PROPOSED GUIDE KAMTEC MOCK 2024

MATHEMATICS

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ITEM 1

let the dimensions be l

a) Cube, $V = 27000cm^3$

$V = l \times l \times l$ M=1

$V = l^3$

$\Rightarrow 27000 = l^3$ M=1

$\sqrt[3]{27000} = l$ I=1

$30 = l$ M=1

∴ The dimension of the faces will be 30cm by 30cm. AP=1

b) Home ——120Km——> Y M=1

09:00cm

If 100Km is covered in 2 hours (120 minutes) I=1

1Km is covered in $(\frac{2}{100})$ hours I=1

120Km will be covered in $(\frac{2}{100} \times 120)$ hours I=1

= 2.4 hours

= 2hours 24 minutes M=1

09:00cm

+ 02:24 M=1

11:24 am I=1

Tom will reach the interview at 11:24am. AP=1

c) Budget required : 3000000 UGX

Contributions

Tom = 1000000 UGX I=1

Friend = 1½ of Tom's Contribution

= $\frac{3}{2}$ of 1000000 M=1

$\frac{3}{2} \times 1000000$ I=1

= 1500000 UGX I=1

Total Contribution = 1000000 + 1500000

= 2500000 UGX M=1

Yes, they need to aquire a loan, because their Contributions was less by 500000 UGX according to their budget. AP=1

ITEM 2

a)

Day 1	Day 2
Total sale = 1750000 UGX	Total sale = 17 3000000 UGX
Vest 100	Vest 150
shirt 50	shirts 100

let the number of vests and shirts be x and y respectively.

$\Rightarrow$ $100x + 50y = 1750000$ — I M=1

$150x + 100y = 3000000$ — II M=1

By substitution,

$100x + 50y = 1750000$ M=1

$100x = 1750000 - 50y$

$x = \frac{1750000 - 50y}{100}$ — III I=1

substitute for x in equation II

$150x + 100y = 3000000$

$150\left(\frac{1750000 - 50y}{100}\right) + 100y = 3000000$ M=1

$\frac{26250000 - 750y}{10} + 100y = 3000000$

M=1

$26250000 - 750y + 1000y = 30000000$

$250y = 3750000$

$y = \frac{3750000}{250}$

$y = 15000$ A=1

substitute for y in equation III

$x = \frac{1750000 - 50 \times 15000}{100}$

$x = 10000$ A=1

He need to sell each vest at 10000 UGX and each shirt at 15000 UGX TP=7

ITEM 2

b) Let the workers working on vest and T-shirt be x and y respectively

Inequalities

$x + y \leq 6$ 1

$x > y$ 1

$x \geq 0$ 1

$y \geq 0$ 1

Inequality	Boundary line	Coordinates
$x + y \leq 6$	$x + y = 6$ (solid)	(0, 6), (6, 0)
$x > y$	$x = y$ (dotted)	(0, 0), (3, 3)
$x \geq 0$	$x = 0$ (solid)	
$y \geq 0$	$y = 0$ (solid) M=1	

x, y	Expenses : 60000x + 50000y	Number
(1, 1)	60000(1) + 50000(1) : 110 000	(1, 1)
(0, 1)(1, 0)	60000(1) + 50000(0) : 60000 ✓	
(6, 0)	60000(6) + 50000(0) : 360000	M=1
(3, 3)	60000(3) + 50000(3) : 330 000	

He should hire 1 worker on stall for vest and AP=1
1 worker on stall for T-shirt to minimise the cost.

