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JULY/AUGUST:

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CANDIDATE'S NAME: TR. KASUMBA JOHN INDEX No.

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SECTION A

Item 1 (a)

Amount of Pure litres in the first batch

$$= \frac{75}{100} \times 460 \quad I=1$$

$$= 345 \text{ litres.}$$

Let x be the amount of 90% pure that must be added to the 460 litres to obtain a 78% pure mixture.

$$345 + \frac{90x}{100} = \frac{78}{100} (460 + x)$$

$$345 + 0.9x = 0.78(460 + x)$$

$$345 + 0.9x = 358.8 + 0.78x \quad I=1$$

$$0.9x - 0.78x = 358.8 - 345$$

$$= 0.12x = 13.8$$

$$\frac{0.12x}{0.12} = \frac{13.8}{0.12}$$

$$x = 115 \quad M=1$$

115 litres which is 90% pure, must be added to the 460 litres to obtain a 78% pure mixture. $AP=1$

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Item 2 (b)

Let x be the amount of work for each cycle.

Machine A takes 6 hours to complete the work.

$$6 \text{ hr} = x$$

$$1 \text{ hr} = \frac{x}{6}$$

Amount of work for machine A in 1 hr = $\frac{x}{6}$

Machine B takes 8 hours to complete the work.

$$8 \text{ hr} = x$$

$$1 \text{ hr} = \frac{x}{8}$$

Amount of work done by machine B in 1 hour = $\frac{x}{8}$

Machine C takes 12 hours to complete the work.

$$12 \text{ hr} = x$$

$$1 \text{ hr} = \frac{x}{12}$$

Amount of work done by machine C in 1 hour = $\frac{x}{12}$

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Amount of work done by all machines in 1 hour

$$= \frac{x}{6} + \frac{x}{8} + \frac{x}{12} \quad I=1$$

$$= \frac{3x}{8}$$

After 40 minutes.

$$40 \text{ minutes} = \left(\frac{40}{60}\right) \text{ hours}$$

$$= \frac{2}{3} \text{ hours.}$$

Amount of work done by all machine in 40 minutes before A broke down.

$$= \frac{3x}{8} \times \frac{2}{3}$$

$$= \frac{6x}{24}$$

$$= \frac{1}{4}x$$

Amount of work left = $\left(x - \frac{1}{4}x\right) \quad I=1$

$$= \frac{3}{4}x \quad M=1$$

Fraction of work that was still left is $\frac{3}{4}$ of work to be done.

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Amount of work done by Machines B and C working for 1 hour.

$$= \left(\frac{x}{8} + \frac{x}{12} \right) \times 1$$

$$= \frac{5x}{24}$$

Fraction for B and C working for 1 hour is $\frac{5}{24}$ of the work.

Amount of work done by Machine C in 20 minutes

$$= \left(\frac{x}{12} \times \frac{20}{60} \right)$$

$$= \frac{x}{36}$$

Fraction is $\frac{1}{36}$ of the work to be done. $A=1$

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Item 1 (c)

Gross Profit = $UGX 181,300$
at the end of the
first year

$$\begin{aligned}\text{Amount of money to be re-invested} &= \frac{25}{100} \times 181,300 \\ &= 0.25 \times 181,300 \\ &= UGX 45,325 \quad M=1\end{aligned}$$

Amount of money for salaries and other
annual expenses = $\frac{40}{100} \times 181,300$

$$\begin{aligned}&= 0.4 \times 181,300 \\ &= UGX 72,520 \quad M=1\end{aligned}$$

$$\begin{aligned}\text{Remaining Profit} &= 181,300 - (45,325 + 72,520) \\ &= 181,300 - 117,845 \\ &= UGX 63,455 \quad M=1\end{aligned}$$

$$\begin{aligned}\text{Ratio of Capital Contribution; Kagoro: Beatrice} &= 90,000 : 120,000 \quad I=1 \\ &= 3 : 4\end{aligned}$$

$$\begin{aligned}\text{Total ratio} &= 3 + 4 \\ &= 7\end{aligned}$$

$$\begin{aligned}\text{Kagoro's share} &= \frac{3}{7} \times 63,455 \\ &= UGX 27,195 \quad M=1\end{aligned}$$

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$$\begin{aligned}\text{Beatrice's share} &= \frac{4}{7} \times 63,455 \\ &= \text{var } 36,260 \quad M=1\end{aligned}$$

Kago received var 27,195 at the end of the first year while Beatrice received var 36,260 at the end of the first year, $AP=1$

$$\begin{aligned}\text{Profit made at the end of the second year} &= \text{var } 181,300\end{aligned}$$

$$\begin{aligned}\text{Amount for salaries and annual expenses} &= \frac{40}{100} \times 181,300 \\ &= \text{var } 72,520\end{aligned}$$

$$\begin{aligned}\text{Total amount to be shared after dissolving the business} &= 181,300 - 72,520 \\ &= \text{var } 108,780 \quad M=1\end{aligned}$$

$$\begin{aligned}\text{Kago's share at the end of second year} &= \frac{3}{7} \times 108,780 + 90,000 \\ &= \text{var } 46,620 + 90,000 \\ &= \text{var } 136,620 \quad M=1\end{aligned}$$

$$\begin{aligned}\text{Beatrice's share at the end of second year} &= \frac{4}{7} \times 108,780 + 120,000 \\ &= \text{var } 62,160 + 120,000 \quad M=1 \\ &= \text{var } 182,160\end{aligned}$$

KAMPALA INTEGRATED SECONDARY SCHOOLS EXAMINATION BUREAU (KAMSSA) EXAMINATION
There fore Kago and Beatrice got var 136,620 and $AP=1$
var 182,160 respectively at the end of second year.

