FORM FOUR PRE MOCK EXAMINATION
MARCH 2026
BASIC MATHEMATICS
MARKING SCHEME.

1. (a) Total number = 150 people

20% are children = 20% x 150

= 30 children 01

$\frac{1}{2}$ are men = $\frac{1}{2}$ x 150

= 75 men 01

No, of women = 150 - (75+30)

= 45

∴ Women are 45. 01

(b) GCF of 400 and 500

100 | 400 , 500
4 , 5

GCF = 100 01

Largest size of the tile is 100 by 100cm

No, of tiles = $\frac{\text{Area of the floor room}}{\text{Area of square tile}}$.

= $\frac{(400 \times 500)\ cm^2}{(100 \times 100)\ cm^2}$

= 20 tiles. 01

1. (b) ...

1 tile = 2500 Tshs

20 tiles = 20 × 2500

= 50,000 Tsh.

Total cost = 50,000/= Tshs. 01

2. (a) $\frac{\sqrt{3}}{2-\sqrt{3}} = a\sqrt{b} + c$

$\frac{\sqrt{3}(2+\sqrt{3})}{(2-\sqrt{3})(2+\sqrt{3})}$ 01

$\frac{2\sqrt{3}+3}{2^2-(\sqrt{3})^2}$

$\frac{2\sqrt{3}+3}{4-3}$

$\frac{2\sqrt{3}+3}{1}$ 01

$2\sqrt{3}+3 = a\sqrt{b} + c$

$a = 2 \quad b = 3$ and $c = 3$ 01

(b) $2\log x = \log 4 + \log(2x-3)$

$\log x^2 = \log 4(2x-3)$

$x^2 = 8x - 12$ 01

$x^2 - 8x + 12 = 0$

$x^2 - 6x - 2x + 12 = 0$

$x(x-6) - 2(x-6) = 0$

$(x-6)(x-2) = 0$ 01

$x - 6 = 0$

$x = 6$

$x - 2 = 0$

$x = 2$. 01

4 (a) (i) $L_1 \Rightarrow (1, 7)$ and $(-4, -3)$

$L_2 \Rightarrow (6, 3)$ and $(-2, n)$

$$m_1 = \frac{-3-n}{-4-1} = \frac{-3-n}{-5}$$

$$m_2 = \frac{n-3}{-2-6} = \frac{n-3}{-8}$$

(i) $L_1 // L_2$

$m_1 = m_2$

$$\frac{-3-n}{-5} = \frac{n-3}{-8}$$

$$n = -\frac{9}{13}$$ 0 1/2

(ii) $L_1 \perp L_2$

$m_1 m_2 = -1$

$$\left(\frac{-3-n}{-5}\right)\left(\frac{n-3}{-8}\right) = -1$$

$n^2 + 49 = 0$

$n = \pm 7$ 0 1/2

4(b)(i) $\underline{d} = 3\underline{a} - \underline{b} - \frac{1}{2}\underline{c}$

$= 3(3\underline{i} + 2\underline{j}) - (8\underline{i} - 3\underline{j}) - \frac{1}{2}(2\underline{i} + 4\underline{j})$ 01

$= 0\underline{i} + 7\underline{j}$

$= 7\underline{j}$

$d = 7\underline{j}$ 00½

(ii) $\hat{d} = \frac{d}{|d|}$

$= \frac{7\underline{j}}{\sqrt{0^2 + 7^2}}$

$= \frac{7\underline{j}}{\sqrt{49}}$

$= \frac{7\underline{j}}{7}$ 01½

$= \underline{j}$

Unit vector $= \underline{j}$.

