Exercise - 3.10

(4) Draw the graph for the following.

(i) $y = 2x$ (ii) $y = 4x - 1$ (iii) $y = (\frac{3}{2})x + 3$

(iv) $3x + 2y = 14$.

⇒ (i) given the line

$y = 2x$.

Let $x = 1$, then $y = 2.1 = 2$

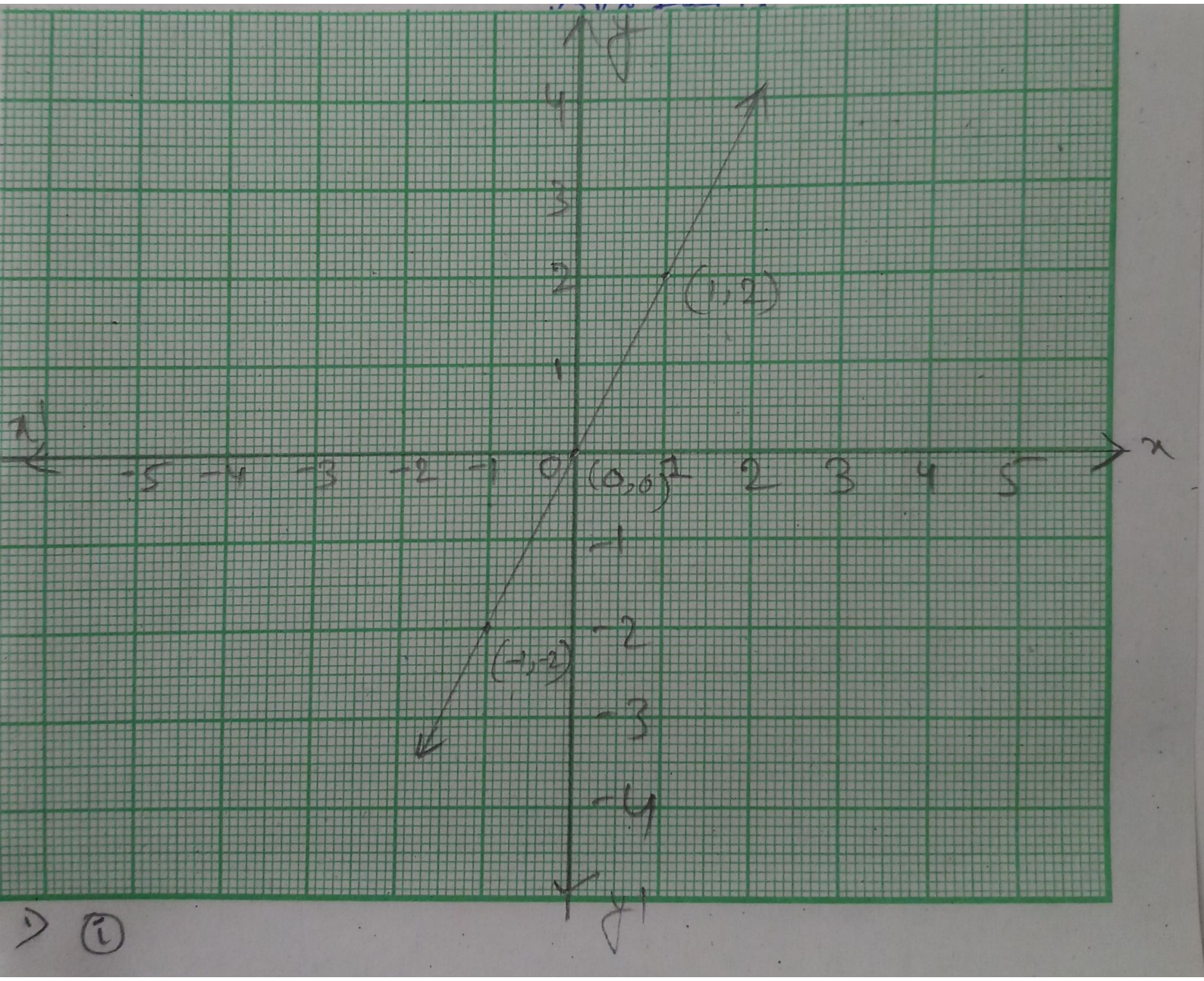
Let $x = 0$, then $y = 2.0 = 0$

Let $x = -1$, then $y = 2.(-1) = -2$

x	1	0	-1
y	2	0	-2

The points (x, y) to be plotted:-

$(1, 2)$, $(0, 0)$, and $(-1, -2)$



i) (i)