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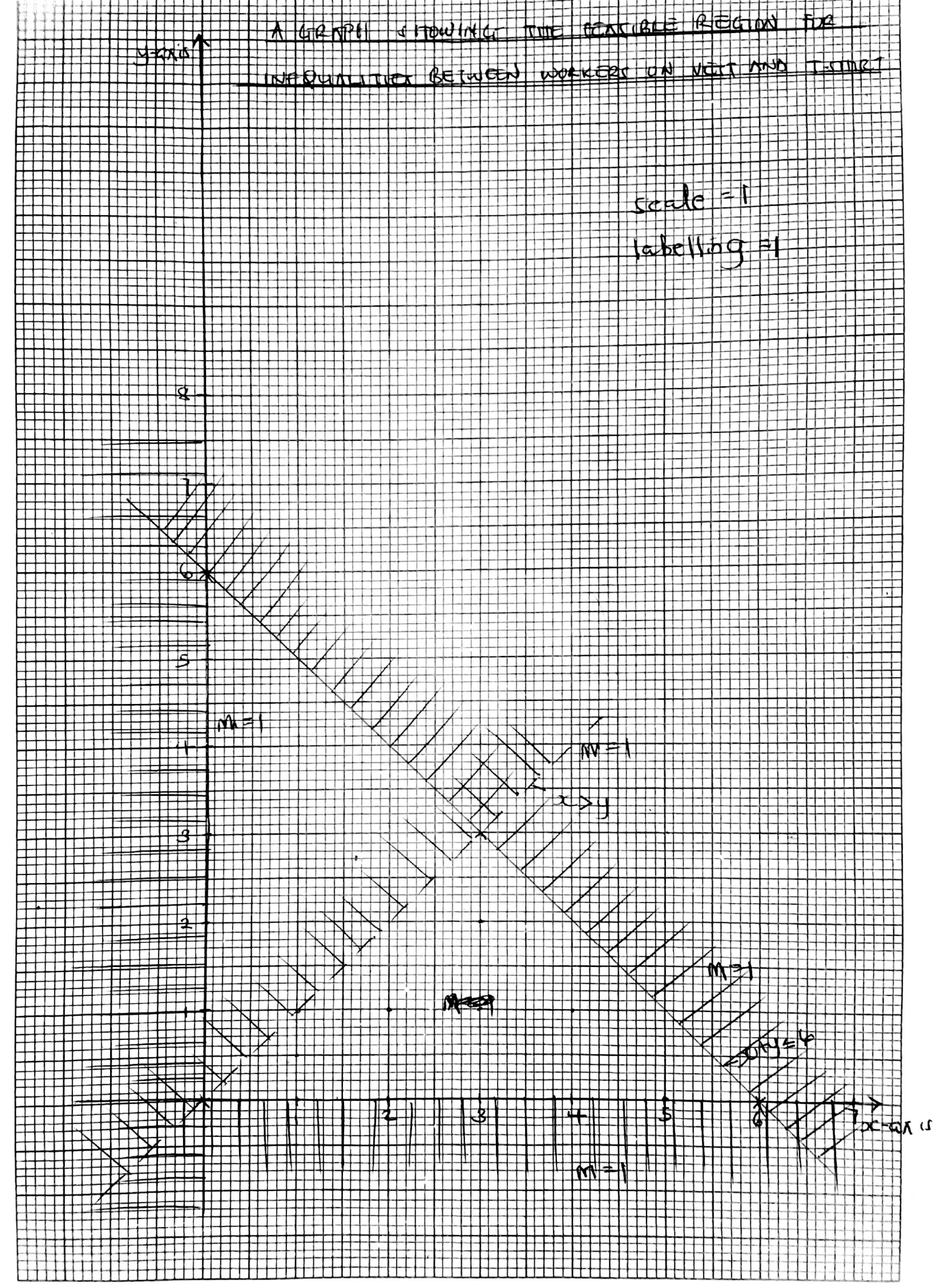
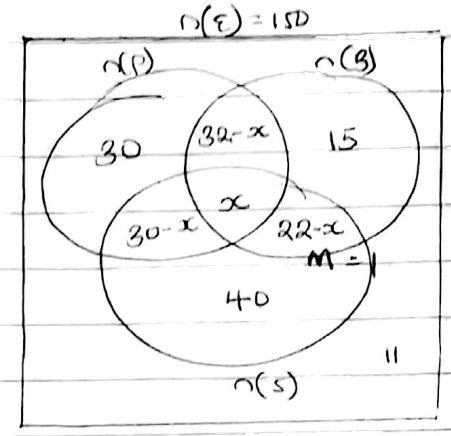
A GRAPH SHOWING THE FEASIBLE REGION FOR INEQUALITIES BETWEEN WORKERS ON VAT AND T-SHIRT



