

INSTRUCTIONS:

Answer ALL the given questions on the spaces given below each question showing all your workings.

1 Find the co-ordinates of the points at which the straight line $x-y=5$ intersects the curve $xy=24$

$$x - y = 5$$

$$x - 5 = y$$

$$xy = 24$$

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

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

$$x^2 - 5x = 24$$

$$x^2 - 5x - 24 = 0$$

$$x^2 - 8x + 3x - 24 = 0$$

$$x(x-8) + 3(x-8) \quad (4\text{mks})$$

$$(x+3)(x-8) = 0$$

$$x = -3$$

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

$$\text{when } x = -3$$

$$y = 8$$

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

$$y = -3$$

$$(-3, 8) \text{ \& } (8, -3)$$

2 Solve for X in the equation $2\log x + \log 6 = 2 + \log 9$

$$2\log x + \log 6 = 2 + \log 9$$

$$\log x^2 = \log 100 + \log 9 - \log 6$$

$$\log x^2 = \log \left(\frac{100 \times 9}{6} \right)$$

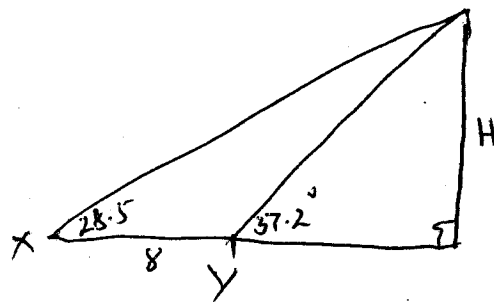
$$\log x^2 = \frac{50}{100} \times 9 \times 3$$

$$x^2 = 150$$

$$x = \sqrt{150}$$

$$x = \pm 12.45$$

3 The angle of elevation of the top of a tower from a point X on the horizontal is 28.5° . From another point Y, 8 meters nearer to the base of the tower the angle of elevation of the top of the tower is 37.2° . Calculate to one decimal place the height of the tower. (3mks)



$$\tan 37.2 = \frac{H}{k-8}$$

$$H = (k-8) \tan 37.2$$

$$(k-8) \tan 37.2 = k \tan 28.5$$

$$0.7590(k-8) = 0.5430k$$

$$0.7590k - 6.072 = 0.543k$$

$$0.216k = 6.072$$

$$k = \frac{6.072}{0.216} \quad k = 28.11$$

$$H = 28.11 \times \tan 28.5$$

$$H = 28.11 \times 0.5430$$

$$H = 15.26 \text{ cm}$$

$$\tan \theta = \frac{op}{ad.}$$

$$\tan 28.5 = \frac{H}{k}$$

$$H = k \tan 28.5$$

4 Given that $y=7+3x-x^2$ complete the table below.

X	-3	-2	-1	0	1	2	3	4	5	6
Y	-11	-3	3	7	9	9	7	3	-3	-11

(2MKS)

(A) On the grid provided and using a suitable scale draw the graph of $Y=7+3x-x^2$
(3mks)

(B) On the same grid draw a straight line and use your graph to solve the equation $x^2-4x-3=0$ $(-0.75, 4.6)$ & $(4.75, -0.6)$ (3mks)

(C) Determine the co-ordinates of the turning points of the curve. (3mks)