(ii) given the line

$$y = 4x - 1$$

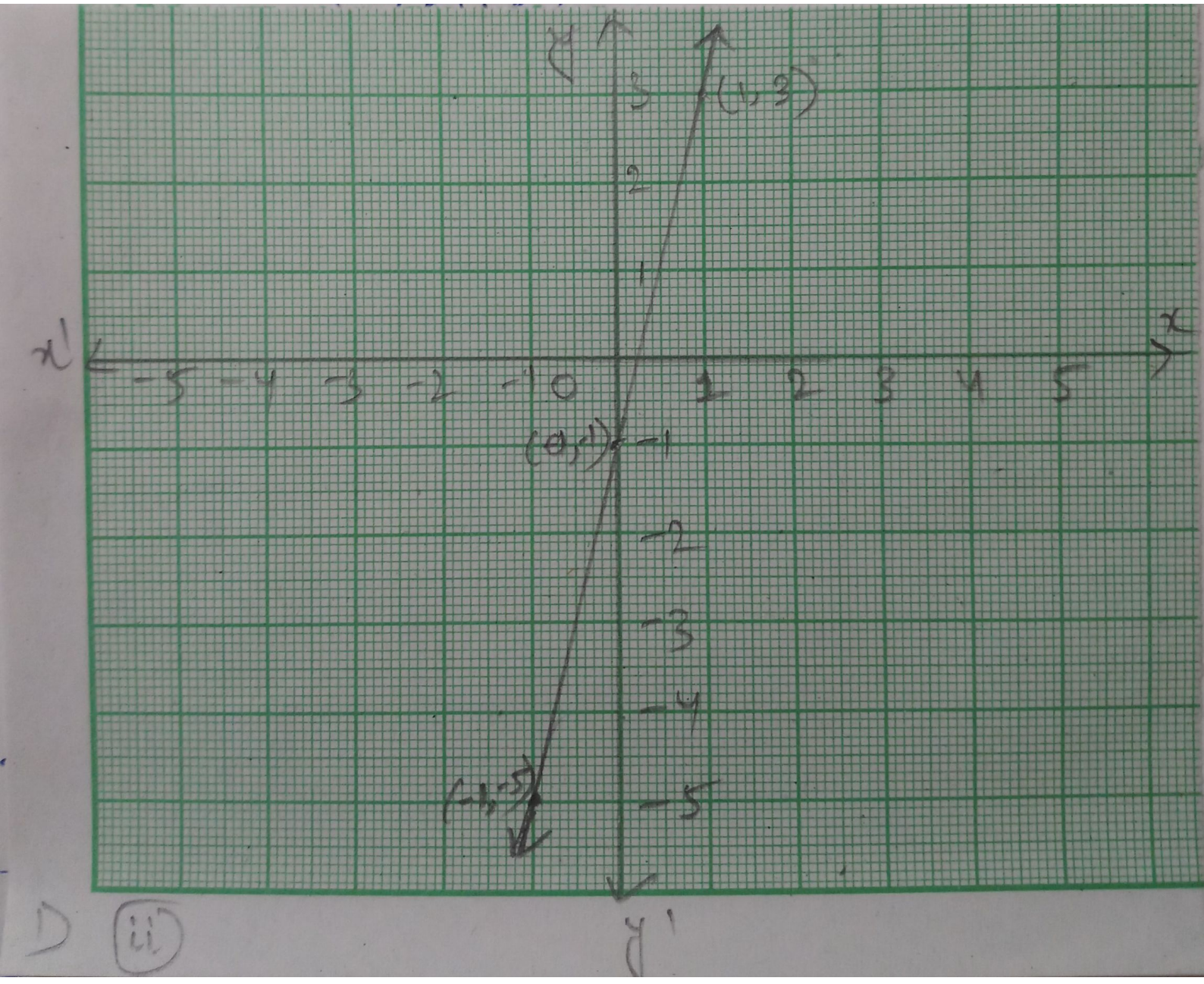
Let $x = 1$, then $y = 4 \cdot 1 - 1 = 4 - 1 = 3$

Let $x = 0$, then $y = 4 \cdot 0 - 1 = 0 - 1 = -1$

Let $x = -1$, then $y = 4 \cdot (-1) \cdot -1 = -4 - 1 = -5$

x	1	0	-1
y	3	-1	-5

The points (x, y) to be plotted $(1, 3)$ $(0, -1)$ and $(-1, -5)$.