SECTION B

ITEM 3

a) let the cause of school drop out by pregnancy, be P
let the cause of school drop out by Bullying be B
and school fees be S



$n(\varepsilon) = 150$

$n(P)\text{only} = 30$

$n(B)\text{only} = 15$ M=1

$n(S)\text{only} = 40$

$n(S \cap B) = 22$

$n(S \cap P) = 30$

$n(P \cap B) = 32$

$n(S \cap P \cap B)' = 11$

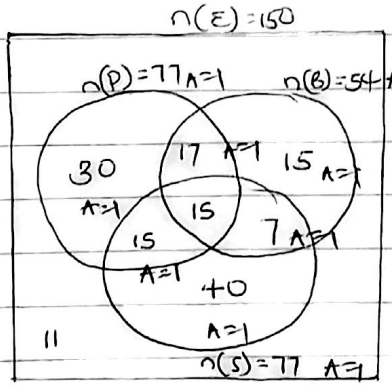
let $n(S \cap P \cap B)$ be x M=1

$30 + 15 + 40 + 32 - x + x + 30 - x + 22 - x + 11 = 150$ M=1

$180 - 2x = 150$

$-2x = -30$

$x = 15$ A=1



i) The two reasons are pregnancy and school fees A=1 A=1

ii) $P(P \text{ and } S) = \frac{\text{Outcomes}}{\text{sample space}}$ M=1

$= \frac{7+40+15+15+17+30}{150}$ B=1

$= \frac{124}{150} = \frac{62}{75}$ or 0.827 A=1

The probability is $\frac{62}{75}$ or 0.827 A1=1

ITEM 4 Frequency distribution Table. $R_1 = 1$

a)

Age	Tally	f	x	fx	c.f	c.b
10-14	𝍸 III	8	12	96	8	9.5-14.5
15-19	𝍸 𝍸 II	12	17	204	20	14.5-19.5
20-24	𝍸 IIII	10	22	220	30	19.5-24.5
25-29	𝍸 I	7	27	189	37	24.5-29.5
30-34	III	3	32	96	40	29.5-34.5
		$\Sigma f = 40$	P=1	$\Sigma fx = 805$	P=1	P=1

Age limit porressed by 80%.