$(1.5, 9.25)$

$$y = -x^2 + 3x + 7$$

$$0 = x^2 - 4x - 3$$

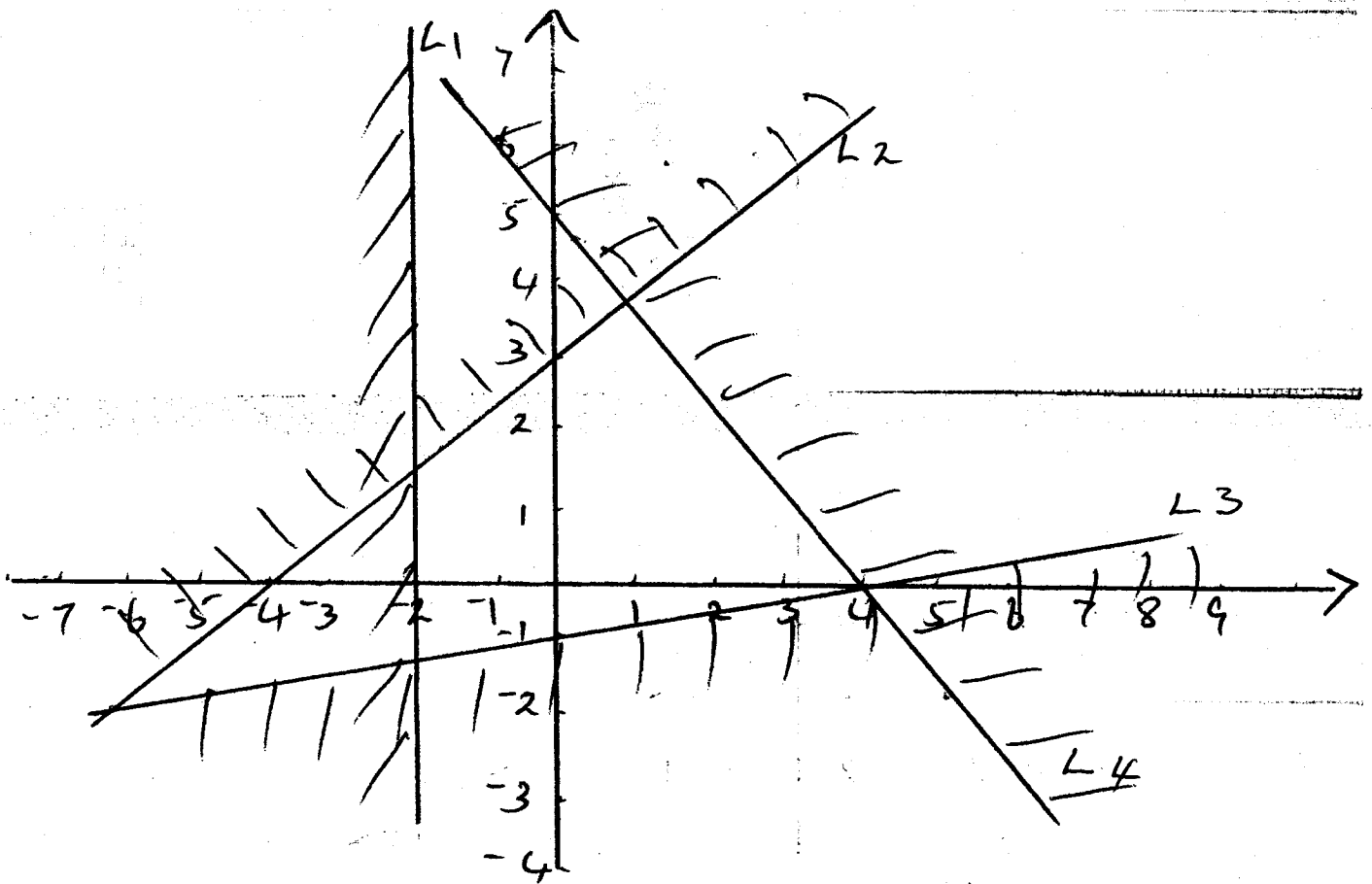
$$y = -2x + 4$$

x	-1	0	1	2	3
y	5	4	3	2	1

5 The diagram below shows the un shaded region of linear inequalities, find the

inequalities representing the region.

(10mks)