5 (a) $\frac{A_1}{A_2} = \left(\frac{L_1}{L_2}\right)^2$

$\sqrt{\frac{205}{32.8}} = \frac{L_1}{5.4}$ 01

$L_1 = 5.4 \times 2.5$ 01

$= 13.5\ m$

$= 1350\ cm$ 01

height of the larger = 1350 cm

(b) Perimeter $= 2nr \sin \frac{180}{n}$ 01

$P = 2 \times 8 \times 10 \sin \frac{180}{8}$ 01

$= 61.23\ cm$

01

Perimeter of octagon = 61.25 cm

6 (a) Total $= (22 + 13 + 39 + 18)\,mm$

$= 92\ mm$ 01

Height of shelf $= 10 \times 10 = 100\ mm$

The pile can fit in the shelf since height of shelf is greater than 92mm 01

Length left $= 100 - 92$

$= 8\ mm$ 01

$= 0.8\ cm$

(b) $v \propto \frac{x^2}{\sqrt{y}}$

$v = \frac{kx^2}{\sqrt{y}}$ 01

$k = \frac{v\sqrt{y}}{x^2}$

$= \frac{18\sqrt{16}}{3^2}$

$= \frac{18^2 \times 4}{9}$

$k = 8$ 01

$v_1 = 18$
$x_1 = 3$
$y_1 = 16$
$v =$
$x_2 = 5$
$y_2 = 4$

$V_2 = \frac{8 \times \sqrt{4}}{5^2}$

$= \frac{8 \times 2}{25}$

$V_2 = \frac{16}{25}$ 01

~~6 (b) Therefore, mass supported by a beam was increased by 85.71%.~~

7 (a) Given, Buying price (B.P) = Tsh. 15000

% profit = 10%

Selling price (S.P) = ?

$$\% \text{ profit} = \frac{\text{Profit made}}{\text{Buying price}} \times 100\% \quad 01$$

$$10\% = \frac{S.P - 15000}{15000} \times 100\% \quad 01$$

$$0.1 \times 15000 = S.P - 15000$$

$$S.P = \cancel{3000}\ 1500 + 15000$$

$$= 16500 \text{ Tsh.} \quad 01$$

∴ The selling price was 16500 Tsh.

7 (b) OSWARD'S INCOME STATEMENT AS AT 31ST DEC. 2025

Sales		600,000
Opening Stock	90,000	
Add purchases	200,000	
Cost of goods available for sales	290,000	
Less closing Stock	120,000	
		170,000
Gross profit		430,000

03

8 @. Three consecutive terms of AP are:

A_1, A_2, A_3.

$A_1 = A_1, \; A_2 = A_1 + d, \; A_3 = A_1 + 2d$

$S_n = \frac{n}{2}(2A_1 + (n-1)d)$

$S_3 = \frac{3}{2}(2 \times A_1 + (3-1)d)$

$S_3 = \frac{3}{2}(2A_1 + 2d)$ 01

$15 = \frac{3}{2}(2A_1 + 2d)$

$3(2A_1 + 2d) = 30$

8) (c) $2A_1 + 2d = 10$ — (ii)

$A_1 + d = 5$ — (i)

$A_1 \times A_2 \times A_3 = 45$

$A_1 \times (A_1 + d)(A_1 + 2d) = 45$

But $A_1 = 5 - d$ from eqn (i)

$(5-d)(5-d+d)(5-d+2d) = 45$

$(5-d)(5)(5+d) = 45$

$(5-d)(5+d) = 9$

$25 + 5d - 5d - d^2 = 9$

$-d^2 = -16$

$d = 4$ 01

From $A_1 = 5 - d = 5 - 4 = 1$

$S_n = \frac{n}{2}(2A_1 + (n-1)d)$

$S_5 = \frac{5}{2}(2 \times 1 + (5-1)4)$

$= 2.5(2 + 16)$

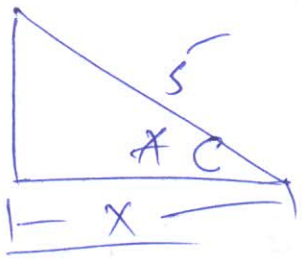
$= 2.5 \times 18$

$= 45$. 01

∴ Sum of the first five terms is 45.

9 (a) $\sin\theta = \frac{\text{opp}}{\text{Hyp}}$

$\sin A = \frac{3}{5}$



$\sqrt{x^2} = \sqrt{25 - 9}$

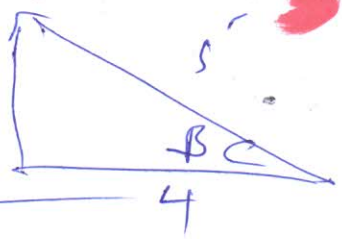
$= 4$ 01

$\cos A = \frac{\text{Adj}}{\text{Hyp}} = \frac{4}{5}$.

