

FORM 3
EXAMINATION
121/2 MATHEMATICS
MARKING SCHEME

No

1.	$\sqrt{\frac{0.8064 \times 1000}{1.008 \times 10000} \times \frac{6.048 \times 10000}{0.134 \times 1000}}$ $\sqrt{\frac{80.64}{1008} \times \frac{6048}{134}}$ $\sqrt{4 \times 9}$ $4 \times 9 = 36$	B 1 B 1 A1
2.	$\begin{array}{r} -4(-4 \frac{1}{3}) \\ -12 \quad 3 \quad 5 \\ -4 \times -8 \\ \hline -4 \\ -8 \end{array}$	B1
3.	$\sin(2\theta - 30^\circ) \cos 4\theta = 0$ $\sin(2\theta - 30^\circ) \cos 4\theta = 0$ $A = 1 \quad B = 1 \quad 90^\circ$ $\theta = \frac{120^\circ}{6}$ $= 20^\circ$	A1 B 1 B1 A 1
4.	Let $52x$ be U $5^{2x}(5^3) - 20(5^{2x}) = 625$ $25U - 20U = 625$ $5U = 625$ $U = 125$ $52x = 53$ $2x = 3$ $x = \frac{3}{2}$	B1 B1 A 1
5.	The sum of n sides polygon in degrees $(n - 2) 180^\circ$ Angles in quadrilateral add up to 360° $5(x + 4) + 4(x + 5) + 2(x + 10) + (x + 20) + 360^\circ$ $(x + 20) = 360^\circ$	A 1 B 1

	$12x = 360$ $x = 30^\circ$ Interior angles $5(x+4) = 170^\circ$ $4(x+5) = 140^\circ$ $2(x+10) = 40^\circ$ $x+20 = 10^\circ$	B 1
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	Exterior angles $180^\circ \quad 170^\circ \quad 10^\circ$ $180^\circ \quad 140^\circ \quad 40^\circ$ $180^\circ \quad 40^\circ \quad 140^\circ$ $180^\circ \quad 10^\circ \quad 170^\circ$	B2 for all 4 angles correct B1 for two three angles correct No mark for 1 or less correct angles
6.	$140 \times 1240 \quad 1736$ 100 Selling price 75×1736 100 Ksh 1302	B 1 B 1 A 1
7.	Co-ordinates A are (-1,7) B are (3,-5) C are (6,-4) AB $\begin{bmatrix} 3 \\ 5 \end{bmatrix} - \begin{bmatrix} -1 \\ 7 \end{bmatrix} = \begin{bmatrix} 4 \\ -12 \end{bmatrix}$ BC $\begin{bmatrix} 0 \\ 4 \end{bmatrix} - \begin{bmatrix} 3 \\ -5 \end{bmatrix} = \begin{bmatrix} -3 \\ 9 \end{bmatrix}$ 4BC -3 -3 AB hence BC parallel to AB. They share a common point B hence collinear.	B 1 B 1 B 1
8.	1 man $\begin{bmatrix} 2 \\ 4 \end{bmatrix} \times 1$ in 3 days 4 hr a day 1 man $\begin{bmatrix} 2 \\ 4 \end{bmatrix} \times 1$ in 3 days 1 hr a day 1 man $\begin{bmatrix} 2 \\ 4 \end{bmatrix} \times 1 \times 1$ acres in 1 day 1 hr a day $\begin{bmatrix} 2 \\ 4 \end{bmatrix} \times 1 \times 1 \times 5 \times 4 \times 3$ men $\begin{bmatrix} 2 \\ 4 \end{bmatrix} \times 1 \times 1 \times 4 \times 3$ 1 man 0.5 acres 4 day in 3 hrs 1 day 5 half 0.5 0.5 10 men	B 1 B 1 A 1
9.	(30cm^3) 12	B 1

