URATIGA MATHEMATICS EXAM

FORM 2 MARKING SCHEME.

SECTION I

1. Numerator

$-3^2 + (-4) \div 2 \times 1$

$-9 + -2 \times 1$ m1

$-9 - 2 = -11$

Denominator

$10 - (-5) \div \frac{1}{2}$

$10 + 5 \div \frac{1}{2}$ m1

$10 + 10 = 20$

$\frac{N}{D} = \frac{-11}{20}$ A1

03

2. midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\left(\frac{2+4}{2}, \frac{6-8}{2}\right) \Rightarrow (3, -1)$

Gradient $= \frac{-8-6}{4-2} = \frac{-14}{2} = -7$. m1

$(3, -1)\ (x, y)$

$-7 = \frac{y+1}{x-3}$ m1

$-7(x-3) = y+1$

$-7x + 21 = y + 1$

$7x + y - 20 = 0$ A1

03

3. $\sqrt{0.2468} \Rightarrow 2.468 \times 10^{-2} = 4.9679 \times 10^{-1}$ m1

$= 0.49679$

Reciprocal of $0.49679 = 4.9679 \times 10^{-1}$

$\Rightarrow 0.2013 \times 10$ m1

$= 2.013$.

$0.14682^3 \Rightarrow (1.4682 \times 10^{-1})^3$.

$= 3.162 \times 10^{-3}$.

$= 0.003162$ m1

$0.003162 + 2.013 = 2.016162$ A1

04

4. $V = \frac{2}{3}\pi R^3 - \frac{2}{3}\pi r^3$ — M1

$(\frac{2}{3} \times \frac{22}{7} \times 32^3) - (\frac{2}{3} \times \frac{22}{7} \times 30^3)$ — M1

$= 68,656.76 - 56,571.43$

$= 12,085.33 cm^3$. — A1

03

5 $\frac{x-3}{5} = 4 - \frac{x-2}{2}$

$10^2(\frac{x-3}{5}) = 4 \times 10 - 10^5(\frac{x-2}{2})$ — M1

$2x - 6 = 40 - 5x + 10$

$2x + 5x = 50 + 6$ — M1

$7x = 56$

$x = 8$. — A1

02

6 Let sheep be x and goats be y

$x - y = 6$

$\frac{1}{3}x + \frac{1}{4}y = 30$

$x - y = 6$ —(i)

$4x + 3y = 360$ —(ii) — M1

From eqn (i)

$x = 6 + y$

Sub. in eqn ii)

$4(6+y) + 3y = 360$

$24 + 4y + 3y = 360$

$7y = 360 - 24$ — M1

$7y = 336$.

$y = 48$ goats

$x = 6 + 48 = 54$ sheep.

Total $= 54 + 48$

$= 102$ animals. — A1

03

7

2	60	30	40
2	30	15	20
2	15	15	10
3	15	15	5
5	5	5	5
	1	1	1

$L.C.M = 2^3 \times 3 \times 5$

$= 120$ mins. M1

$\frac{120 \text{ mins}}{60} = 2 \text{ hrs}$. M1

8.00 am
2.00 hrs +
10.00 am Monday. A1 02

8 $1L = 1000ml$

$5L = \frac{5 \times 1000}{1} = 5000ml$.

$V.S.f = \frac{5000}{320} = \frac{125}{8}$ M1

$L.S.f = \sqrt[3]{\frac{125}{8}} = 5/2$.

$A.S.f = (\frac{5}{2})^2 = \frac{25}{4}$.

$25 = 0.25$

$\therefore 4 = \frac{4 \times 0.25}{25} = 0.04m^2$ M1
or $\frac{1}{25}m^2$. A1 03