$\cos A = \frac{4}{5}$ → $-4/5$

Given angle A as obtuse ∴ $\cos A = -4/5$

$\cos B = \frac{4}{5}$



$\sqrt{y^2} = \sqrt{5^2 - 4^2}$

$y = 3$, $\sin B = \frac{3}{5}$

$\cos(A+B) = \cos A \cos B - \sin A \sin B$ 01

$= \frac{-4}{5} \times \frac{4}{5} - \frac{3}{5} \times \frac{3}{5}$

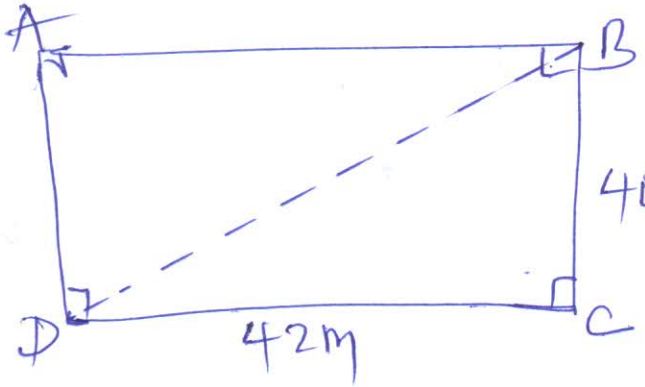
$= \frac{-16}{25} - \frac{9}{25} = \frac{-25}{25}$

$= -1$

$= \cancel{25}$ 01

∴ $\cos(A+B) = \cancel{25} = -1$

9 (b)



01

$\overline{DB}^2 = \overline{DC}^2 + \overline{BC}^2$ (Pythagoras theorem)

$= 42^2 + 40^2$

$= 1764 + 1600$

$= 3364$

$\sqrt{\overline{BD}^2} = \sqrt{3364}$

$= 58M$. 01

Then $A_n = 58m$ $n = ?$ $A_1 = 0$

$d = 2$.

$A_n = A_1 + (n-1)d$

$58 = 0 + (n-1)2$

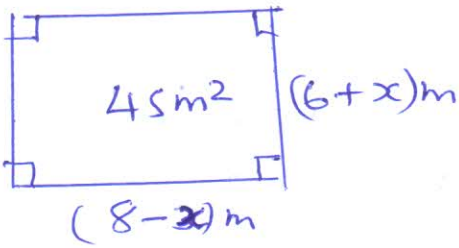
$58 = 2n - 2$

$2n = 60$

$n = 30$ 01

30 Soldiers were arranged on the diagonal of rectangular field.

10 [a]



$45 = (8-x)(6+x)$ ✓1

$x^2 - 2x - 3 = 0$ ✓1

$(x-3)(x+1) = 0$

$x = 3$ or -1

3 m should be added to the shorter and reduced from the longer side. ✓1

(b) $x + y = 7$

$xy = 12$ ✓1

$x = 7 - y$

$y(7-y) = 12$

$7y - y^2 = 12$

$y^2 - 7y + 12 = 0$ ✓1

$y^2 - 4y - 3y + 12 = 0$

$y(y-4) - 3(y-4) = 0$

$(y-3)(y-4) = 0$

$y = 3$ or 4.

$x = 7-3$ or $7-4$ ✓1

$x = 4$ or 3

Hence the two numbers are 3 and 4

11 (a)

Ages	15-25	26-36	37-47	48-58	59-69	70-80
F	8	10	m	10	7	3

(i) $8 + 10 + m + 10 + 7 + 3 = 50$

$38 + m = 50$

$m = 12$ 01

(ii) $A = 31$

x	f	x − A	fd
20	8	−11	−88
31	10	0	0
42	12	11	132
53	10	22	220
64	7	33	231
75	3	44	132