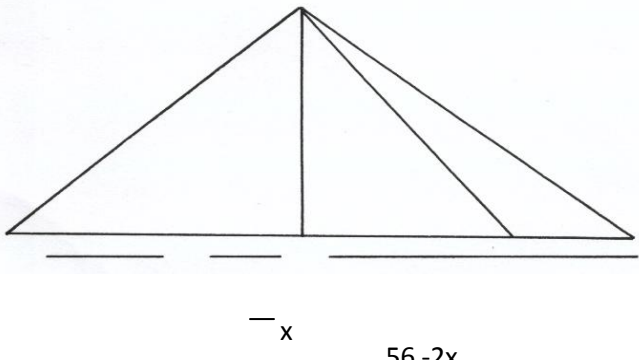
	$\frac{ASF}{-12} = \frac{108}{-12}$ 3 $LSF = \frac{ASF}{3} = \frac{810}{3} = 27$ $VSF = \frac{LSF^3}{27} = \frac{27^3}{27} = 27$ $V1 = \frac{810}{27} = 30\text{cm}^3$	B 2 A 1
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10.	Area of triangle ADB is $\frac{1}{2} \times 7 \times 125 \sin 60^\circ$ $= \frac{1}{2} \times 7 \times 125 \times \frac{\sqrt{3}}{2} = 36.37 \text{ cm}^2$ b) Area of unshaded sector $\frac{60}{360} \times \frac{22}{7} \times 7 \times 7 = 25.6667$ Shaded area $36.37 - 25.67 = 10.7 \text{ cm}^2$	B1 A1 M1 B1
11.	$-7 < X < 3x + 2$ $2x < 9, x > 4.5$ $3x + 2 < 4(x - 5), 3x + 2 < 4x - 20$ $-x < -22, x > 22$ If $x > -5$ and $x > 22$ $\xrightarrow{\hspace{2cm}}$ 22	M1 M1 A1
12.	(3.5) $\left[\frac{2p \sqrt{x}}{3x - 5} \right]$ $(3x - 5)95^2 - 4p^2 x \times 3x - 5$ $27x^2 - 5^2 - 4p^2 x - 455^2$ $27x^2 - 4p^2 x - 455^2$ $x(27x^2 - 4p^2) - 455^2$ $x - \frac{455^2}{27x^2 - 4p^2}$	Square both sides M1 M2 A1
13.	Max val of x 13.45 min 13.35 Max val of y 4.35 min 4.25 Max value of x $\frac{13.45}{4.25} = 3.1647$ Max value of x $\frac{13.35}{4.35} = 3.069$ Actual value of x 13.4 $\frac{13.4}{4.3} = 3.1163$ Absolute error $3.1642 - 3.069 = 0.04785$	B1 B1

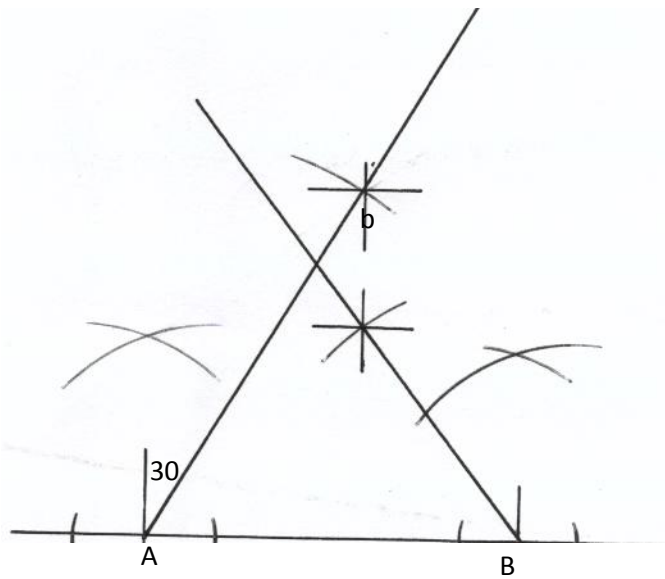
	$\frac{2}{0.04785 \times 100} = 3.1163$ $\frac{0.015355 \times 100}{3.1163} = 1.5355\%$	
14.	Gradient of AB is $\frac{M-1}{4} = \frac{M-1}{2}$ Gradient product is -1 Gradient of second line $Y = \frac{5}{3}x + 2$ $\frac{m-1}{2} = \frac{3}{2}$ $2m - 2 = 6$ $2m = 8$ $M = 4$	

