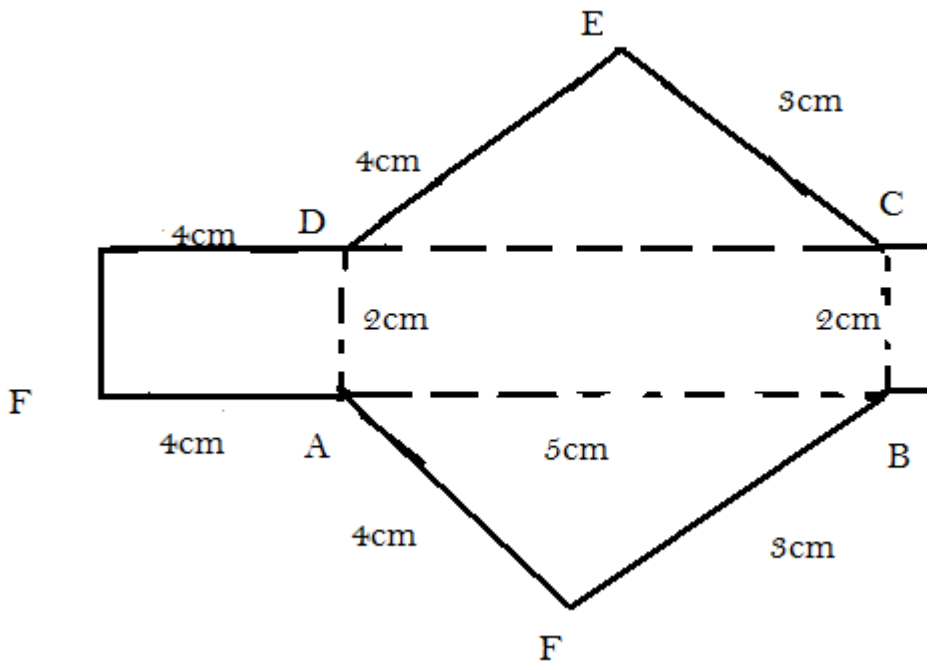
THE LAINAKU FORM THREE MATHEMATICS PAPER I YEAR 2013 MARKING SCHEME

1	1725 – 125 + 169 x 450 = 1725 – 125 + 76500 =77,650 ⇒ 6 x 100 = 600	M1 A1 B1	Working out Value of 6
2	$3^{2}(x^{2}) = 3^{3(2x+12)}$ $2x^{2} = 6x + 36$ $2x^{2} - 6x - 36 = 0$ $x^{2} - 3x - 18 = 0$ $(x + 3)(x - 6) = 0$ $x = -3$ or 6	M 1 M 1 M 1 A1	 both
3	8.00a.m 400km 9.00a.m A ——————— B 60km/hr 60km/hr After 1 hur = 60km=1hour Remaining distance =400-60=360 Relative speed (60+60)=120km/hr T = D/S 360/120= 3Hours 9.00a.m. 3 12.00 = 12.00p.m.		
4	(a) Swiss Franc = $^{52}/_{1.28}$ M1 = 40.625 (b) Kenya shillings = 40.625 x 45.21 = 1837		
5	Cos 620= 15/h h=15/cos 62=31.951 Cos 30=JT/31.951 JT =31.951cos 30 JT=27.67 JP=27.67-15 =12.67M		
		B1	Solving

6	$4ax = 3y + 12$ $m_1 = {}^{4a}/_{3}$ $7bx - 2 = 3y$ $m_2 = {}^{7b}/_{3}$ $m1 = m_2$ $41/_{3} = {}^{7b}/_{3}$ $4a = 7b$ $a : b = 7 : 4$	M 1 A1	for both m1
7	$2.6 \times 4.8 \times 3.2 = 39.936 m^3$ $\frac{39.936 \times 100 \times 100 \times 100}{1000} = 39936\ litres$		
8)			
9.	$\frac{3(x+y)-(x-y)}{X^2 - y^2}$ $= \frac{3x + 3y - x + y}{x^2 - y^2}$ $= \frac{2(x+2y)}{x^2 - y^2}$		

10	Numerator = 36 – 4 = 32 Denominator = 10-6 + 4 = 14 - 6 = 8 Combine = $^{32}/_{8}$ = 4 , 4 = 2^2 ∴.m= 2	B1 B1	Solving the numerator Solving the denominator Value of m
11	v.s.f $\frac{540}{160}=\frac{27}{8}$ lsf = $\frac{3}{2}$ asf = $\frac{9}{4}$ area of large container = $\frac{25}{4}$x9=56.25 height of larger container = 56.25xh= 540 h=$\frac{540}{56.25}$ h=9.600	M1 M1 M1 A1 04	 4 sf 9.600