D (ii)

(iii) Given the line

$$y = \left(\frac{3}{2}\right)x + 3$$

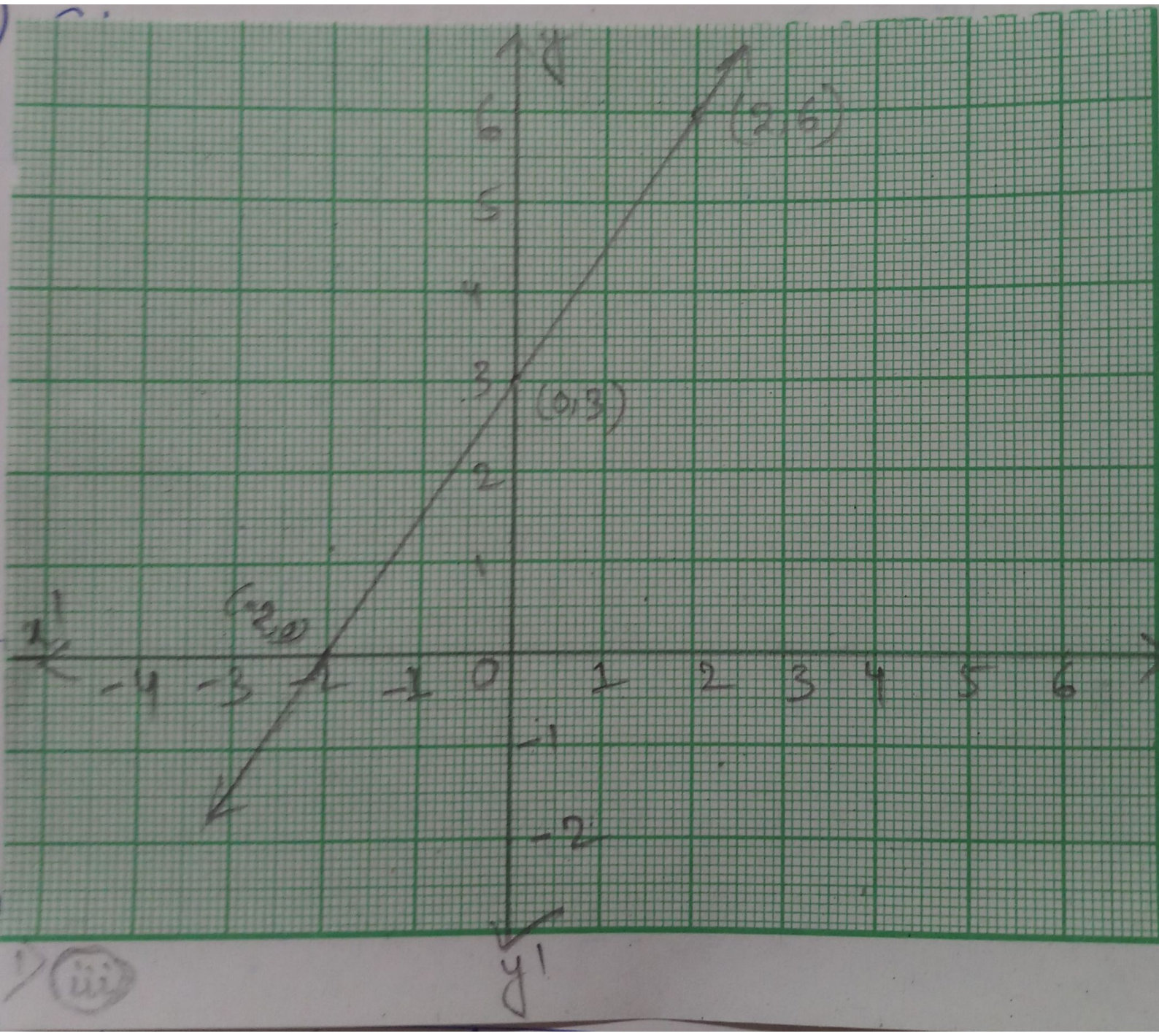
Let $x = 2$, then $y = \frac{3}{2}(2) + 3 = 3 + 3 = 6$

Let $x = 0$, then $y = \left(\frac{3}{2}\right).(0) + 3 = 0 + 3 = 3$

Let $x = -2$, then $y = \left(\frac{3}{2}\right)(-2) + 3 = -3 + 3 = 0$.

x	2	0	-2
y	6	3	0

The points (x, y) to be plotted $(2, 6)$, $(0, 3)$ and $(-2, 0)$.