9 1 Euro = Ksh. 147.56

$\therefore 20,000 = 20,000 \times 147.56 = \text{ksh. } 2951200$

Balance $= 2951200 - 2510200$ M1

$= \text{Sh. } 441000$

1 US dollar = Sh. 74.50

7. = Sh. 440,000

$= \frac{441000}{74.50}$ M1

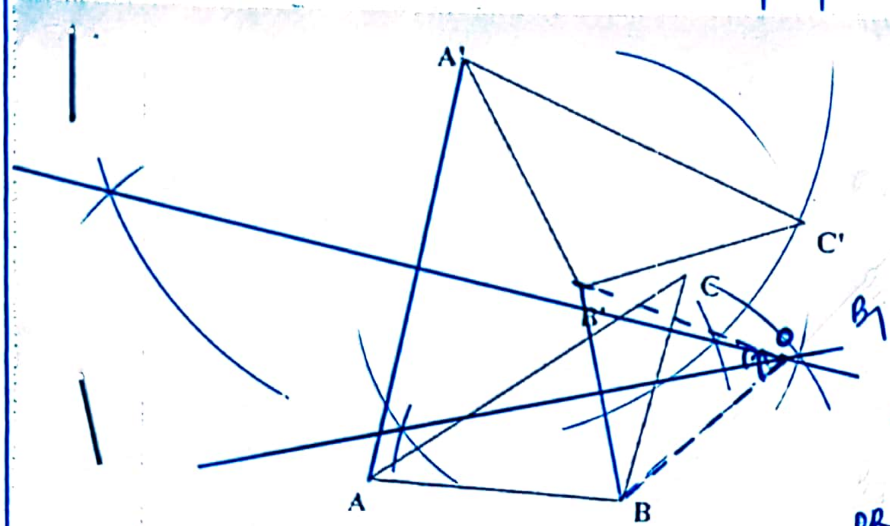
$= 5919.4631$ us dollar A1

03

13

NO	log	
1.23	0.0899	
0.0089	$\bar{3}.9494$ +	M1
	$\bar{2}.0393$	M1
76.54	1.8839 −	
	$\bar{4}.1554 \times \frac{1}{3}$	M1
	$\frac{-4-2}{3} + \frac{2.1554}{3}$	
5.230×10^{-2}	$\bar{2}.7185$	A1
0.05230		04

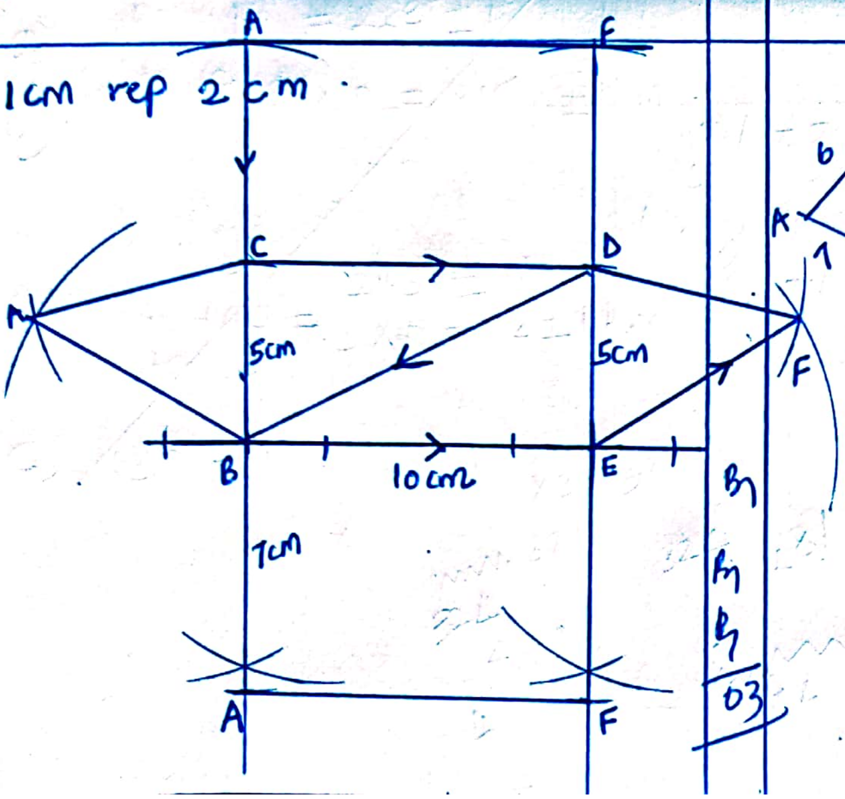
14



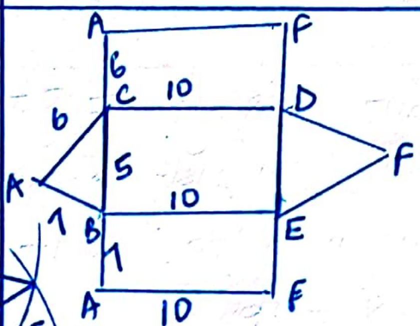
B1 – Bisecting any two lines.