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Item 2 a)

Let x be the quantity of maize Flour
 $n \rightarrow$ number of people (refugees)
 $d \rightarrow$ Number of days.

$$\frac{x}{n} = d \quad F_1$$

$$\frac{x}{1540} = 84$$

$$x = 84 \times 1540$$

$$= 129,360 \quad M_1$$

$$\text{New number of refugees} = 1540 + 295$$

$$= 1835$$

Number of days the food stock can last

$$d = \frac{x}{1835} \quad F_1$$

$$= \frac{129,360}{1835}$$

$$= 70.4959 \quad M_1$$

$$\approx 70.5 \text{ days.}$$

The food stock can last for 70.5 days after the arrival of the new refugees. AP=1

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Item 2 b

Let x represent number of Kifenge shirts
of Garment A F_1

y → Number of school uniforms of Garment B

$$3x + 2\frac{1}{2}y \leq 600 \quad F_1$$

$$3x + \frac{5}{2}y \leq 600$$

$$6x + 5y \leq 1200$$

$$x \leq 100 \quad F_1$$

$$y \geq 80 \quad F_1$$

$$x \geq 0 \quad F_1$$

$$y \geq 0 \quad F_1$$

objective function.

$$f(x, y) = 80x + 60y \quad F_1$$

The lines to be plotted

$$x = 100$$

$$y = 80 \quad F_1$$

$$x = 0$$

$$y = 0$$

$$6x + 5y = 1200$$

x	0	100	200
y	240	120	0

M_1

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$$f(x, y) = 80x + 60y$$

Point	$80x + 60y$	Total Profit
(0, 80)	$(80 \times 0) + (60 \times 80)$	max 4,800
(0, 240)	$(80 \times 0) + (60 \times 240)$	max 14,400
(100 , 80)	$(80 \times 100) + (80 \times 60)$	max 12,800 ✗
(100, 120)	$(80 \times 100) + (120 \times 60)$	max 15,200

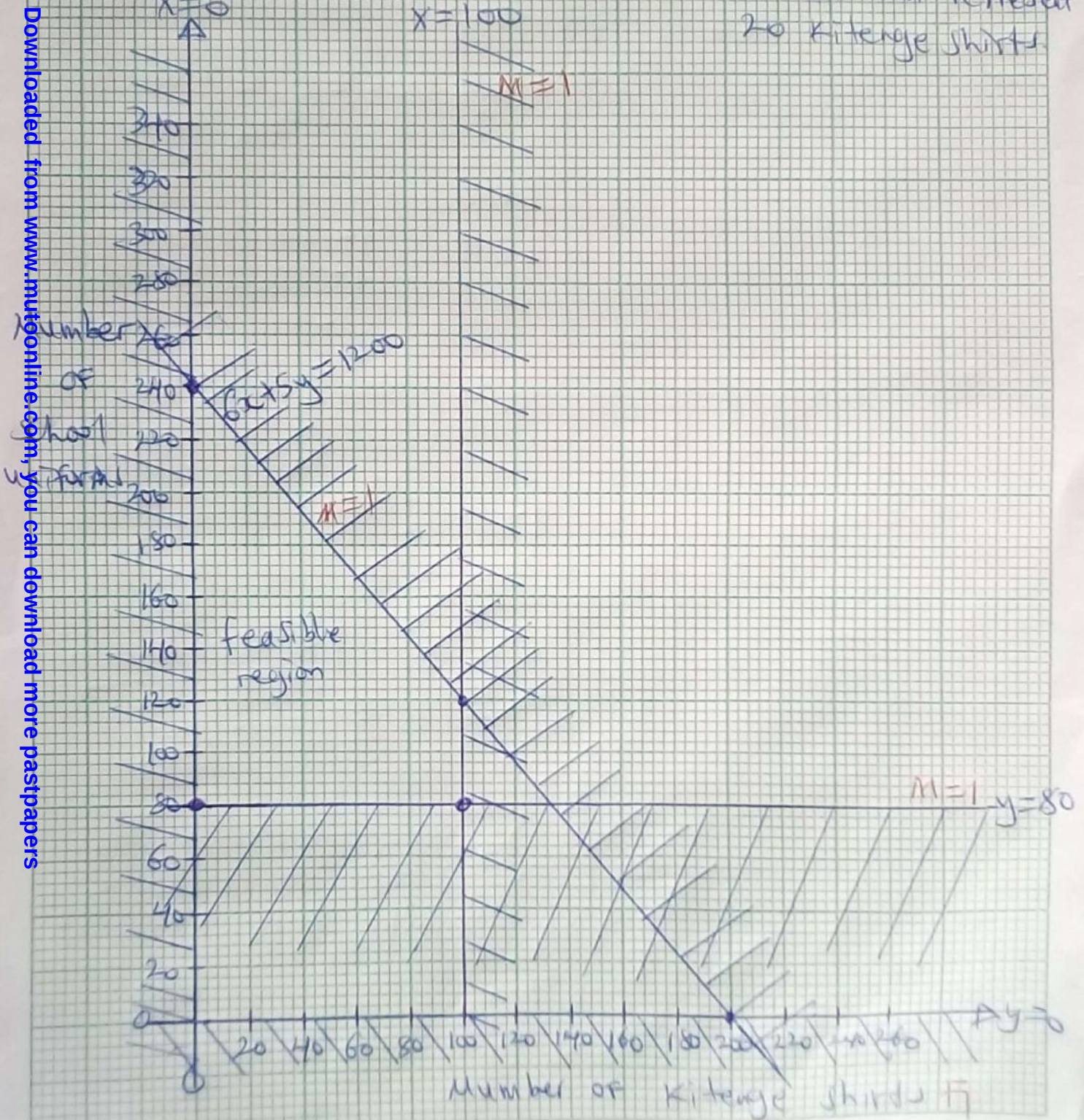
They should produce 100 Kiteenge shirts
or Garment A and 120 school uniforms
or Garment B so as to get the ~~AP=1~~
maximum Profit of max 15,200.

