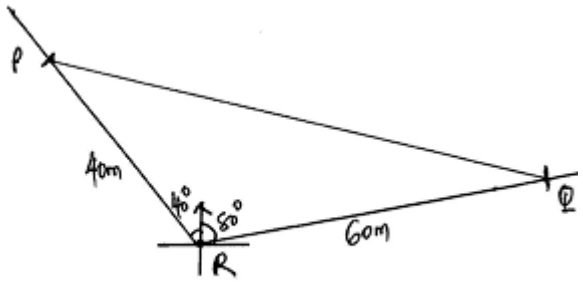
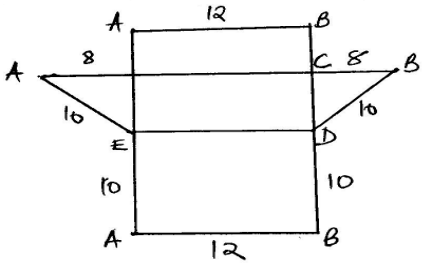
KABONDO DIVISION JOINT EXAMINATION MATHEMATICS
PP1 MARKING SCHEME.

1	$\left(\frac{38X\,23X\,27X100}{114X575}\right)^{1/2}$ $=\frac{\left(2X19X\,23X\,3^3\,X10^2\right)^{1/2}}{2X\,3X19X\,5^2\,X\,23}$ $=\left(\frac{3^2\,X10^2}{5^2}\right)^{1/2}$ $=\frac{3X10}{5}$ $=6$		
2	$y=\frac{-2}{5}x+2$ $M_1=\frac{-2}{5}$ $M_2=\frac{5}{2}$ $\frac{5-K}{-2-3}=\frac{5}{2}$ $10-2k=-25$ $-2k=-35$ $=17.5$		
3	$\frac{1}{3}\left(\frac{180(n-2)}{n}\right)=\frac{360}{n}$ $180n-360=1080$ $180n=1440$ $n=8$		
4	Amount =20,000x147.56 =Sh 2,951,200 Reminder = 2,951,200 – 2,510,200 =Sh.441,000 In dollars = $\frac{441,000}{74.50}$ **=5919 U S dollar**		

5	Let log x = y $y^2 - y - 2 = 0$ (y+1) (y-2) =0 Y = -1 or y = 2 When y = -1, log x = -1 X= 0.1 When y = 2, log x = 2 X = 100		
6	Let the number of goats = g and number of chicken = C g+c = 45……..(i) 4g+2c = 100……..(ii) 4g+4c =180 4g+2c =100 2c = 80 c=40 g=5 there are 40 chickens and 5 digits		
7	x+11>4x-9 4x-9≥2(2-x) -3x>-20 4x-9≥4-2x $x<{}^{20}/_{3}$ 6x7≥13 $x<6\ {}^{2}/_{3}$ $x\geq 2\ {}^{1}/_{3}$ $2\ {}^{1}/_{3} \leq x < 6\ {}^{2}/_{3}$ Integral value = £3,4,5,6		
8	$m.p = \frac{100x160}{180}$ $= Sh.200$ $13\% = 160$ $100\% = \frac{100x160}{130}$ $= Sh.123.10$ $\%profit = \frac{200-123.10}{123.10} x100$ $= 62.5\%$		
9	$\frac{30}{360} x \frac{22}{7} xr^2 - \frac{1}{2} xr^2 \sin 30 = 5.25$ $\frac{22}{91} r^2 - \frac{1}{4} r^2 = 5.25$ $r^2 = 441$ $r = 21cm$		
10	$(x^2-4)(x^2+4) = x^2+4x^2-4x^2-16$ $= x^2-16$ $(x^{2-}6)(x^4-16) = x6-16x^2-16x^4+256$		

11	 $(PQ)^2=40^2+60^2+2x40x60\ COS\ 120^0$ $PQ^2=5200+4156.92$ $PQ=\sqrt{9356.92}$ $=96.73m$		
12	 S.A=8x12+12x6+12x10+2($^1/_2$ x8x6) =96+72+120+48 =336cm^2		
13	$\frac{a^4-b^4}{a^3-ab^2}=\frac{\left(a2+b^2\right)\left(a^2-b^2\right)}{a\left(a^2-b^2\right)}$ $=\frac{a^2+b^2}{a}$		
14	$2^{x-1}x2^{-3+3x}=2^{6x-2}$ (x-1)+(-3+3x)=6x-2 x-1-3+3x=6x-2 -2x=2 X= -1		