Angle of rotation $-60° \pm 1°$ OR 60° clockwise B1

15 1cm rep 2 cm



B1
B1
B1
03



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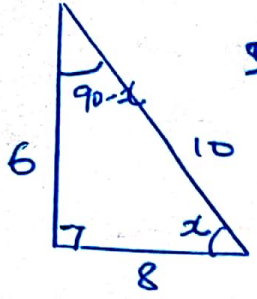


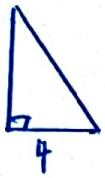
$\sin(90-x) = \frac{8}{10}$ M1

$\tan x^\circ = \frac{6}{8}$ A1

02

SECTION B

17 a)



$HYP^2 = 10^2 + 4^2$

$= \sqrt{10^2+4^2}$ M1

$= \sqrt{116} = 10.8\text{cm}$ A1

b) Let slant height of smaller cone be x

$\frac{2}{10} = \frac{x}{x+10.8}$

$\Rightarrow 2(x+10.8) = 10x$ M1

$2x + 21.6 = 10x$

$8x = 21.6$

$x = 2.7\text{cm}$ A1

c) C.S.A of the neck $= \pi DL$

$\Rightarrow 3.142 \times 2 \times 2 = 12.568\text{cm}^2$ M1

C.S.A of the frustrum $= \pi RL - \pi rl$

$\Rightarrow 3.142\{(5\times13.5) - (1\times2.7)\}$ M1

$= 3.142(67.5 - 2.7)$.

$= 3.142(64.8) = 203.6016\text{cm}^2$ A1 2.

Area of the base $= \pi r^2$

$= 3.142 \times 5^2 = 78.55\text{cm}^2$ A1

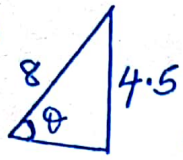
Total surface area of the conical flask.

$= (12.568 + 203.6016 + 78.55)\text{cm}^2$ M1 2

$= 294.7\text{cm}^2$. A1

10

18 a) i)

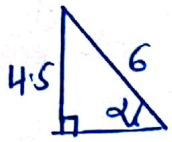


$\sin\theta = \frac{4.5}{8}$ m1

$\angle APB \quad 2\theta = \sin^{-1}\left(\frac{4.5}{8}\right)\} \times 2$ A1

$= 68.46°$

ii) $\angle AQB$



$\sin\alpha = \frac{4.5}{6}$ m1

$2\alpha = \sin^{-1}\left(\frac{4.5}{6}\right)\} \times 2$ A1

$= 97.18°$

b) Area of the quadrilateral APBQ

$\left(\frac{1}{2} \times 8^2 \times \sin 68.46°\right) + \left(\frac{1}{2} \times 6^2 \sin 97.18°\right)$ m1

$= (29.77 + 17.86)cm^2 = 47.63cm^2$ A1

Area of Segments (unshaded)

$\left\{\left(\frac{68.46°}{360°} \times \frac{22}{7} \times 8^2\right) - 29.77\right\}cm^2$

$(38.25 - 29.77)cm^2 = 8.48cm^2$ m1

$\left\{\frac{97.18°}{360°} \times \frac{22}{7} \times 6^2\right) - 17.86\}\ cm^2$

$(30.54 - 17.86)cm^2 = 12.68cm^2$ A1

Total area of unshaded part

$(8.48 + 12.68)cm^2 = 21.16cm^2$

Area of shaded part m1

$= (47.63 - 21.16)cm^2$

$= 26.47cm^2$. A1

10

9 a) i) $\frac{7}{16} \times 4800,000$ M1

$= Ksh. 2,100,000$ A1

ii) $\frac{1}{4}$ of $8^2 = 2ha$

$= 8 - 2 = 6ha.$

$1ha = 10,000m^2.$

$6ha = 6 \times 10,000 = 60,000m^2.$ M1

$1Plot = 15 \times 25 = 375m^2.$

$1plot = 375m^2.$

$? = 60,000m^2.$ M1

$\frac{60,000m^2}{375} = 160 plots.$ A1

b) i) 160×50.000

$= Sh. 8,000,000.$ M1

$Profit = 8,000,000 - 4,800,000$

$= Sh. 3,200,000$

$\frac{30}{100} \times 3,200,000$ M1

$= Sh. 960,000$

$3,200,000 - 960,000$

$= Sh. 2,240,000$ A1

ii) Amina

$\frac{4}{16} \times 2,240000 = Sh. 560,000$

Bosire

$\frac{5}{16} \times 2,240,000 = Sh. 700,000$ M1

$Difference = Sh. (700,000 - 560,000)$

$= Sh. 140,000.$ A1

10

a) Let goats be g and bulls be b.