Item 2 b

A GRAPH SHOWING THE FEASIBLE REGION FOR THE NUMBER OF KITENGE SHIRTS OF GARMENT A AND THE NUMBER OF SCHOOL UNIFORMS OF GARMENT B.

Vertical scale: 1 cm represent 20 school uniforms.

Horizontal scale: 1 cm represent 20 Kitenge shirts.



SECTION B (Part 1)
Item 3

$$\begin{aligned} \text{Number of students in Bugoma House} \\ &= \frac{60}{360} \times 60 \end{aligned}$$

$$= 10 \text{ students. } A_1$$

$$\begin{aligned} \text{Number of students in ELGON House} \\ &= \frac{84}{360} \times 60 \end{aligned}$$

$$= 14 \text{ students. } A_1$$

$$\begin{aligned} \text{Number of students in NILE House} \\ &= \frac{54}{360} \times 60 \end{aligned}$$

$$= 9 \text{ students. } A_1$$

$$\begin{aligned} \text{Number of students in MPOLOGOMA House} \\ &= \frac{36}{360} \times 60 \end{aligned}$$

$$= 6 \text{ students. } A_1$$

$$\begin{aligned} \text{Number of students in RwenZori House} \\ &= \frac{42}{360} \times 60 \end{aligned}$$

$$= 7 \text{ students. } A_1$$

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Q&A

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Number of students in ssese house

$$= \frac{54}{360} \times 60$$

$$= 9 \text{ students}$$

Number of students in Mabira house

$$= \frac{30}{360} \times 60$$

$$= 5 \text{ students}$$

Number of students in Mabira house

$$= \frac{30}{360} \times 60$$

$$= 5 \text{ students.}$$

3(a)

Name	Marks	Number of students
Mabira	30-34	5
Rwenzori	35-39	7
Mpologoma	40-44	6
Mile	45-49	9
Bugoma	50-54	10
Elgon	55-59	14
Ssese	60-64	9

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Item 3(b)

~~Item 3(b)~~ A frequency distribution table $N=1$

Marks	f	x	d=x-A	fd	class boundaries
30-34	5	32	-15	-75	29.5-34.5
35-39	7	37	-10	-70	34.5-39.5
40-44	6	42	-5	-30	39.5-44.5
45-49	9	47	0	0	44.5-49.5
50-54	10	52	5	50	49.5-54.5
55-59	14	57	10	140	54.5-59.5
60-64	9	62	15	135	59.5-64.5
	Σf = 60			Σfd = 150	