$$L_1 \quad x = -2$$

$$x \geq -2$$

$$L_2 \quad (0, 3) \quad (-4, 0)$$

$$\frac{3-0}{x-0} = \frac{3}{4}$$

$$\frac{y-3}{x-0} = \frac{3}{4}$$

$$y-3 = \frac{3}{4}x$$

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

$$(0, 4)$$

$$4 = 3 \quad 4 > 3$$

$$(0, 1)$$

$$1 = 3$$

$$y \leq \frac{3}{4}x + 3$$

$$L_3 \Rightarrow (4, 0) \quad (0, -1)$$

$$\frac{0-(-1)}{4-0} = \frac{1}{4}$$

$$\frac{y+1}{x-0} = \frac{1}{4}$$

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

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

$$(0, 2)$$

$$2 \geq -1$$

$$y \geq \frac{1}{4}x - 1$$

$$L_4 \quad (0, 5) \quad (4, 0)$$

$$\frac{5-0}{0-4} = \frac{5}{-4}$$

$$y \leq -\frac{5}{4}x + 5$$

$$\frac{y-5}{x-0} = \frac{-5}{4}$$

$$y-5 = -\frac{5}{4}x$$

$$y = -\frac{5}{4}x + 5$$

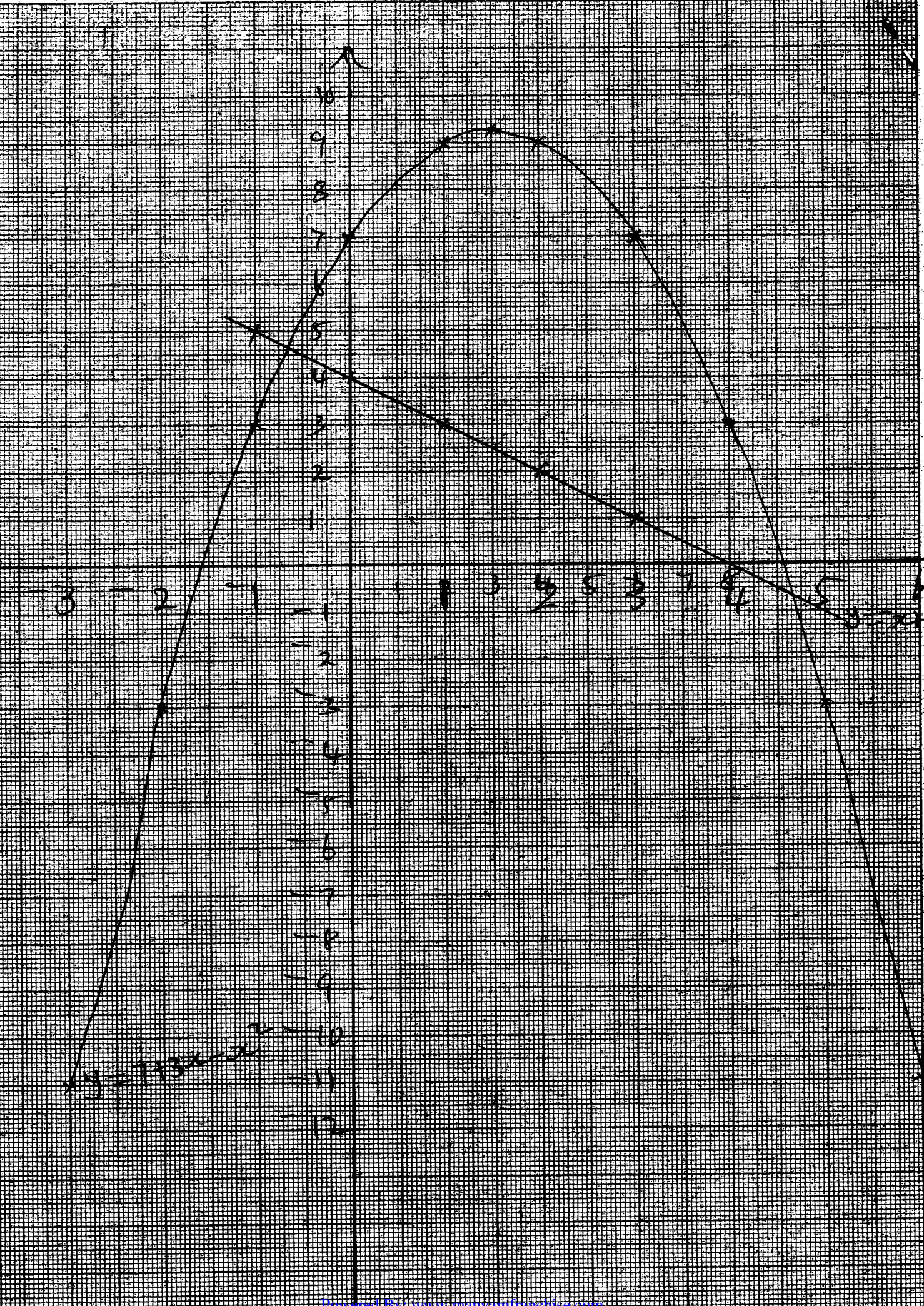
$$(2, 0)$$

$$0 = -\frac{5}{4}x + 5$$

$$0 = -2.5 + 5$$

$$0 = 2.5$$

$$y \leq -\frac{5}{4}x + 5$$



$y = -x^2 + 6x - 11$