15	Volume of cone = $^1/_3\ \pi r^2$ $^1/_3$ x3.142x13^{2}x18 =3,185.988cm^3 Volume of hemisphere=volume of cone $^2/_3\ \pi r^3$=3185.988 $^2/_3$ x3.142xr^2=3185.988 r^3=1521 r=11.5 S.A = $2\pi^2$ =2x3.142x11.5^2 =831.1cm^2		
16	No of people= $\frac{80}{100}x200 = 160$		
17 a	Children = 20 Adult = 160-20 =140 Total collected=(25x20)+(140x50) =500+7000 =7,500/= 25x+50(200-x)=9050 -25x = -950 X = 38 $^7/_{12}$ =63,000 1 = 63000x$^{12}/_7$ =Sh.108,000		

	Cost = $^{2}/_{12}$x108,000 Sh.18,000		
18	a)		

	c) Area(MαN)= ½ x8.4^2xsin69.58 =33.063cm^2 Area(MPN)= ½ x7^2xsin84.42 = 24.452cm^2 Total Area=33.063+24.452 =57.52cm^2 d) Area of shaded region = $57.515 - \frac{86.42}{360} x \frac{22}{7} x 7^2$ =20.56cm^2		

19	$a)\ \frac{h}{h+4} = \frac{2.1}{4.9}$ $4.9h = 2.1h + 8.4$ $2.8h = 8.4$ $h = 3cm$ $b)\ L^2 = \sqrt{4.9^2 + 7^2}$ $= 8.545cm$ $\zeta^2 = \sqrt{2.1^2 + 32}$ $= 3.662cm$ $S.A = \pi\left[RL - rL + r^2 + 2r^2\right]$ $= 3.142x86.61$ $= 272.13cm^2$ $c)\ V = \frac{1}{3}\pi\left[R^2H - r^2h + 2R^3\right]$ $\frac{1}{3}x3.142\left[4.9^2x7 - 2.1^2x3 + 2x4.9^3\right]$ $= 10.47x390.138$ $= 408.5cm^3$		
20	$a)\angle TSQ = 180 - 150$ $= 30^0$ $(Opposite\ angles of\ cyclic quadrelateral)$ $b)\angle SQV = 180 - 82$ $= 98^0$		
	$(Opposite angles of\ cyclic quadelateral)$ $c)\angle WVu = 52^0$ $(Sum of\ \text{int}\ erior\ angles of\ \Delta)$ $d)\angle QTS = 28^0$ $(angles in\ alternate segment)$ $(exterior angles = sum of\ two\ \text{int}\ erior\ angles)$ $e)\angle PWQ = 30^0$ $\angle S\ in\ a\ straight line$		

21	$a)\det A = 2x4 - 3x4$ $= -4$ $A^{-1} = \frac{-4}{4}\begin{pmatrix} 4 & -4 \\ -3 & 2 \end{pmatrix}$ $= \begin{pmatrix} -1 & 1 \\ \frac{3}{4} & \frac{-1}{2} \end{pmatrix}$ $b)i)\ let\ shirts\ be\ s\ and\ trousers\ be\ t$ $16s + 32t = 20800$ $15s + 20t = 14500$ $\begin{pmatrix} 16 & 32 \\ 15 & 20 \end{pmatrix}\begin{pmatrix} s \\ t \end{pmatrix} = \begin{pmatrix} 20800 \\ 14500 \end{pmatrix}$ $ii)\ 2s + 4t = 2600$ $3s + 4t = 2900$ $\begin{pmatrix} -1 & 1 \\ \frac{3}{4} & \frac{-1}{2} \end{pmatrix}\begin{pmatrix} 2 & 4 \\ 3 & 4 \end{pmatrix}\begin{pmatrix} s \\ t \end{pmatrix} = \begin{pmatrix} -1 & 1 \\ \frac{3}{4} & \frac{1}{2} \end{pmatrix}\begin{pmatrix} 2600 \\ 2900 \end{pmatrix}$ $\begin{pmatrix} s \\ t \end{pmatrix} = \begin{pmatrix} 300 \\ 500 \end{pmatrix}$ $\therefore shirt = sh.300$ $trousers = sh.500$		
	$c)\ price\ of\ shirt = \frac{110}{100}x300 = sh.330$ $price\ of\ trouser = \frac{105}{100}x500 = sh.525$ $\cos t\ of\ 12\ shirts\ and\ 10\ trousers$ $= (12x330) + (10x525)$ $= sh.9210$ $original\ price = 12x300 + 500x10 = 8600$ $\%\ increase = \frac{9210-8600}{8600}x100$ $= 7.093\%$		