$$\text{Average score} = A + \frac{\Sigma fd}{\Sigma f}$$

$$= 47 + \frac{150}{60}$$

$$= 47 + 2.5$$

Therefore, the average score is 49.5 $N=1$

From the Histogram

$$\text{Modal score} = 54.5 + (0.5 \times 4) + \frac{1}{2}(0.5)$$

$$= 54.5 + 2 + 0.25$$

$$= 56.75$$

The modal score is 56.75 $N=1$

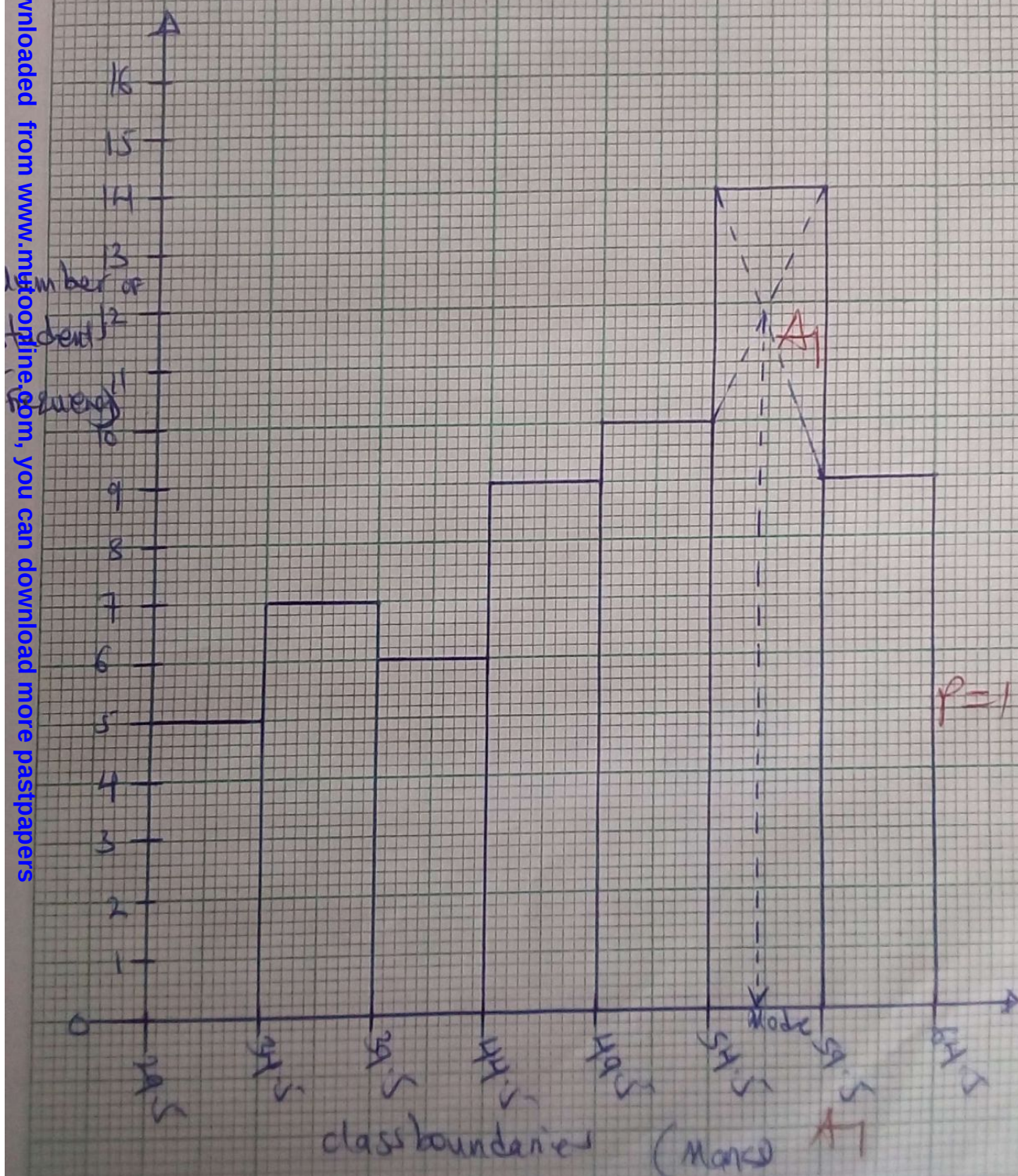
$$\text{Range} = 56.75 - 57$$

Item 3 (G)

A HISTOGRAM SHOWING MARKS OBTAINED BY SENIOR FOUR STUDENTS AT ST MARY'S PROGRESSIVE HIGH SCHOOL.