y
(2, 6)
(0, 3)
(-2, 0)
x
y1
-4
-3
-2
-1
0
1
2
3
4
5
6

(iv) given the line

$$3x + 2y = 14$$

$$2y = 14 - 3x$$

$$y = \frac{14}{2} - \frac{3}{2}x$$

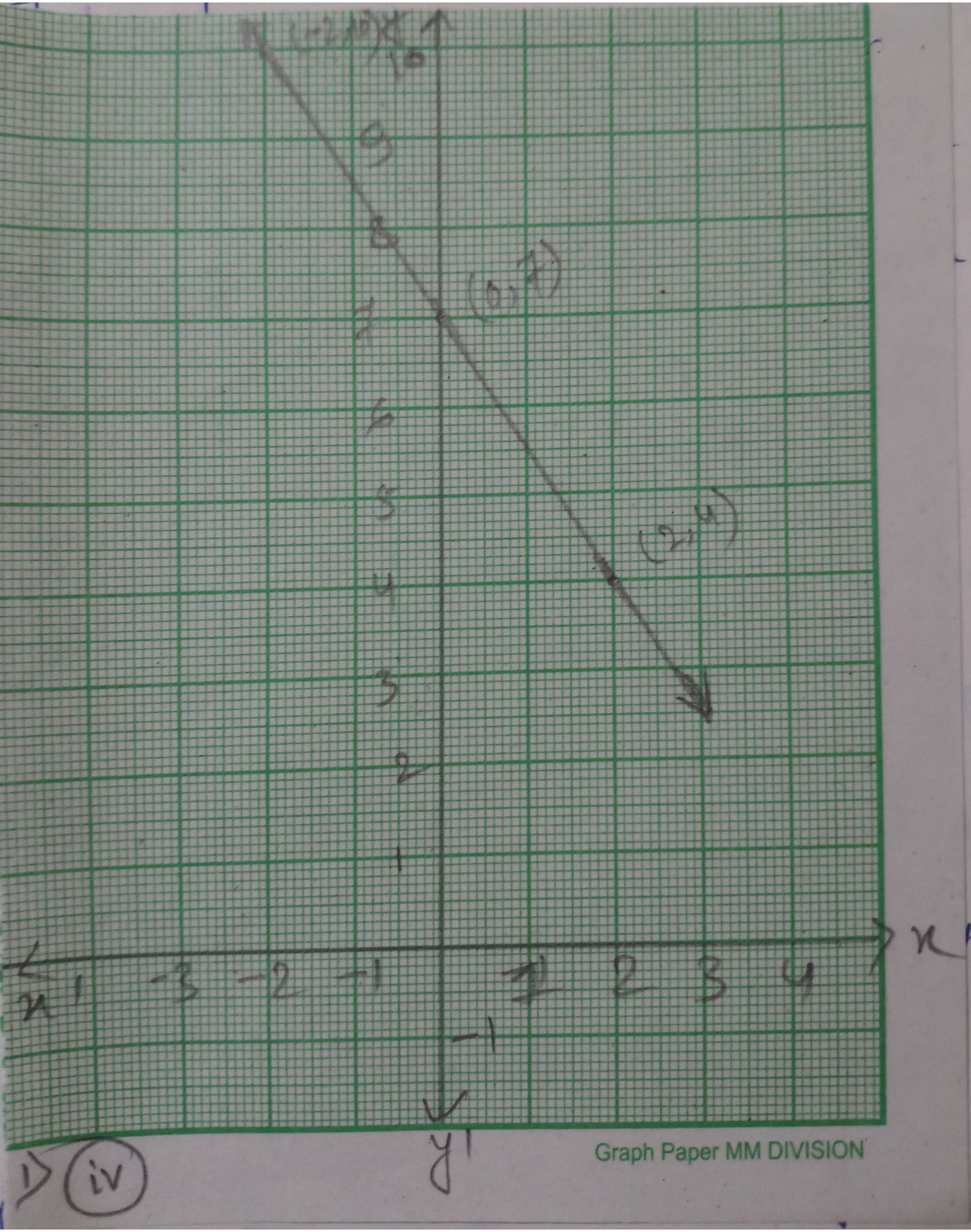
$$y = 7 - \frac{3}{2}x$$

Let $x = 2$, then $y = 7 - \frac{3}{2} \times 2 = 7 - 3 = 4$

Let $x = 0$, then $y = 7 - \frac{3}{2} \cdot 0 = 7 - 0 = 7$

Let $x = -2$, then $y = 7 - \frac{3}{2}(-2) = 7 + 3 = 10$

x	2	0	-2
y	4	7	10



(iv)

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(2) Solve graphically :-

(i) $x+y=7$; $x-y=3$ (ii) $3x+2y=4$; $9x+6y-12=0$

(iii) $\frac{x}{2}+\frac{y}{4}=1$; $\frac{x}{2}+\frac{y}{4}=2$ (iv) $x-y=0$; $y+3=0$

(v) $y=2x+1$; $y+3x-6=0$ (vi) $x=-3$; $y=3$.