22	$a)i)\ \bar{A}D = -a + d$ $ii)OB = 5d + 4a$ $b)i)OE = a + k(d - a)$ $= ra - ka + kd$ $= (1 - k)a + kd$ $ii)OE = h(5d + 4a)$ $= 4ha + 5hd$ $(-1 - k)a + kd = 4ha + 5dh$ $k = 5h.....(i)$ $1 - k = 4h.....(ii)$ $1 - sh = 4h$ $-9h = -1$ $h = \frac{1}{9}$ $k = 5\left(\frac{1}{9}\right)$ $k = \frac{5}{9}$ $iii)\ DE : EA = 4 : 5$		
23	Frequency=9		

23	b)		

Class	X	F	d=x-38	Fd	c.f
1-15	8	4	-30	-120	4
16-30	23	1	-15	-15	5
31-45	38	7	0	0	12
46-60	53	9	15	135	21
61-75	68	2	30	60	23
76-90	83	5	45	225	28
91-105	98	2	60	120	30

23

23	$mean = A + \frac{\sum df}{\sum f}$ $= 38 + \frac{405}{30}$ $= 51.5$ $c) median class = 46 - 60$ $d) Median = 45.5 + \frac{15.5-12}{9} x15$ $= 45.5 + 5.833$ $= 51.33.$		

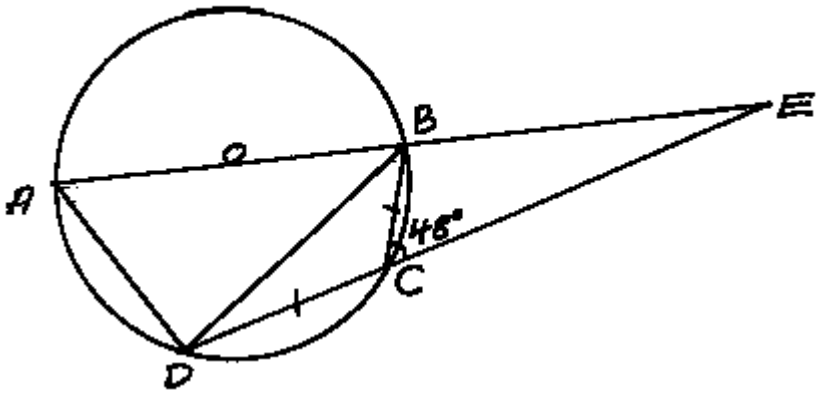
24	Area A= ½ x20x20=200 Area B= ½ x80x120=4800 Area C= ½ x50x150=3750 Area D= ½ x30x125=1875 Area E= ½ x75x60=2250 Area F= ½ x60x50=1500 Area G= ½ x160x70=5600 Area H= ½ x130x70=4550 Area I= ½ x30x50=470 Total=24995 In hectres= $\frac{24,995}{10,000}$ =2.4995ha		
24	c) = 65,000 x 2.4995 = Sh.162,467.50.		

KABONDO DIVISION JOINT EXAMINATION
MATHEMATICS PP2 MARKING SCHEME.

1	$\sqrt[3]{\frac{0.0485x0.5850}{0.9834\div 88.3}}$ $\sqrt[3]{\frac{0.0485x0.5850}{8902834}}$ 0.0485 0.5850 89.2834 $\bar{2}.6857 + \bar{1}.7672 = \bar{2}.4529 - 1.9508$ $\frac{4.5021}{3}\ \frac{6+\bar{2}.5021}{3}$ $0.06823 \leftarrow \bar{2}.8340$	B_1 M_1 M_1 $\underline{A_1}$ $\underline{04}$	✓ log of 3.846 and + ✓ log S $\pm$ - & $\div$ CAO
2 3	$T = P\sqrt[3]{\frac{Q^2}{Q^2-1}}$ $T^3 = P^3\left(\frac{Q^2}{Q^2-1}\right)$ $T^3Q^2 - T^3 = P^3Q^2$ $T^3Q^2 - P^3Q^2 = T^3$ $Q^2\left(T^3 - P^3\right) = T^3$ $Q^2 = \frac{T^3}{T^3-P^3}$ $Q = \pm\sqrt{\frac{T^3}{T^3-P^3}}$	M_1 M_1 A_1	Removal of root sign Factorization