$$P_{80} = L_1 + \left(\frac{\frac{80}{100}N - cfb}{f}\right)c \quad M=1$$

But $\frac{80}{100}N = \frac{80}{100} \times 40$ A=1

$= 32$

$P_{80} = 24.5 + \left(\frac{32-30}{7}\right)5$ A=1

$P_{80} = 24.5 + 1.42857$

$= 25.928$ A=1

$P_{80} = \underline{26}$ A=1

Average (Mean) $= \frac{\Sigma fx}{\Sigma f}$ M=1

$= \frac{805}{40}$ A=1

$= 20.125$

Average $= \underline{20}$ A=1

Age limits suggested are 26 (80%) and 20 (average) A=1

b) I suggest (recommend) the age limit passed by 80% of the population. AP=B

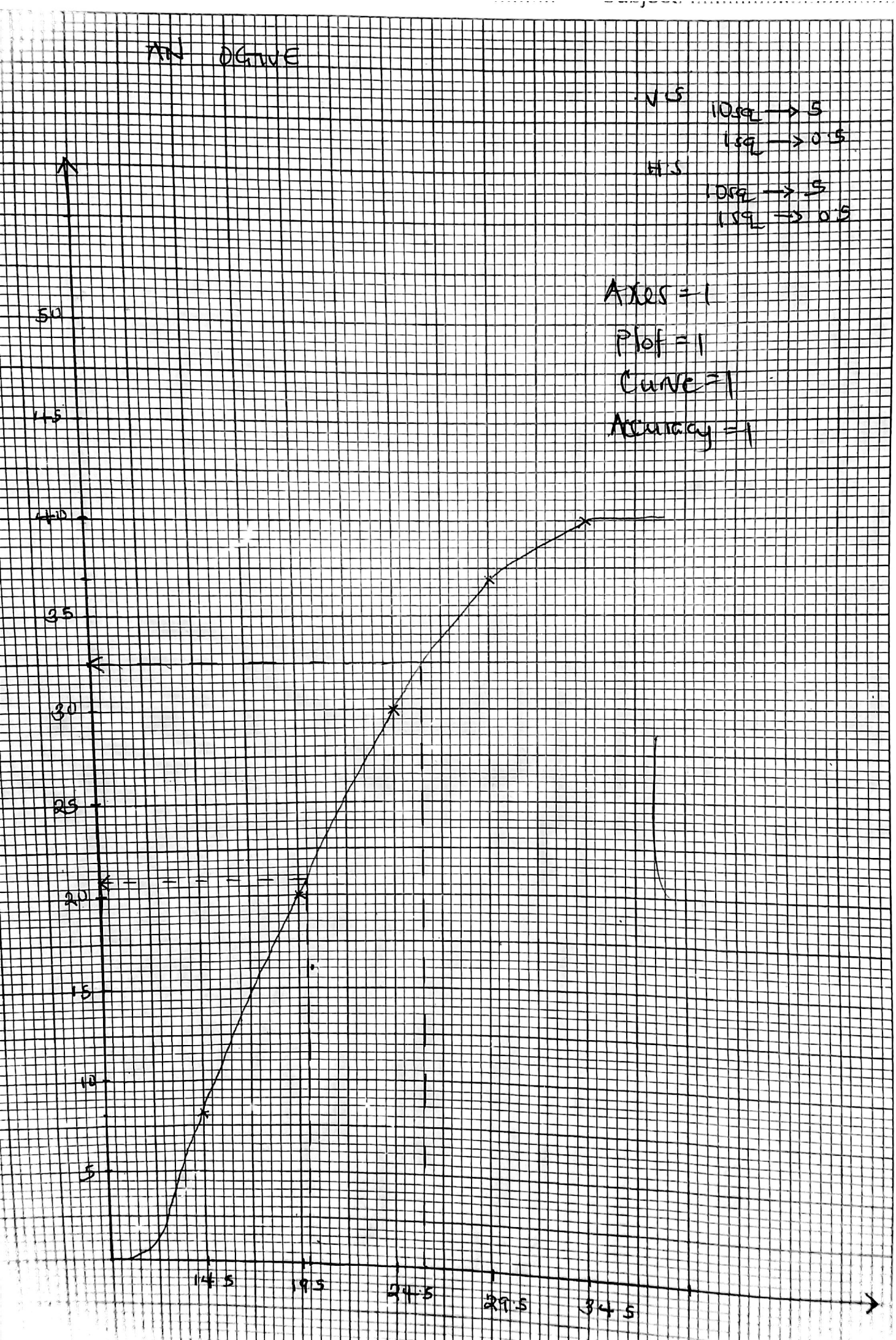
Because 80% Cover most of the population.

AN OGIVE

V.S 10sq → 5
1sq → 0.5

H.S 10sq → 5
1sq → 0.5

Axes = 1
Plot = 1
Curve = 1
Accuracy = 1



ITEM 5

a) $X(4,2)$ $Y(12,8)$

$x_1\ y_1$ $x_2\ y_2$

Distance between x and y $= \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ M=1