$2000g + 15000b = 190,000$ M1
$4000g + 15000(b-3) = 185,000$ M1

$\Rightarrow 2000g + 15000b = 190,000$
$4000g + 15000b = 230,000$ −

$-2000g = -40,000$

$-2g = -40$

$g = 20$ goats A1

$2000(20) + 15000b = 190,000$ M1

$40000 + 15000b = 190,000$

$150,000b = 150,000$ A1

$b = 10$ bulls.

b) 100% of goats = 2000

$\therefore 125\% = \frac{125 \times 2000}{100}$ M1

$= sh.\ 2500$

Total S.P $= 2500 \times 20$

$= sh.\ 50,000$ A1

100% of bulls $= sh.\ 15000$

$130\% = \frac{130 \times 15000}{100}$ M1

$= sh.\ 19,500$

T.S.P $= (19,500 \times 10)\ sh.$

$= sh.\ 195000$ A1

S.P $= sh.\ (50,000 + 195,000)$

$= sh.\ 245,000$

Profit $= sh.\ 245,000 - sh.\ 190,000$

$= sh.\ 55,000$. A1

10

21

a) $3y - 2x = -2$

at x-axis, $y = 0$ M1

$3(0) - 2x = -2$

$-2x = -2$

$x = 1$ A1

$R(1, 0)$

b) $L_1 \Rightarrow 3y = 2x - 2$

$y = \frac{2}{3}x - \frac{2}{3}$.

$G_1 = \frac{2}{3}$. $G_2 = -\frac{3}{2}$ for the lines M1

$-\frac{3}{2} = \frac{y - 0}{x - 1}$ M1

$2y = -3x + 3$ A1

$y = -\frac{3}{2}x + \frac{3}{2}$.

c) i) $G_1 = G_2$ for parallel lines $= \frac{2}{3}$.

$\frac{y - 1}{x + 4} = \frac{2}{3}$ M1

$2(x + 4) = 3(y - 1)$

$2x + 8 = 3y - 3$

$3y = 2x + 11$

$y = \frac{2}{3}x + \frac{11}{3}$. A1

ii) $y = -\frac{3}{2}x + \frac{3}{2}$

$y = \frac{2}{3}x + \frac{11}{3}$. M1

$0 = -\frac{13}{6}x - \frac{13}{6}$. m1

$\frac{13}{6}x = -\frac{13}{6}$

$\Rightarrow x = -1$

$y = -\frac{3}{2}(-1) + \frac{3}{2} \Rightarrow y = 3$. A1

$S(-1, 3)$ 10

22 a) $\frac{1}{3}\pi r^2 h$. m1

$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times 21^2 \times 30$ A1

$= 13860 cm^3$.

b) i) $\frac{H}{h} = \frac{R}{r} \Rightarrow \frac{36}{30} = \frac{R}{21}$ m1

$30R = 36 \times 21$

$R = \frac{36 \times 21}{30} = 25.2 cm$ A1

ii) $\left(\frac{1}{3} \times \frac{22}{7} \times 25.2^2 \times 36\right) - 13860$ m1

$= 23950.08 - 13860$ m1

$= 10090.08 cm^3$. A1

iii) $\frac{4}{3}\pi r^3 = 10090.08$. m1

$\frac{4}{3} \times \frac{22}{7} \times r^3 = 10090.08$.

$\frac{88 r^3}{21} = 10090.08$ m1

$r^3 = 10090.08 \times \frac{21}{88}$.