	$.\text{Re}\,al\ value = (5+3)^2 = 64$ $misread\ \ value = 25+9$ $= 34$ $error = 30$ $\%\,error = \frac{30}{64}x100$ $= 46.875$	M_1 M_1	
4	$(x-y)^6=1.x^6.y0-6.x^5.y^1+15x^4y^2$ -20^x2y^3 $=x6-6x^5+15x^4y^2-20x^3y^3$ $(0.98)^6=(1-0.02)^6 \ \therefore x=1,y=0.02$ $(0.98)^6=1^6-6.15(0.02)+15(1)^4(0.02)^2$ $20(1)^3(0.02)^3$ $=1-0.12+0.006-0.00016$ $=0.8854$	M_1 M_1 M_1 $\underline{A_1}$ 04	 Allow substitution into the whole expression CAO
5	$A=\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix}$ $\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix}\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix}=\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix}+B$ $\begin{bmatrix}7 & 6\\ 18 & 19\end{bmatrix}=\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix}+B$ $B=\begin{bmatrix}7 & 6\\ 18 & 19\end{bmatrix}-\begin{bmatrix}2 & 1\\ 3 & 4\end{bmatrix}$ $B=\begin{bmatrix}5 & 5\\ 15 & 15\end{bmatrix}$	M_1 M_1 $\underline{A_1}$ 03	 L . H . S
6	SU.TU=QU.RU SUx14=31x16 SU=$\underline{31x16}$	M_1 M_1	

	14 $=35.43\text{cm}$	$\underline{A_1}$ 03	CAO
7	$\frac{3}{\sqrt{5-2}}+\frac{1}{\sqrt{5}}$ $\frac{\sqrt[3]{5}+\sqrt{5-2}}{\sqrt{5}\left(\sqrt{5-2}\right)}=\frac{\sqrt[4]{5}-2}{5-\sqrt[2]{5}}$ $\frac{\left(\sqrt[4]{5}-2\right)\left(5+\sqrt[22]{5}\right)}{\left(5-\sqrt[2]{5}\right)\left(5+\sqrt[2]{5}\right)}=\frac{20\sqrt{5}+40-10-\sqrt[4]{5}}{25-20}$ $=\frac{30+16\sqrt{5}}{5}$	M_1 M_1 $\underline{A_1}$ 03	
8	$A=P\left(1+\frac{r}{100}\right)^n$ $A=20000\left(1+\frac{8}{100}\right)^4$ $=27,210$ $I=27210-20,000$ $=Sh.7,210$	M_1 A_1 $\underline{B_1}$ 03	Or alternative allow 27209.78 allow 7209.78
9	$70x+64y=68$ $x+y=1$ $70x+64y=68$ $\underline{70x+70y=70}$ $\underline{-6y=-2}$, $y=\frac{1}{3}$ $x=\frac{2}{3}$ *ratio* 2:1	M_1 A_1 $\underline{B_1}$ $\underline{03}$	Or alternative
10	x2+8x+y2-2y=1 x2+8x+42+y2-2y+(-1)2=1+16+1 (x+4)2+(y-1)2 =18 x= -4, y=1, r= $\sqrt{18}$ = 4.283 (-4,1) and radius = 4.243	M_1 M_1 $\underline{A_1}$ 03	for both centre and radius.

11	 BAD = 48^0 BDC = 24^0 BEC = 18^0	B_1 B_1 B_1 03	
12	$4x^2-32x-20+k$ b2 = 4ac $(-32)^2=4x4(20+k)$ 64 = -20+k K = 84	M1 A1 02	
13	$\frac{9.2cm}{\sin c}=\frac{7.9}{\sin 48}$ $\sin c=\frac{9.2\sin 48}{7.9}$ $c=\sin^{-1}(0.8654)$ $=59.93$	M1 A1 02	
14	$a=128, ar=32$ $r=\frac{32}{128}=\frac{1}{4}$ $S_5=\frac{128\left(1-\frac{1}{1024}\right)}{\frac{3}{4}}$ $\frac{2^x-1}{6}=170.5$ $2^x=1024$ $2^x=1024$ $2^x=2^{10}$	B_1 M_1 M_1 A_1 04	