01 $\Sigma fd = 627$

(ii) $\bar{x} = A + \frac{\Sigma fd}{N}$

$= 31 + \frac{627}{50}$

$= 31 + 12.54$

$= 43.54$ 01

11 (a)(iii) $\text{Mode} = L + \frac{t_1 i}{t_1 + t_2}$ 01/2

$L = 36.5$

$t_1 = 2$

$t_2 = 2$

$i = 11$

$\text{Mode} = 36.5 + \frac{2 \times 11}{2+2}$ 001/2

$= 36.5 + 5.5$

$= 42.$ 001/2

$\text{Median} = L + \left(\frac{N/2 - n_b}{n_w}\right) i$ 01/2

$= 36.5 + \left(\frac{25-18}{12}\right) 11$ 001/2

$= 36.5 + 6.42$

$= 42.92$

Median $= 42.92$ 001/2

11 (b) Given Radius (r) = 32 m

Central angle = 145°

Arc length = l

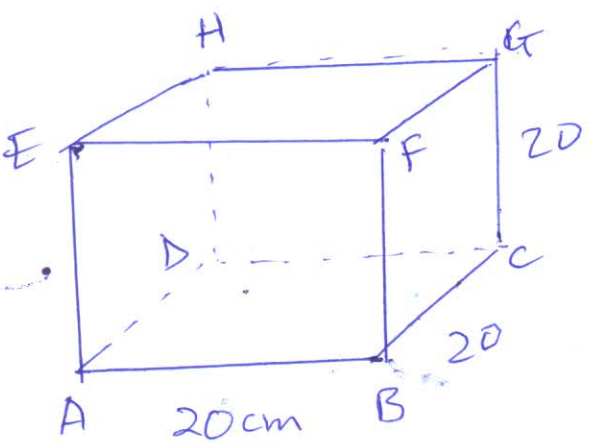
$$l = \frac{\theta}{360} \times 2\pi r \quad \text{01}$$

$$= \frac{145}{360} \times 2 \times 3.14 \times 32 \quad \text{02}$$

$$= 81 \text{ m}$$

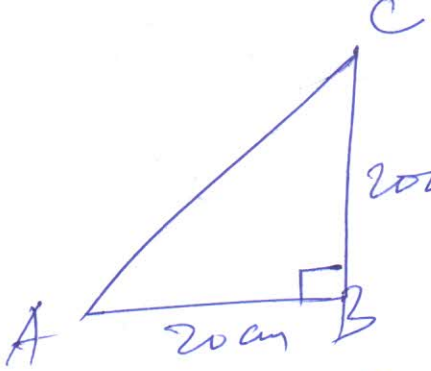
The car travels $\simeq$ 81 m 01

12 (a)



01

12 @ (i)



0 1/2

$\overline{AC}^2 = \overline{AB}^2 + \overline{BC}^2$ (Pythagoras Theorem)

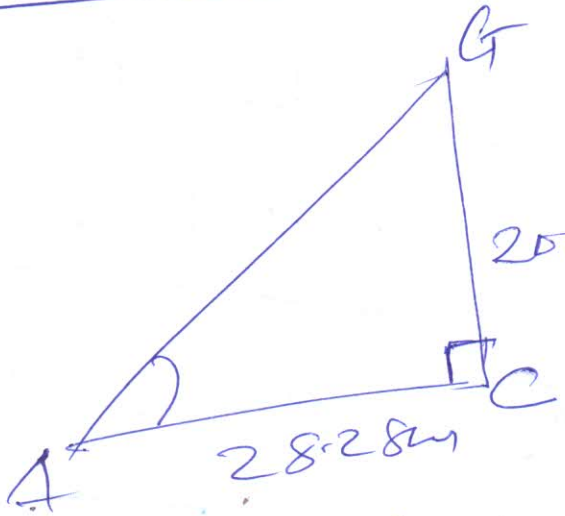
$\overline{AC} = \sqrt{20^2 + 20^2}$

$= \sqrt{800}$

$= 28.28\text{cm}$. 0

$\therefore$ length $\overline{AC} = 28.28\text{cm}$

(ii) $\overline{AG}$:



0 1/2

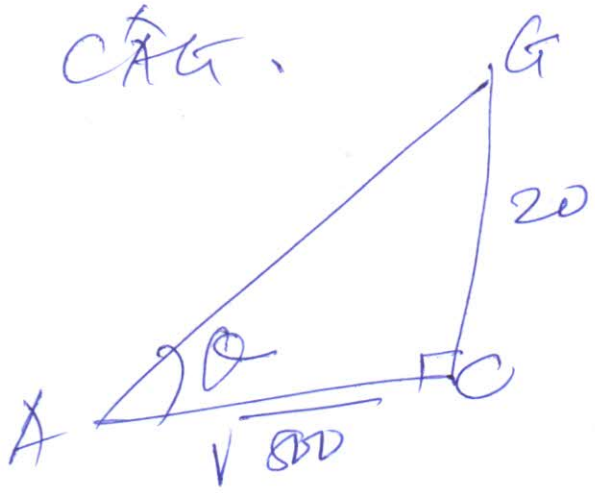
$\overline{AG}^2 = (28.28)^2 + (20)^2$

$= \sqrt{800 + 400}$

$= \sqrt{1200}$ 0

$= 34.64\text{cm}$.