$r^3 = 2407.86$

$r = \sqrt[3]{2407.86}$ A1

$r = 13.40 cm$

10

23

a) Total Sales = 360 × 500
= sh. 180,000 M1

Commission = $\frac{20}{100}$ × 80,000
= sh. 16000 M1

Total Earnings = 12,000 + 16,000
= sh 28,000. A1

b i) New Salary = $\frac{110}{100}$ × 12000
= sh 13,200 M1

Commission = 17,600 − 13,200
= sh. 4400 M1

20% = 4400

∴ 100% = $\frac{100 \times 4400}{20}$ M1
= 22,000

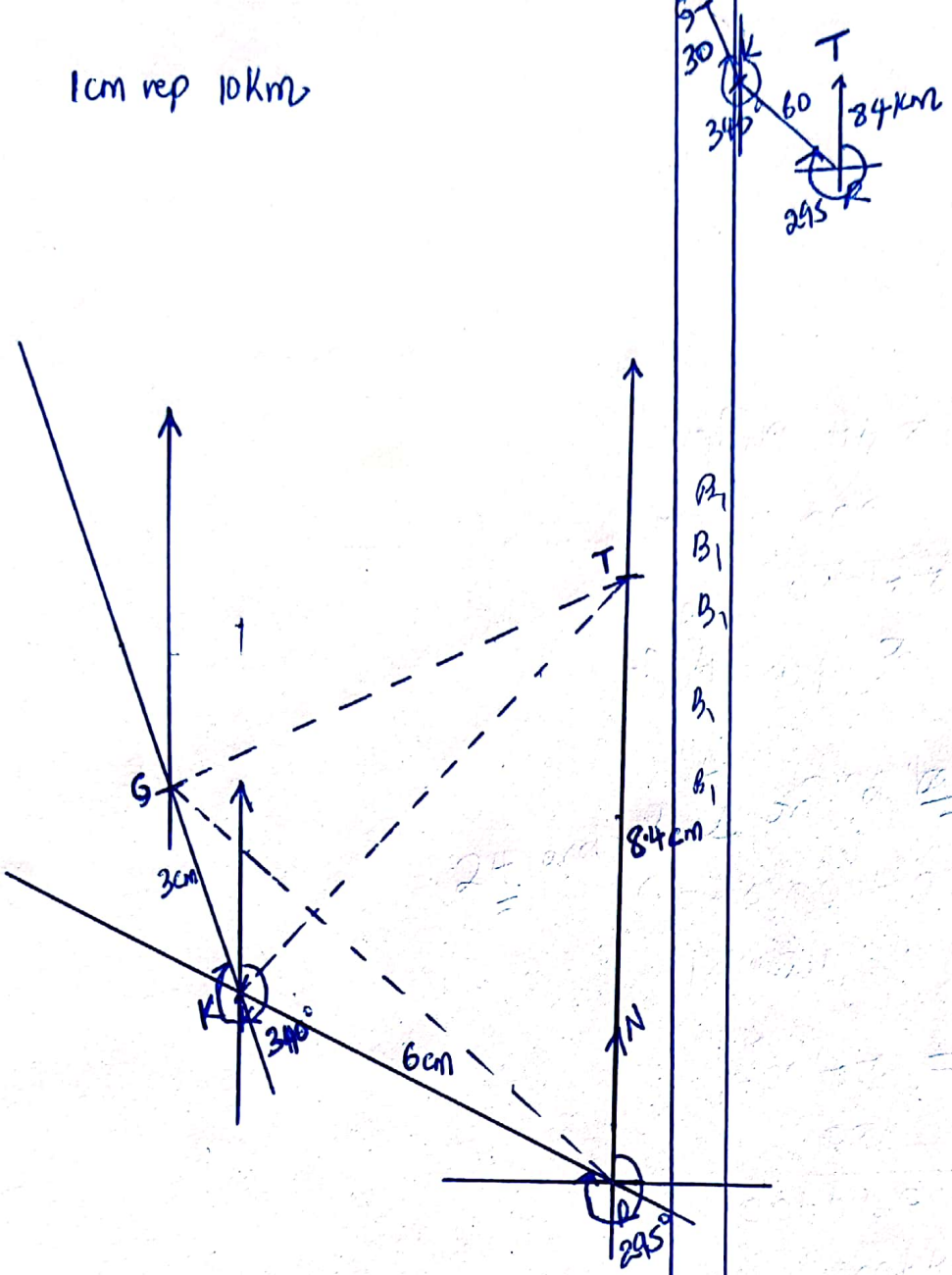
Total amount received.
sh (22,000 + 100,000) M1
= sh. 122,000. A1

ii) Number of handbags
= $\frac{122,000}{500}$ M1
= 244 bags. A1

TO

24.

1cm rep 10Km



Bearing

a) $180 + 43^\circ = 223^\circ \pm 1^\circ$

Distance $8.1 \times 10 = 81\text{km} \pm 1\text{km}$

b) Bearing

$180 + 65^\circ = 245^\circ \pm 1^\circ$

Distance $7.3 \times 10 = 73 \pm 1\text{ Km}$

c) $130^\circ \pm 1^\circ$