$= \sqrt{(12-4)^2+(8-2)^2}$ A=1

$= \sqrt{64+36}$ A=1

Distance between x and y $= \sqrt{100}$ km

$= 10$ km A=1

From Y to the party venue $= 32$ km

Total distance $= (10+32)$ km

$= 42$ km A=1

Time to be taken 45 minutes $= \frac{3}{4}$ hours B=1

from Distance = speed x Time M=1

$42 = \text{speed} \times \frac{3}{4}$ A=1

$\frac{4 \times 42}{3} = \text{speed}$

speed $= 56$ km/hr A=1

He need to drive at a speed of 56 km/hr C=1

Item 5

b) Surface area of an open Cone = πrL

Diameter
Radius = 5.9 inch → 1 inch = 2.54 cm

5.9 inc = (5 × 2.54) cm

= 14.986 cm A=1

slanting length = 6.3 inch → 1 inch = 2.54 cm

6.3 inch = (6.3 × 2.54) cm

= 16.002 cm A=1

Surface area of the Cone = πrl M=1

$= \frac{22}{7} \times \frac{14.986}{2} \times 16.002$

$= 376.84\ cm^2$ A=1

For 50 Cones, SA = 50 × 376.84 A=1

$= 18841.9\ cm^2$ A=1

1 wall paper = 61 × 84

$= 5124\ cm^2$ A=1

wall paper required = $\frac{18841.9}{5124}$ M=1

= 3.677

≈ 4 A=1

the needs 4 wall papers to make 50 hats C=1

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ITEM 6

a) Base area = $8100\,cm^2$

Area = S x S

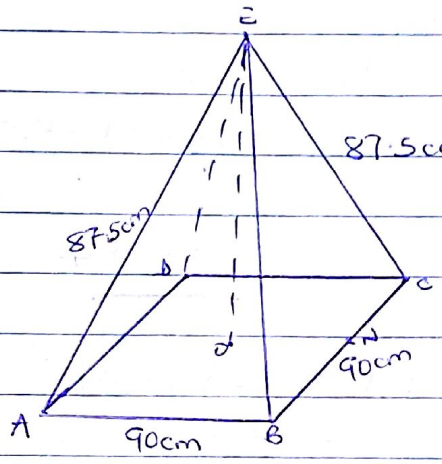
$\Rightarrow 8100 = S^2$

$S^2 = 8100$ M=1

$\sqrt{S^2} = \sqrt{8100}$

$S = 90$

Base dimension = 90 cm. A=1



A=1

K=1

D=1

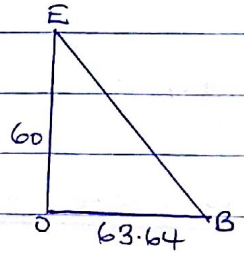
Diagonal AC

$(AC)^2 = (AB)^2 + (BC)^2$ M=1

$AC = \sqrt{90^2 + 90^2}$

$AC = 127.28\,cm$ A=1

for slanting side, Taking EOB



$EB = \sqrt{60^2 + 63.64^2}$ M=1,

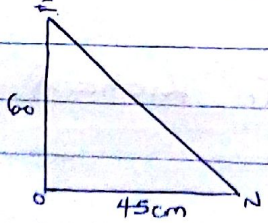
$EB = \sqrt{7650.05}$

$EB = 87.46$

$EB = 87.5\,cm$ A=1

Total surface area = Base area + Triangular faces M=1

Using EON



$EN = \sqrt{60^2 + 45^2}$

$EN = \sqrt{5625}$

$EN = 75\,cm$ A=1

Area of Triangle EBC $= \frac{1}{2} \times b \times h$ M = 1

$= \frac{1}{2} \times 90 \times 75$

$= 3375\ cm^2$ A = 1

Total surface area = 8100 + 4(3375)

= 8100 + 13500

= 21600 cm^2 A = 1

Board 2500mm by 400mm

But

1cm — 10mm 400mm = 40cm A = 1

2500mm = 250cm

Area of the board = 250 × 40

= 10000 cm^2 A = 1

The board will not be enough, because it covers an area of 10000 cm^2 while the pyramid pdt must cover an area of 21600 cm^2. C = 4

An excess of 1600 cm^2 of board need to be added.

b) principle = 2500000 UGX

Rate = 10%

Time = 2 years

$I = PRT$ M = 1

$= \frac{2500000 \times 10 \times 2}{100}$

I = 500000 UGX

A = P + I

A = 2500000 + 500000

A = 3000000 UGX A = 1

Percentage profit = $\frac{\text{Profit}}{\text{Cost price}}$ M=1

$\frac{40}{100} = \frac{\text{Profit}}{4000000}$

Profit = $\frac{40 \times 4000000}{100}$ A=1

Profit = 1600000 UGX

Profits for 2 years = 1600000 × 2

= 3200000 UGX A=1

Yes, he has to take the loan because he can generate (get) profits that can pay back the loan and remain with 200000 UGX C=1

THE END

ANY CORRECTION IS HIGHLY WELCOME

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