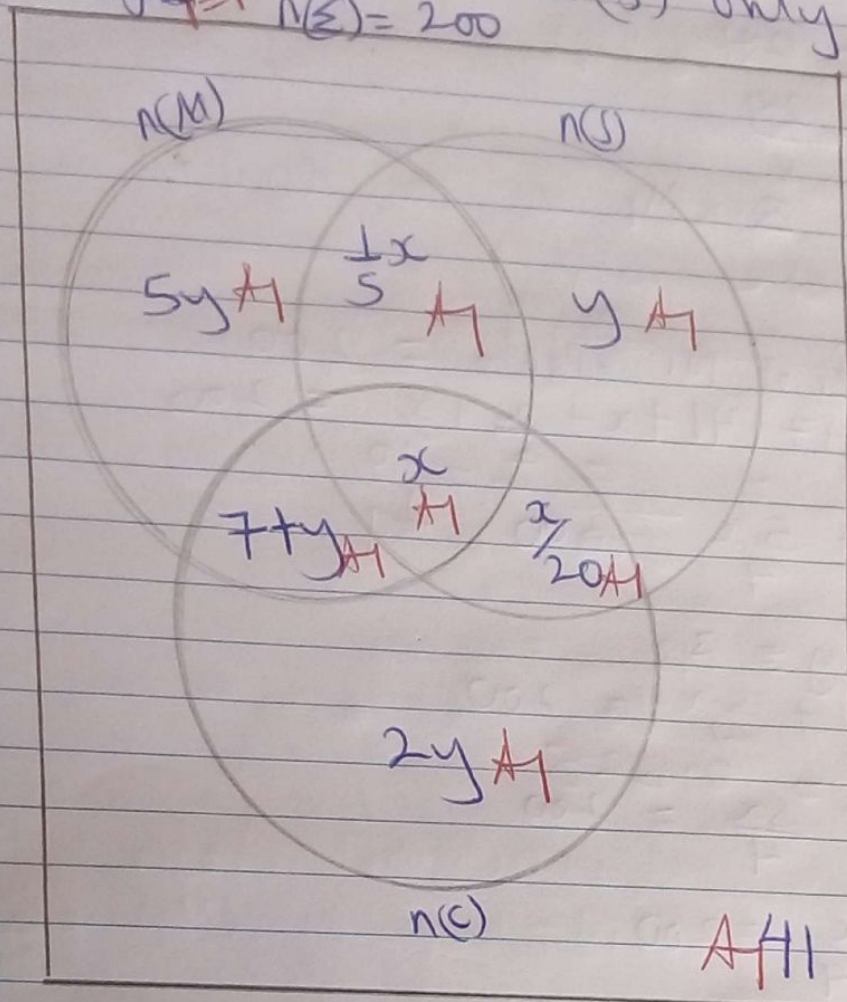
Vertical scale: 1 cm represent each student

Horizontal scale: 2 cm represent 5 marks



Item 4

Let x represent the number of participants in all subjects.
Let y represent $n(S)$ only.
Venn diagram $x=1$ $n(S)=200$



From

$$n(M) \text{ only} = \frac{5}{2} n(C) \text{ only}$$

$$5y = \frac{5}{2} n(C) \text{ only}$$

$$n(C) \text{ only} = \frac{5y \times 2}{5}$$

$$n(C) \text{ only} = 2y$$

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Total number of Participants who engage
in only one subject = 24

$$5y + y + 2y = 24 \quad A1$$

$$8y = 24$$

$$\frac{8y}{8} = \frac{24}{8}$$

$$y = 3 \quad M1$$

Also,

Total number of Participants = 200

$$5y + y + 2y + 7 + 41 + x + \frac{x}{5} + \frac{x}{20} = 200$$

$$9y + 48 + \frac{5x}{4} = 200 \quad A1$$

$$\text{Put } y = 3$$

$$(9 \times 3) + 48 + \frac{5x}{4} = 200$$

$$27 + 48 + \frac{5x}{4} = 200$$

$$75 + \frac{5x}{4} = 200$$

$$\frac{5x}{4} = 200 - 75$$

$$\frac{5x}{4} = \frac{125}{1}$$

$$\frac{5x}{5} = \frac{500}{5}$$

$$x = 100 \quad M1$$

100 Participants like all the three subjects.

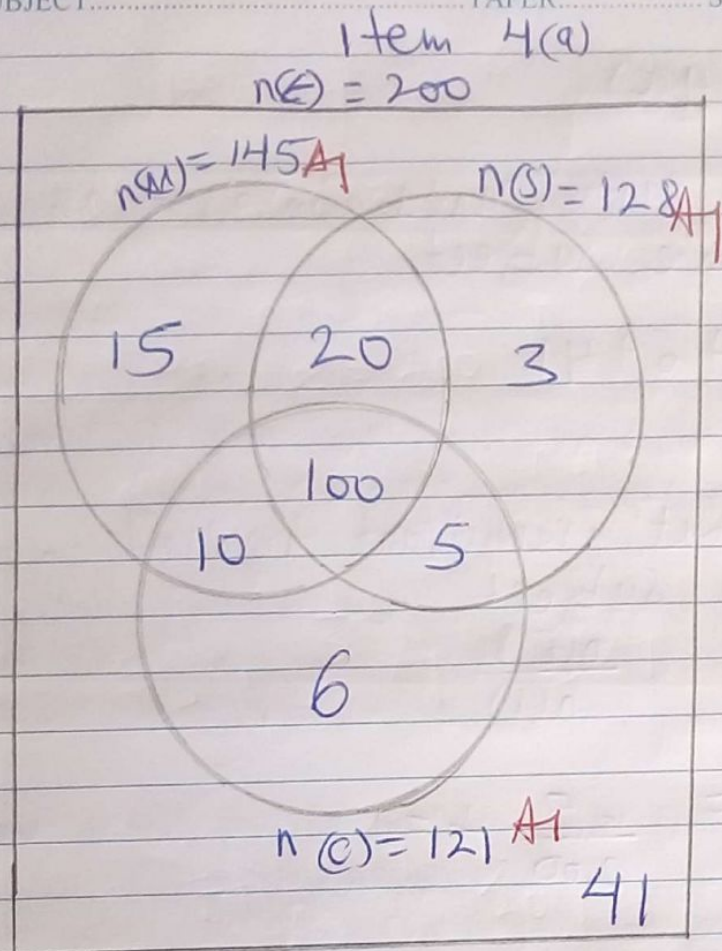
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$$n(M) = 145$$

$$n(S) = 128 \quad \text{IM=1}$$

$$n(C) = 121$$

4(b)

The most popular subject is Mathematics because it has the highest number of participants than other subject.