12 (a)(ii). ∠ Btn $\overline{AG}$ and ABCD is $C\hat{A}G$.



$$\tan\theta = \frac{\overline{CG}}{\overline{AC}}$$

$$\tan\theta = \frac{20}{\sqrt{800}}$$

$$\theta = \tan^{-1}(0.707)$$

$$= 35.26^\circ$$

Therefore $C\hat{A}G = 35.26^\circ$.

12 (b) P(50°N, 12°W) to Q(50°N, 26°E)

$$\theta = 12^\circ + 26^\circ$$

$$= 38^\circ$$

Knot = 27.534

12 (b) $d = \theta \times 60 \cos x$

$= 38 \times 60 \times \cos 50^\circ$

$= 1465.584$ nm 01

$\text{Speed} = \frac{\text{Distance}}{\text{time}}$

$\text{time} = \frac{\text{distance}}{\text{speed}}$

$= \frac{1465.584}{27.534}$ 01

$= 53.23$ hrs

$= 53$ hr and 13.8 min 01

Tuesday 8. am + 53 hr 14 min

$= 1:14$ PM on Thursday 01

13 (a) Let $A = \begin{bmatrix} 6k & 1 \\ k+3 & k-1 \end{bmatrix}$

$$\begin{vmatrix} 6k & 1 \\ k+3 & k-1 \end{vmatrix} = 0 \qquad 01$$

$$6k(k-1) - (k+3) = 0$$

$$6k^2 - 7k - 3 = 0 \qquad 01$$

$$6k^2 - 9k + 2k - 3 = 0$$

$$3k(2k-3) + (2k-3) = 0$$

$$(3k+1)(2k-3) = 0$$

$$3k+1 = 0 \quad \text{or} \quad 2k-3 = 0$$

$$k = -\frac{1}{3} \quad \text{or} \quad k = \frac{3}{2} \qquad 01$$

(b) Let b be no of boys

g " " Girls

$$b = g + 10$$

$$b - g = 10 \qquad 01$$

$$b = 2g + 2$$

$$b - 2g = 2$$

matrix

$$\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix} \begin{pmatrix} b \\ g \end{pmatrix} = \begin{pmatrix} 10 \\ 2 \end{pmatrix} \qquad 00\frac{1}{2}$$

13 (b) Inverse of $\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix} = \frac{1}{-1}\begin{pmatrix} -2 & 1 \\ -1 & 1 \end{pmatrix}$

$= \begin{pmatrix} 2 & -1 \\ 1 & -1 \end{pmatrix}$ 001/2

$\begin{pmatrix} 2 & -1 \\ 1 & -1 \end{pmatrix}\begin{pmatrix} 1 & -1 \\ 1 & -2 \end{pmatrix}\begin{pmatrix} b \\ g \end{pmatrix} = \begin{pmatrix} 2 & -1 \\ 1 & -1 \end{pmatrix}\begin{pmatrix} 10 \\ 2 \end{pmatrix}$ 01

$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} b \\ g \end{pmatrix} = \begin{pmatrix} 20-2 \\ 10-2 \end{pmatrix}$

$\begin{pmatrix} b \\ g \end{pmatrix} = \begin{pmatrix} 18 \\ 8 \end{pmatrix}$ 01

There were 18 boys and 8 girls

13 [c] $T[(x,y)] = (x', y')$

$$\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} a \\ b \end{pmatrix}$$

$T[(0,0)] = (8,7)$

$$\begin{pmatrix} 8 \\ 7 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} + \begin{pmatrix} a \\ b \end{pmatrix}$$

$$\begin{pmatrix} 8 \\ 7 \end{pmatrix} = \begin{pmatrix} a \\ b \end{pmatrix}$$ 01