12	Let profit be P $\frac{13}{19}$P = 60,000 P = 60,000 x $\frac{19}{3}$ = 20,000 x 19 380,000	 M1 M1 A1	
		03	

13	2s + 3t = 1750 x 2 3s + 2t = 1500 x 3 4s + 6t = 3500 9s + 6t = 4500 -5s = -1000 Shirt =shs.200 Trouser =shs. 450	M1 M1 A1	
		3	
14.	$y = 180^0 - 130^0 = 50^0$ $x = 180^0 - (50^0 + 83^0) = 47^0$ $z = 180^0 - 47^0 - 133^0$	B1 B1 B1 3	
15.	*2 20, 24, 26, 28* *2 10 12 13 14* *2 5 6 13 7* *3 2 3 13 7* *5 5 1 13 7* *7 1 1 13 7* *13 1 1 13 1* *1 1 1 1* *Size of the land = (2^3 x 3 x 5 x 7 x 13) + 7) aces* *= 10920 + 7 = 10,927 aces*		
16.	P(3i+0J + K) Q(0i +2J-K) Q-P = -2i + 2J-2K $\|PQ\| = \sqrt{(-2)^2 + 2^2 + (-2)^2}$ $= \sqrt{4+4+4} = 3.464$	M1 M1 A1 03	

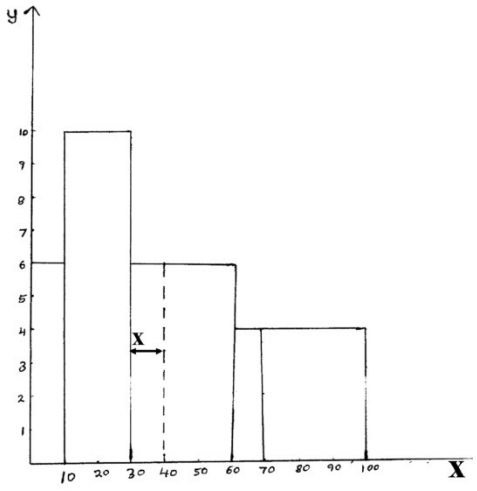
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Marks	0 -10	10 – 30	30 – 60	60 – 70	70 – 100
Frequency	12	40	36	8	24
Area of rectangle	60	200	180	40	120
Height of rectangle	6	10	6	4	4

B2 ✓ for all B1 ✓ for 3 correct values

B2 ✓ for all B 1 ✓ for 3 correct values



i) Median mark lies in 30 - 60 **S1**

ii) $60 + 200 + 6 \times x = 300$ **B1**

$6x = 300 - 260$

$6x = 40$ **B1**

$x = 6\ 2/3$ **M1**

∴ Median mark lies at $6\ ^2/_3 + 30$

$= 36^2/_3$ **A1**

B1

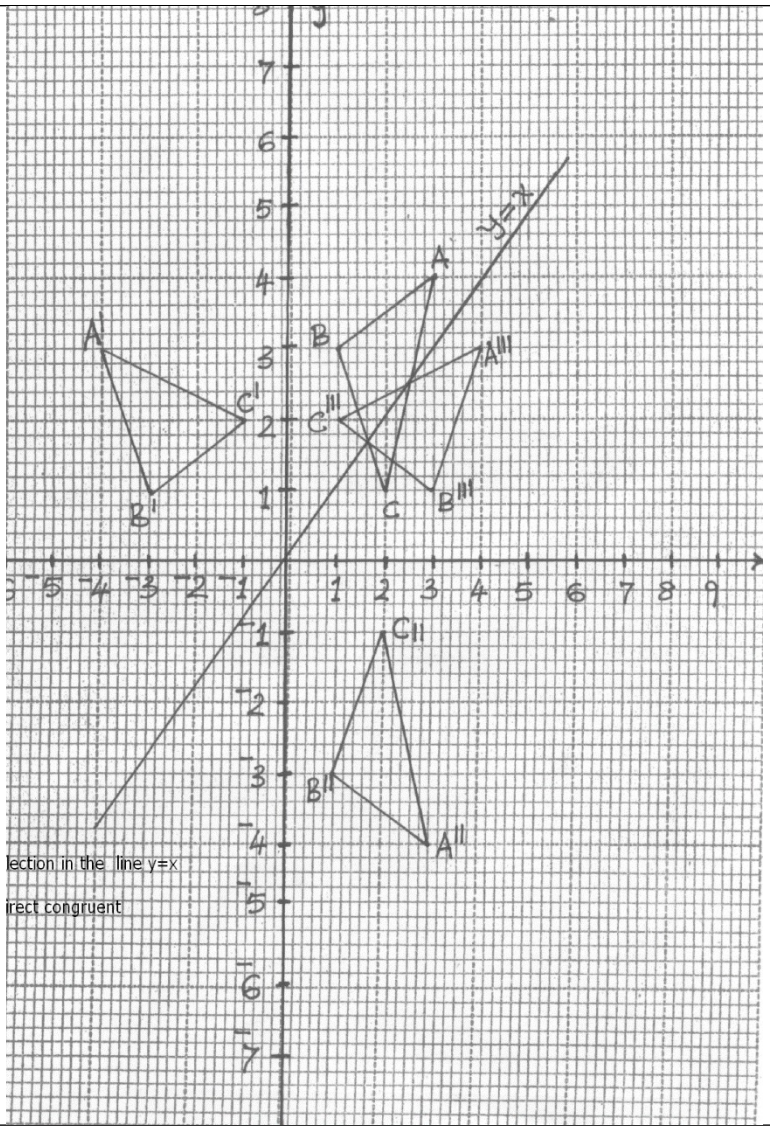
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18 a) Grade A be 2 kg