→ 15 participants like mathematics only which is higher than the $n(S)$ only and $n(C)$ only. IM=1

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Item 4(c)

Number of participants involved in
at most one subject

$$= 15 + 3 + 6 + 41$$
$$= 65$$

Probability that a participant involved in
at most one subject

$$= \frac{n(E)}{n(S)}$$

$$= \frac{65}{200} \quad A = 1$$

$$= \frac{13}{40}$$

$$= 0.325$$

The Probability that a participant chosen
involved in at most $n = 1$ one subject is $\frac{65}{200}$

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PART II

Item 5 (a)

$$\begin{aligned}\text{Depreciation in the first year} &= \frac{20}{100} \times 800,000 \\ &= \text{Ugx } 160,000\end{aligned}$$

$$\begin{aligned}\text{Value at the end of first year} &= 800,000 - 160,000 \\ &= \text{Ugx } 640,000 \quad \text{A1}\end{aligned}$$

$$\begin{aligned}\text{Depreciation value in the second year} &= \frac{5}{100} \times 640,000 \\ &= \text{Ugx } 32,000\end{aligned}$$

$$\begin{aligned}\text{Value of the machine at the end of second year} &= 640,000 - 32,000 \\ &= \text{Ugx } 608,000 \quad \text{A1}\end{aligned}$$

$$\begin{aligned}\text{Depreciation value in the third year} &= \frac{10}{100} \times 608,000 \\ &= \text{Ugx } 60,800\end{aligned}$$

$$\begin{aligned}\text{Value of the machine at the end of the third year} &= 608,000 - 60,800 \\ &= \text{Ugx } 547,200 \quad \text{A1}\end{aligned}$$

$$\begin{aligned}\text{Depreciation value in the fourth year} &= \frac{10}{100} \times 547,200 \\ &= \text{Ugx } 54,720\end{aligned}$$

$$\begin{aligned}\text{Value of the machine at the end of fourth year} &= 547,200 - 54,720\end{aligned}$$

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$$= \text{UGX } 492,480 \text{ (M)}$$

Depreciation value in the fifth year = $\frac{10}{100} \times 492,480$

$$= \text{UGX } 49,248$$

Value of the machine at the end of the fifth year = $492,480 - 49,248$

$$= \text{UGX } 443,232 \text{ (M)}$$

Amount which is less the original value of the tailoring machine at the end of the fifth year

$$= \text{original value} - \text{value at the end of the fifth year}$$

$$= 800,000 - 443,232 \text{ (M)}$$

$$= \text{UGX } 356,768 \text{ (M)}$$

The value of the machine depreciated by UGX 356,768 (M) by the end of fifth year

$$\text{Amount} = P \left(1 + \frac{r}{100}\right)^n$$

$$= 3000 \left(1 + \frac{5}{100}\right)^2$$

$$= 3000 (1.05)^2$$

$$= \text{UGX } 3,967.5 \text{ (M)}$$

$$A = P + I$$

$$I = A - P$$

$$I = 3,967.5 - 3000$$

$$= \text{UGX } 967.5 \text{ (M)}$$

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$$\text{Simple Interest} = \frac{P \times R \times T}{100}$$

$$= 3000 \times \frac{15}{100} \times 2$$

$$= \text{KSh } 900$$

The amount which the compound interest exceeds the simple interest

$$= \text{Compound Interest} - \text{Simple Interest}$$

$$= 967.5 - 900$$

$$= \text{KSh } 67.5$$

∴ The Compound Interest exceeds the simple interest by KSh 67.5.

Item 5 (b) (i)

Allowances:

$$\text{Kamirage} = \text{KSh } 25,000$$

$$\text{Insurance Premium} = \text{KSh } 15,000$$

$$\text{Children allowance} = (1 \times 8000) = \text{KSh } 8,000$$

$$= \text{KSh } 8,000$$

$$\text{Total allowances} = 25,000 + 15,000 + 8,000$$

$$= \text{KSh } 48,000$$

Let x be the taxable income

Income Per month	R (%)	Income tax
0 - 100,000	10	$\frac{10}{100} \times [100,000] = 10,000$
100,000 - 200,000	15	$\frac{15}{100} \times [200,000 - 100,000] = 15,000$
200,000 - 300,000	20	$\frac{20}{100} \times [300,000 - 200,000] = 20,000$
300,000 - x	25	$\frac{25}{100} \times [x - 300,000]$

$$\frac{25}{100} \times [x - 300,000] = 65,000 - (10,000 + 15,000 + 20,000) \quad \text{M}_1$$

$$0.25(x - 300,000) = 65,000 - 45,000$$

$$0.25x - 75,000 = 20,000$$

$$0.25x = 20,000 + 75,000$$

$$0.25x = 95,000 \quad \text{M}_1$$

$$0.25x = 95,000$$

$$0.25 \quad 0.25$$

$$x = 380,000 \quad \text{M}_1$$

Mr. Brian's taxable income is UGX 380,000

Taxable income = Gross monthly income - Total monthly allowances

$$380,000 = \text{Gross monthly income} - 48,000$$

$$\text{Gross monthly income} = 380,000 + 48,000 = \text{UGX } 428,000 \quad \text{M}_1$$