15	$P\alpha B^2 \; and \sqrt{C}$ $P = KB^2\sqrt{C}$ $New\,P = K(0.9B^2)\sqrt{104C}$ $New\,P = 0.8260\,KB^2\sqrt{C}$ $Change = 1740\ \% = 17.40$	M1 M1 A1 03	
16		**B_1** **B_1** **B_1** **0_3**	bisector of at P bisector of line PR measure of QX
17 (a)	$IF = 38000 + 14000 + 8500 + 3300.$ $= Ksh.63{,}800\ pm$ $IF = \left(\frac{63800 \times 12}{20}\right) = K\oint 38280$	**M_1** **A_1**	
b)	1st 6000x2=12000 2nd6000x3 =18000 3rd6000x4 =24000 4th6000x5 =30000 5th 6000x6=36000 6th 6000x7=42000 7th 2280x8 1842 Tax due =Ksh.180,240pa Less relief 18,000 Tax payable 162,240 PAYE = 13,520	**M_1** **M_1** **M_1** **A_1**	For the 1st 3slabs For 18,240 Process of - relief CAO
c	Total deduction =13520+320+1000+2000+5000+500 =Ksh.22,340	**M_1** **A_1**	addition
d	38280-22340 =Ksh.15,940	**A_1** **10**	

18 a) $y=2x2+5x-12$ for $8\leq x\leq 4$

X	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4
$2X^2$	128	98	72	50	32	18	8	2	0	2	8	18	32
5X	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20
-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12

b) $y = 2x^2+5x-12$

$0=2x^2+5x-12$

$y =0$

$2x^2+5x-12=y \quad x-3$

$-3x^2-7x+3=0 \quad x2$

$-6x^2-15x+36= -3y$

$-6x^2-14x+6 = 0$

$-x+30 = -3y$

$-3y = -x+30$

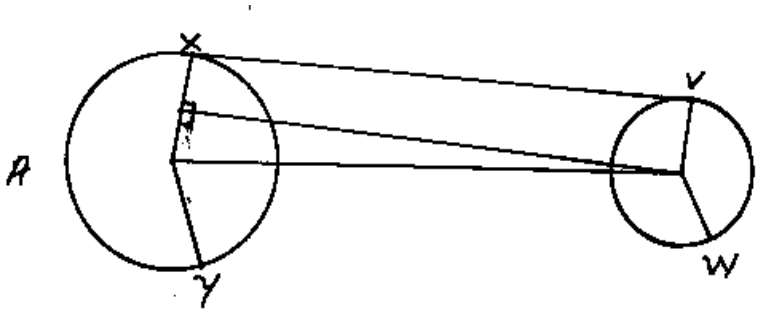
$y = {}^1/_3\ x + 10$

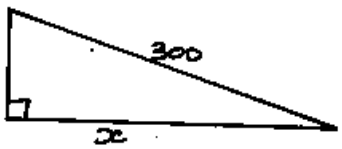
x	-9	-6	-8	0	3	6	9
y	7	8	9	10	11	12	13

19 (a)	$A=3^{2x+1}$ $Ar=9^x$, $ar^2=81$ $\frac{ar}{a} = \frac{ar^2}{ar} = r$ $\frac{9x}{3^{2x+1}} = \frac{81}{9^x}$ $9^{2x} = 81x3^{2x+1}$ $3^{4x} = 3^4 x3^{2x+1}$ $4x = 4 + 2x + 1$ $2x = 5$ $x = 5$ $x = 2.5$	**M1** **M1** **A1**	

b	$r = \frac{81}{92.5} = \frac{1}{3}$	**B1**	
c	$Sn = \frac{a(1-rn)}{1-r}$ $a = 3^{5+1} = 729, r = \frac{1}{3} \& n = 4$ $S4 = \frac{729(1-\left(\frac{1}{3}\right)^4}{1-\frac{1}{3}}$	**M1** **M1**	
d	$= \frac{720}{\frac{2}{3}}$ $= 1080$	**A1**	
	ar^4-ar^6 $729\left(\frac{1}{3}\right)^4, 729\left(\frac{1}{3}\right)^6$ a, 1 $a = 9,\ d = -8$ $S_{20} = \frac{20}{2}\left[2x9 + (20-1) - 8\right]$ $= 10[18 - 152]$ $= -1340$	**B1** **M1** **A1** **10**	Both and d

20





a) length XV = 300 sm 70^0 M_1

= 281.9cm A_1

b) Arc length VBW = $\frac{140}{360} x 2\pi r$

$= \frac{140^0}{360} x 2 x \frac{22}{7} x 180$ M_1

$= 439.88cm$ A_1

c) Length XAY

$C = \frac{\theta}{360} 2\pi r$ $= \frac{220}{360} x 2 x \frac{22}{7} x 180$ M_1

$= 691.24$ A_1

d) Length of the conveyor belt

=691.2+439+(2x281.9)

=1694.88