15.	Principal p amount $2p$ $2p = p(1 + 10\%)^n$ $2p = p(1+0.1)^n$ $2 = (1.1)^n$ $\log 2 = n \log 1.1$ $N = \frac{\log 2}{\log 1.1} = \frac{0.301}{0.0414}$ $N = 7.27$ Round upto 8 $N = 8$ yrs	B1 B1 A1
16.	P(black) and p(brown) or p(brown and p(black)) $\left(\frac{5}{8} \times \frac{3}{7}\right) \times \left(\frac{3}{8} \times \frac{4}{7}\right)$ $\frac{15}{56} = \frac{3}{14}$ $\frac{27}{56}$	B1 B1 A1

17	400km Nairobi $\longrightarrow$ busia Speed = 120 km/hr Distance = 400 km Time = $\frac{400}{120}$ $\frac{120}{8.30 + 3 \text{ hrs } 20\text{min}}$ = 3hrs 20min 11: 50 a.m b) at 8.30 am distance covered by bus $\frac{1}{2} \times 80 = 40\text{km}$ Distance left = 360 km Speed = 2000km/hr Time = $\frac{360}{200} = 1 \text{ hr } 48 \text{ min}$ They met at 8.30 + 1 hr 48min 10.18 am c) 8 – 10.18 is 2 hrs 18min Distance = $2 \times 80 + \frac{18}{60} \times 80$ $160 + 24$ 184km from Nairobi. d) Car arrived in Nairobi after 3 hrs 20 min bus travelled at a time of 3hrs 20 min + 30 min = 3hrs 50 min Dist = $3 \times 80 + \frac{50}{60} \times 80$ $= 240 + 66 \frac{1}{3}$ $= 93 \frac{1}{3}\text{km}$ Distance from Busia is $93 \frac{1}{3}$ km	M1 A1 B1 B1 M1 A1 M1 A1 M1 A1
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18	ABC Y - = -x drawn A¹B¹C¹ draw (rotated) A¹¹B¹¹C¹¹ draw (translated) A¹¹¹B¹¹¹C¹¹¹ Enlarged A^{1v} (2,6) B^{1v} (0,0) C^{1v} (-6,2)	B1 B1 B2 B2 B2 B1
19	 $x^2 + x^2 = (56 - 2x)^2$ $2x^2 = 4x^2 - 224x + 3136$ $2x^2 - 224x + 3136 = 0$ $X^2 - 112x + 1568 = 0$ $X(x - 16) - 98(x - 16) = 0$ $(x - 16)(x - 98) = 0$ $X = 16 \text{ or } 98$ Height = 16 cm $\tan \theta = \frac{16}{35} = 0.4575$ $= 24.57^\circ$ b) ST = $\sqrt{16^2 + 35^2}$	M1 M1 M1 M1 A1 M1 A1 M1

	$= \sqrt{1481}$ $= 38.48$ c) Muximum distance $= 35 \pm 16$ $= 51$	A1 M1 A1	
20	a) $50,00 + \frac{6}{100} \times 62\,5000 + 10000 \times 250$ $50,000 + 37500 + 25,000$ $= 112,5000$ b) i) $12000 \times 2.5 + 0.06x + 50,000 = 134\,000$ $30,00 + 50,000 + 0.06x = 134\,000$ $0.06x = 134\,000 - 80\,000$ $\frac{0.06x}{0.06} = \frac{54000}{0.06}$ $x = 900,000$	M1 M1 A1 M1 M1 M1 A1	
	ii) increase = $900\,000 - 625\,000$ $= 275,000$ % increase = $\frac{275\,000}{625\,000} \times 100$ $= 44\%$	M1 M1 A1	
21	Distance covered in 90 min B1 P = 540km Q = 360 km } Scale 1 cm = 10 000 000 cm 1 cm rep 100 km	B1 B1 B1 B1 B1 B1	For A & B 5cm 030° & 5.4 to P 315° & 3.6 to Q Completed diagram