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Item 5 b(ii)

Percentage of Brian's income that goes to tax

$$= \frac{\text{Income tax}}{\text{Gross monthly income}} \times 100$$

$$= \frac{65,000}{428,000} \times 100$$

$$= 15.186916\%$$

$$\approx 15.19\% \quad \text{my}$$

The Percentage of income that goes to tax is 15.19% $AP=1$

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Item 6 (a)

~~Sketch~~

Plane A flew on a bearing of 070° at a speed of 400 km/h

$$\begin{aligned}\text{Distance Covered by Plane A after three hours} &= S \times T \\ &= 400 \times 3 \\ &= 1200 \text{ km}\end{aligned}$$

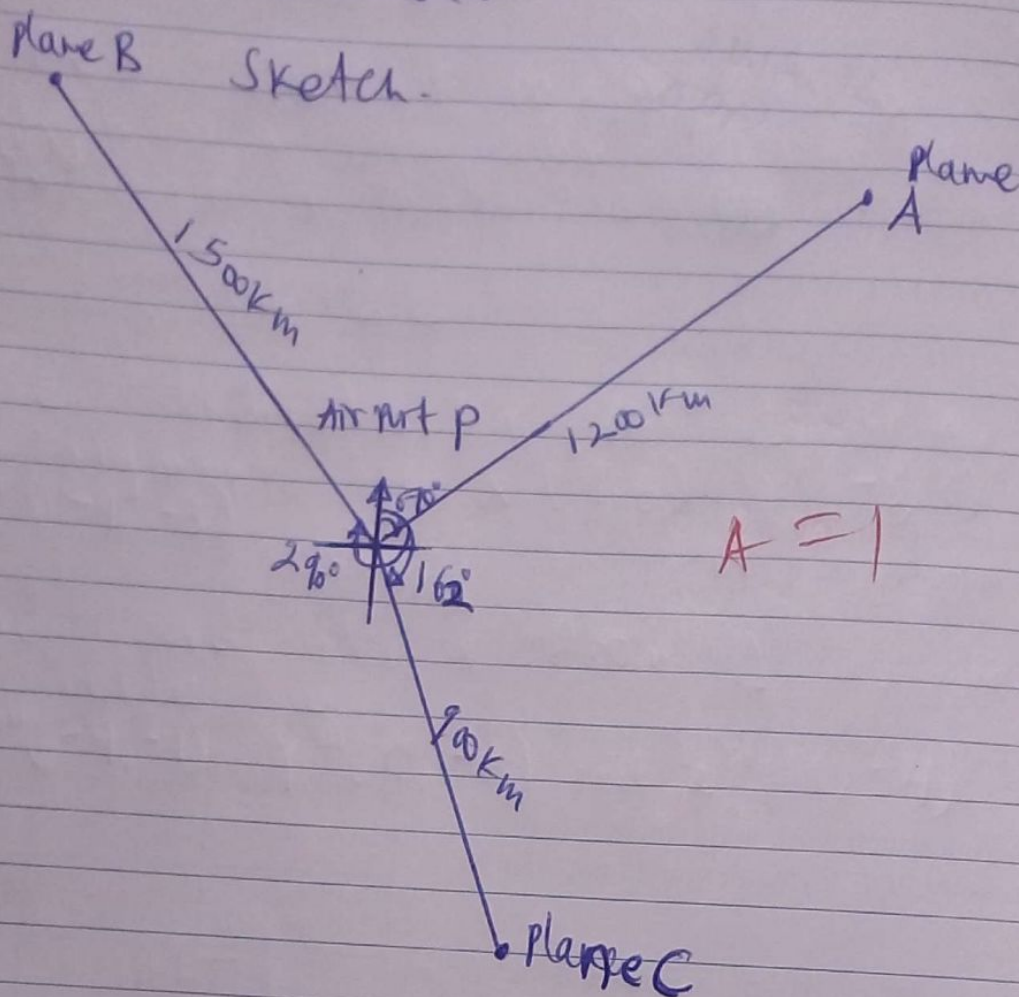
$A = 1$

$$\begin{aligned}\text{Distance Covered by plane B after three hours} &= 500 \times 3 \\ &= 1500 \text{ km}\end{aligned}$$

$$\begin{aligned}\text{Distance Covered by Plane C after three hours} &= 300 \times 3 \\ &= 900 \text{ km}\end{aligned}$$

Item 6(a)

Sketch.



