-5)(x-2)^2=(x-2)^2$ $X^2-3x-10=x^2+4x+4$ $-3x+4x=14$ X=14	M1 M1 A1	

b. i. $\frac{14-5}{14-2}=\frac{9}{12}=\frac{3}{4}$ c. i $t_3 = ar^2$ $16=a(\frac{3}{4})^2$ $A=\frac{16\times16}{9}$ $\frac{256}{9}$ $=28\frac{4}{9}$	B1	
II. $a=\frac{259}{9}$ $r=\frac{3}{4}$ sum = $\frac{a(1-r^n)}{1-r^n}$ $=\frac{259/9(1-(\frac{3}{4})^6}{1-\frac{3}{4}}$ $\left[\frac{259}{9}(1-(\frac{3}{4})^6\right]4$ $\left(\frac{259}{9}(1-\frac{729}{4069})4\right)$ =93.53	M1 M1 A1	

18.  b.i. $(\frac{25}{40}\times\frac{2}{5}\times\frac{2}{3})$ or $(\frac{25}{40}\times\frac{3}{5}\times\frac{1}{3})$ $\frac{1}{6}+\frac{1}{8}$ $=\frac{7}{24}$ ii.$(\frac{15}{40}\times\frac{3}{5}\times\frac{3}{4})+(\frac{15}{40}\times\frac{2}{5}\times\frac{1}{4})$ $(\frac{25}{40}\times\frac{2}{5}\times\frac{2}{3})+(\frac{25}{40}\times\frac{3}{5}\times\frac{1}{3})$ $\frac{27}{160}+\frac{3}{80}+\frac{1}{6}+\frac{1}{8}=\frac{239}{480}$ iii.$(\frac{15}{40}\times\frac{3}{5}\times\frac{1}{4})+(\frac{15}{40}\times\frac{2}{5}\times\frac{3}{4})$ $\frac{9}{160}+\frac{9}{80}$ $=\frac{27}{160}$ iv. $(\frac{15}{40}\times\frac{3}{5}\times\frac{1}{4})+(\frac{25}{40}\times\frac{2}{5}\times\frac{1}{3})$ $\frac{9}{160}+\frac{1}{12}$ $=\frac{67}{480}$	M1 A1 M1 A1 M1 A1 M1 A1	
	10	
19.a i. OP $=\frac{1}{2}(\sqrt{3^2+4^2})$ $= 2.5$ PV $=\sqrt{6^2+2.5^2}$ $=6.964$ ii. $\tan\theta=\frac{6}{2}$	M1 M1 A1 M1	

=3 $\theta = tan^{-1}(3)$ 71.56°	A1	
b. i. Slant height vm VM $=\sqrt{6^2 + 2^2}$ =6.325	 M1 A1	For expression of VM and VN
VN $=\sqrt{6^2 + 1.52^2}$ =6.185	A1	For VM & VN
ii. $(3\times 4) + \left(\frac{1}{2} \times 2 \times 6.325 \times 3\right) + \quad 2 \times 1/2 \times 60185 \times 4)$ 12+18.98+24.74 =55.72	M1 A1	
20. a. $71\times 60 \times \cos 60$ 2130nm	M1 A1	
b.71× 4min =284min =4hrs 44min 1340hrs = 4hrs 44min =8:16 am	M1 A1	
c. $\frac{71}{360} \times 2 \times 6370 \cos 60 \times \frac{22}{7}$ =3948.39km	M1 A1	
d.$\frac{\theta}{360} \times 2 \times \frac{22}{7} \times 6370 = 1001$ $\theta = \frac{1001\times 7\times 360}{2\times 22\times 6370}$ =90° $30°s, 42°w$	B1 M1 M1 A1	
	10	
21.a	B1 S1 P1 C1	For cumulative frequently Scale Plotting Curve smooth
b.	B1	For median

i. median =69.5 ± 0.5 ii. Q3 = 77.5 ± 0.5 Q1 = 58.5 ± 0.5 Quartile deriation = $\frac{77.5-58.5}{2}$ $\frac{19}{2} = 9.5$ iii. percentage fail =40% No of student who Failed = $\frac{40}{100} \times 50$ =20 Pass mark = 65.5 ± 0.5	B1 B1 B1 B1 B1	For Q3 For Q1 For 20
	10	
22.a i. a=2-t $v=2t-t^2 + c$ v = 1, t =0 $v= 2t- t^2+1$ ii. $v= 2t - t^2 + 1\Big\vert_2^3$ $\left[2(3)-3^2+1\right] - \left[2(2)-2^2+1\right]$ $\left[6-9+1\right] - \left[4-4+1\right]$ -2-1 -3m/s b. i. $S=t^2-\frac{t^3}{3} + t + c \ , s = 0\ t = 0$ $S=t^2 - \frac{t^3}{3} + t$ ii. $S=t^2 - \frac{t^3}{3} + t$ t=3 $S =(3^2) - \frac{(3)^3}{3} + 3$ 9-9+3 =3m	M1 A1 M1 A1 M1 M1 A1 M1	

c. $t^2 - 2t - 1 = 0$ t=$2 \pm \sqrt{(-2)^2 - (4 \times 1 \times -1}$ / 2 =$\frac{2 \pm 2.828}{2}$ =2.414	A1	
23.a x: -4, -3, -2, -1, 0, 1, 2, 3 y: 46, 25, 10, 1, -2, 1, 10, 25 $\left[\frac{1}{2} \times 1(46 + 46 + (25 + 10 + 1 + 2 + 10 + 25)\right]$ = $\frac{1}{2}$(92+148) =120 of units	B2 M1 A1	All value collect B1for atlist 5 collet values
b.$\int_{-4}^{4}(3x^2 - 2) = [x^2\text{-}2x]$ =56-(-56) =112 of units	M1 M1 A1	
c. $\frac{116-112}{112} \times 100$ =3.5712	M1 M1 A1	
24. $\begin{pmatrix}-1 & 0\\ 0 & 1\end{pmatrix}\begin{pmatrix}P & R & 5\\ 1 & 4 & 5\\ 1 & 1 & 4\end{pmatrix} = \begin{pmatrix}P^1 & Q^1 & R^1\\ -1 & -4 & -5\\ 1 & 1 & 1\end{pmatrix}$ $\begin{pmatrix}1 & 0\\ 0 & -1\end{pmatrix}\begin{pmatrix}P` & Q` & R`\\ -1 & -4 & -5\\ 1 & 1 & 4\end{pmatrix} = \begin{pmatrix}P`` & Q`` & R``\\ -1 & -4 & -5\\ -1 & -1 & -4\end{pmatrix}$ P` (-1,1), Q` (-4,1) and R` (-5,4) P`` (-1, -1), Q`` (-4, -1) and R`` (-5, -4)	B1 B1 B1	For both
b. it's a reflection in the line y=-x or y+x=0 it's a rotation through $+180° or -180°$ about the origin (0,0)	B1	For both

let the matrix be $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ $\begin{pmatrix} a & b \\ c & d \end{pmatrix}\begin{pmatrix} P & Q & R \\ 1 & 4 & 5 \\ 1 & 1 & 4 \end{pmatrix} = \begin{pmatrix} P`` & Q`` & R`` \\ -1 & -4 & -5 \\ -1 & -1 & -4 \end{pmatrix}$ a+b=-1 4a+b=-4 c+d=-1 4c+d=-1 a+b=-1 c+d=-1 $\underline{4a + b = -4}$ $\underline{4c + d = -1}$ $-3a = 3$ $-3c = 0$ a=-1 c=0 b= 0 d=-1 the matrix is $=\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$	M1 M1 A1	For both
	10	