$u = (-12, 12)$

$v = (6, -16)$

(i) $T[u+v] = T[(-12,12) + (6,-16)]$

$= T[(-6,-4)]$

$T[(-6,-4)] = (x', y')$

$(x', y') = (x, y) + (a, b)$

$= (-6, -4) + (8, 7)$

$= (2, 3)$

hence $T[u+v] = (2, 3)$ 01

13 c)(ii) $T[u] + T[v]$

$\begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 8 \\ 7 \end{pmatrix}$

$u = (-12, 12)$, $v = (6, -16)$

$T[u] + T[v]$

$= \left(\begin{pmatrix} 8 \\ 7 \end{pmatrix} + \begin{pmatrix} -12 \\ 12 \end{pmatrix}\right) + \left(\begin{pmatrix} 8 \\ 7 \end{pmatrix} + \begin{pmatrix} 6 \\ -16 \end{pmatrix}\right)$

$= \begin{pmatrix} -4 \\ 19 \end{pmatrix} + \begin{pmatrix} 14 \\ -9 \end{pmatrix}$

$= \begin{pmatrix} 10 \\ 10 \end{pmatrix}$

hence $T[u] + T[v] = (10, 10)$. 01

/4 (a) $f(2) = -5$, $f(3) = -8$

$(2, -5)$, $(3, -8)$

$$m = \frac{-8+5}{3-2}$$