Scale

1 cm represent 200 km

1 cm = 200 km

1 km = $\left(\frac{1}{200}\right)$ cm

1500 km = $\left(\frac{1}{200} \times 1500\right)$ cm

= 7.5 cm

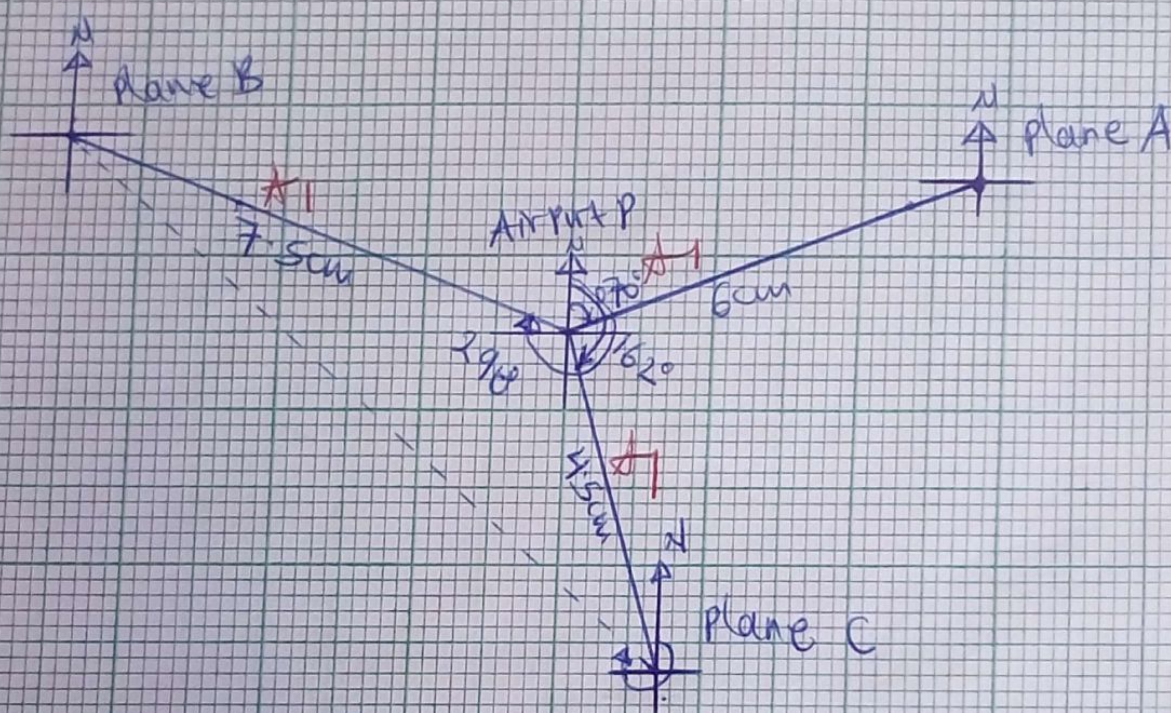
$A = 1$

1200 km = $\left(\frac{1}{200} \times 1200\right)$ cm

= 6 cm

Item 6 (a)

ACCURATE DRAWING SHOWING THE POSITIONS OF
THREE PLANES A, B AND C FROM AIRPORT P



The bearing of Plane B from Plane C is 309°

$AP = 1$

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$$900 \text{ km} = \left(\frac{1}{200} \times 900 \right) \text{ cm} \\ = 4.5 \text{ cm}$$

The bearing of Plane B from Plane C is 309°

Range $(308^\circ - 310^\circ)$

Item 6 (b)

The centre of rotation used to rotate
hall position from Room A to Room B is $(1, 2)$
The angle of rotation is 90° anticlockwise.

Item 6 c

The coordinates of Room C after
enlargement are $x''(9, 6)$, $y''(-3, 3)$ and
 $z''(-9, -3)$

 $AP=1$

The coordinates of Room D as a result
of reflection.

$x'''(-4, -1)$, $y'''(0, -2)$ and $z'''(1, -4)$

6(b)

ALT 1

Centre $(0.5, 1.5) \rightarrow x'x'$ and $zz' \pm 0.1$
 $\theta (069^\circ / 110^\circ / 108^\circ) \rightarrow \Delta_x^{x'} / \Delta_y^{y'} / \Delta_z^{z'} \pm 1^\circ$

ALT 2

$C(0.5, 0.6) \rightarrow y'y'$ and $zz' \pm 0.1$
 $\theta (055^\circ / 170^\circ / 130^\circ) \rightarrow \Delta_x^{x'} / \Delta_y^{y'} / \Delta_z^{z'} \pm 1^\circ$

ALT 3

$C(1, 2) \rightarrow x'x'$ and $y'y'$
 $\theta (090^\circ / 090^\circ / 097^\circ) \rightarrow \Delta_x^{x'} / \Delta_y^{y'} / \Delta_z^{z'} \pm 1^\circ$