	" B be 1 kg $\frac{85\times 2+70\times 1}{3}=80/¿\ per\ kg$ $\therefore for\ 2kg\ it\ \cos t\ =160/¿$ $\frac{x-160}{160}\times 100=30\%$ $x-160=\frac{4800}{100}$ $x=208/¿$ b) $\therefore s.p=208/¿$ $\frac{208-125}{208}\times 100$ c) $=39.90\%$ d) Total kgs. ⇒ 200+ 100 = 300kg s.p = (208 + 120) + (125 x 30) = 28,710 C.P + (160 x 150) = 24,00 % profit = 28,710 – 24,000 x 100 24,000 = 19.625%	**M1** **M1A1** **M1** **A1** **M1** **M1** **A1**	✓ operation ✓ answer ✓ answer ✓ answer
19.	*a) Δ ABD √ly constructed* *Δ ABP* *b) i) AD = 4.5 + 0.1cm* *Distance A + D* *= 4.5 X 10 = 45km* *ii) Bearing of (i) from B* *= 241 + 1* *iii) Bearing P from D* *= 123 = 2* *iv) Dp = 12.9 + 0.2 am* *Distance D + P = 12.9 X 10* *= 129 km*		

20.	(a) PQ =2(8sin 35) =9.177 =9.18	M1 A1	
		02	

	(b) $= \frac{8\sin 35}{\sin 20}$ $=13.42$ $=13.42$	M1 A1	Accept $\frac{4.5}{\sin 20}$
		02	
21	(c) Area of minor segment circle centre A $\frac{70}{360}\times 3.142\times 8\times 8-\frac{1}{2}\times 8\times 8\sin 70$ $=9.03$ Area of minor segment circle centre B $\frac{40}{360}\times 3.142\times 13.42\times 13.42-13.42\times 13.42\times\sin 40$ 4.99 Area of shades region =Area of Δ s APQ and PQB-Area of main segments =(½ 8 8sin 70+ ½ 13 13sin40)-(9.03+4.99) $=73.93$	M1 A1 M1 M1M1M1 A1	$\frac{40}{360}$ 62.87-57.88 =4.99 M1 for area of Δ M1 sum area of segments M1 for difference



22.	Length of the frame (x + x + 5) = (2x + 5)		
	Width of the frame (½ x + ½ x + 5) = (x + 5)	B1	Dimension with unknowns
	Area = (2x + 5)(x + 5)		
	(a) 75 = 2x2 + 10x + 5x + 25	M1	
	2x2 + 15x – 50 = 0	A1	
	(b) 2x2 + 15x – 50 = 0		
	2x2 + 5x + 20x – 50 = 0		
	x(2x – 5) + 10(2x – 5) = 0	M1	
	(x + 10)(2x – 5) = 0		
	x = -10 or 2 ½	A1	Factorization
	length (2 x 5/2 + 5) = 10cm	B1	
	width (5/2 + 5) = 7.5cm	B1	
	(c) Area not covered = area of frame – area of photo		
	= 75 – 25	M1	
	= 50cm2		
	% area = 50/75 x 100	M1	Difference

	= 66.67%/66 2/3%	A1	in area
		10	

23. (a) (i) 800 x 0.2 **M1**
= $160m^3$ **A1**
(ii) 160 x 2000 **M1**
= 320,000kg **A1**
(iii) Cement = $^2/_8$ x 320,000 **M1**
= 80,000 **A1**
(b) Bags = $\frac{80,000}{50}$ **B1**
= 1600 **B1**
(c) Ballast = $^3/_8$ x 320,000 **M1**
= 120,000 tonnes **A1**
= 120 lorries **B1**
10

24 a) $P=\frac{kq}{r^2}$ M1

$Q=k\left(\frac{12}{144}\right)$ A1

$K = \frac{144\,x\,9}{12} = 108$ M1

$P=\frac{108\,q}{r^2} = \frac{108\,x\,15}{5^2}$ A1

P=64.8

b) $P=\frac{Kq}{r^2}$ B1

$q=\frac{pr^2}{k}=\frac{pr^2}{108}$ 11

c= i) = q1 $\frac{1.2\,p\,x\left(0.9\,r\right)^2}{k} = \frac{0.972\,pr^2}{k}$ M1

change $0.9722\frac{pr^2}{k}-\frac{pr^2}{k}$ = $-0.028\ \frac{pr^2}{k}$ A1
M1
A1

ii) percentage change

10

-0.028x100
= -2.8% or reduction of 2.8%