Distance btwn plane 2,1 cm $\pm$ 0.1
 2 10 $\pm$ 10
 Bearing of plane Q from plane P
 185 $\pm$ 1°

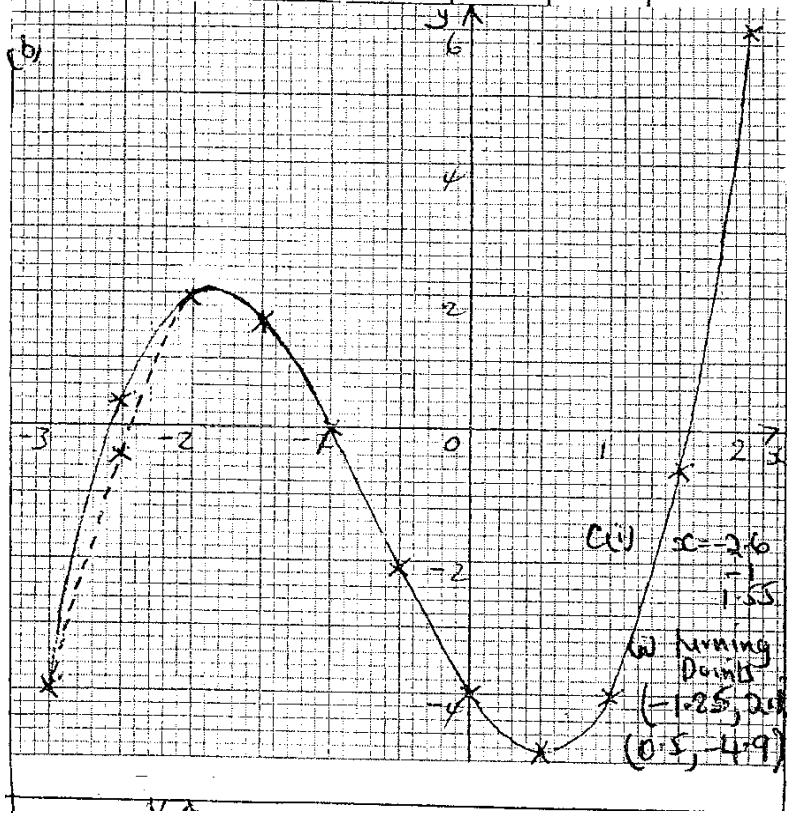
B1
 B1
 B2

23	a. x	-4	-3	-2	-1	0	1	2
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$$y \quad -12 \quad 0 \quad 0 \quad -6 \quad -12 \quad -12 \quad 0$$

c. $x = -3.9, x = 0.9, x = 1.8$

(a)	x	-2	-0.5	1	1.5
	y	2	-2.1	-4	-0.6



B2 B1 fu 3 ✓

SI for $\checkmark$ scale

Dir ✓ plotting

C1 for $\checkmark$ smooth curve

BI
B1

Accept - 2.45 for use c
-0.4

Allow readings within
1 small square.

24.	$\text{a) ACC} = \frac{15 - 0}{20}$ $= 0.75 \text{m/s}^2$
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$$\begin{aligned} \text{b) Dece} &= 0 - 15 \\ &\quad 20 \\ &= -0.75 \end{aligned}$$

c) Area = $\frac{1}{2} \times 20 \times 15$
= 150ml

d) Area = 20×15
= 300m

$$\begin{aligned} \text{e) Area} &= \frac{1}{2}(30 + 60) \times 15 \\ &= 675\text{m} \end{aligned}$$

M1

A1

M1

A1

M1

A1

M1

A1

M1

A1