$$= -3$$ ✓ 1/2

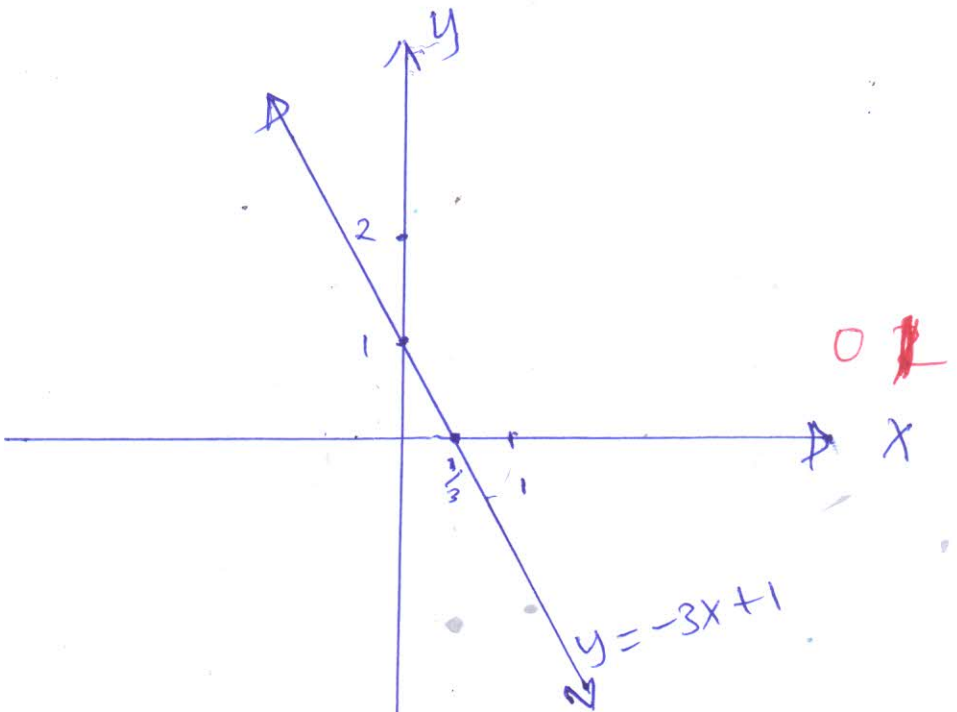
$$-3 = \frac{y+5}{x-2}$$

$$y + 5 = -3x + 6$$

$$y = -3x + 6 - 5$$

$$y = -3x + 1$$ ✓ 1/2

graph



✓ 1

14 (b) Let x be no/ of ticket first class

y -11- lower class

$x \geq 25$

$y \geq 40$ 02

$x + y \leq 150$

$x \geq 0$, $y \geq 0$

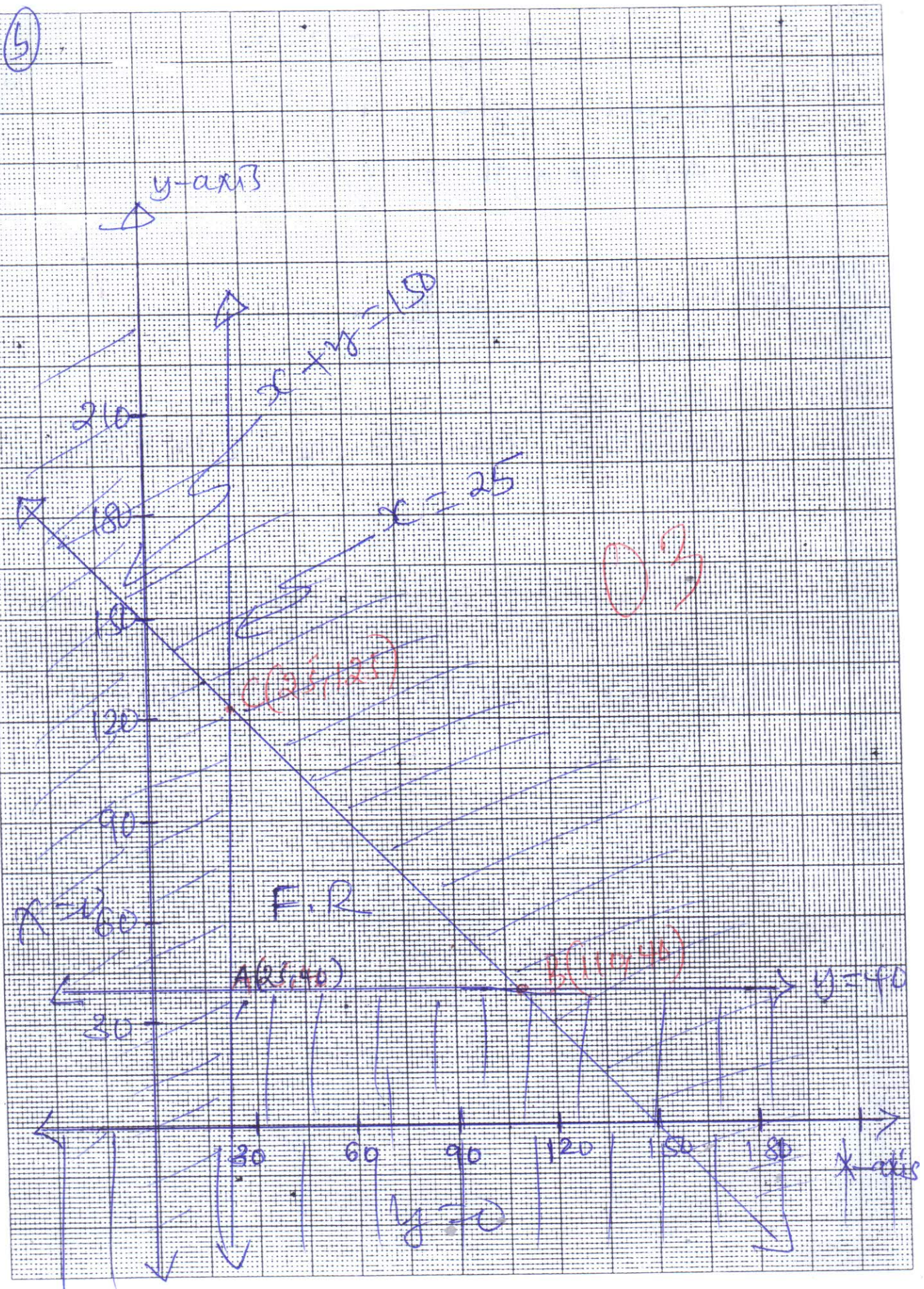
$f(x, y) = 225{,}000x + 200{,}000y$ 01/2

Corner points	$f(x, y)$	Max. value
A (25, 40)	5,625,000 + 8000000	13,625,000 01
B (110, 40)	24,750,000 + 8000,000	32,750,000
C (25, 125)	5,625,000 + 25,000,000	30,625,000

Max value is 32,750,000. 01/2

The company must sale 110 first class and 40 lower class tickets. 01

14 (b)



y-axis
x+y=150
x=25
210
180
150
120
90
60
30
C(25,125)
F.R
A(25,40)
B(110,40)
y=40
30
60
90
120
150
180
x-axis
y=0

03

Pg 31