⇒ (i) Now,

Given, $x+y=7$ — (i)

$y=7-x$

x	1	0	-1
y	6	7	8

and $x-y=3$ -- (ii)

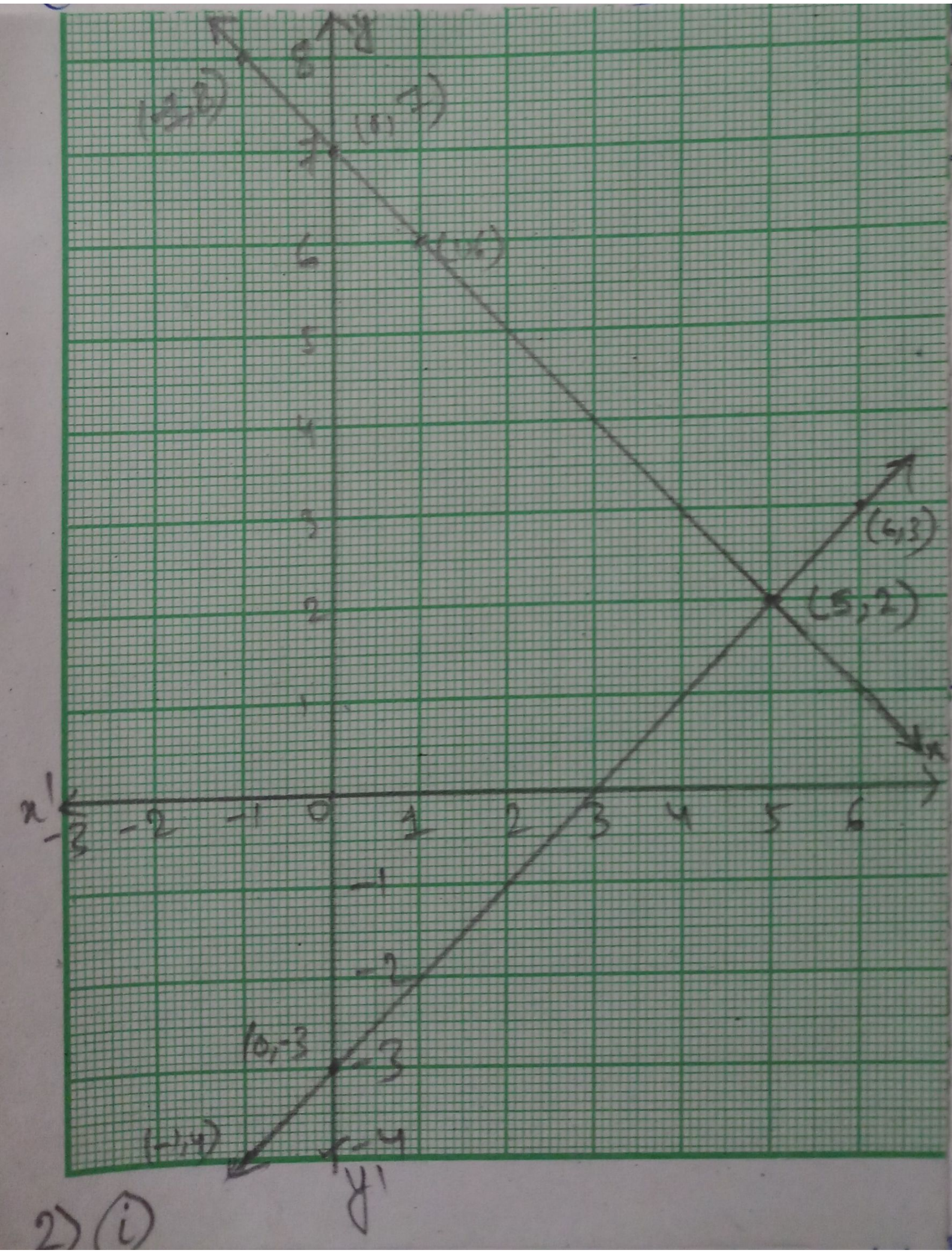
$y=x-3$

x	6	0	-1
y	3	-3	-4

By graph figure, The point (5, 2) of lines (i) and (ii) intersection.

i.e (5, 2) point is the solution of lines (i) and (ii)

Thus, Value of $x=5$ and $y=2$.



2) (i)

(ii) Now,

given

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

$2y = 4-3x$

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

x	2	0	-2
y	-1	2	[illegible]

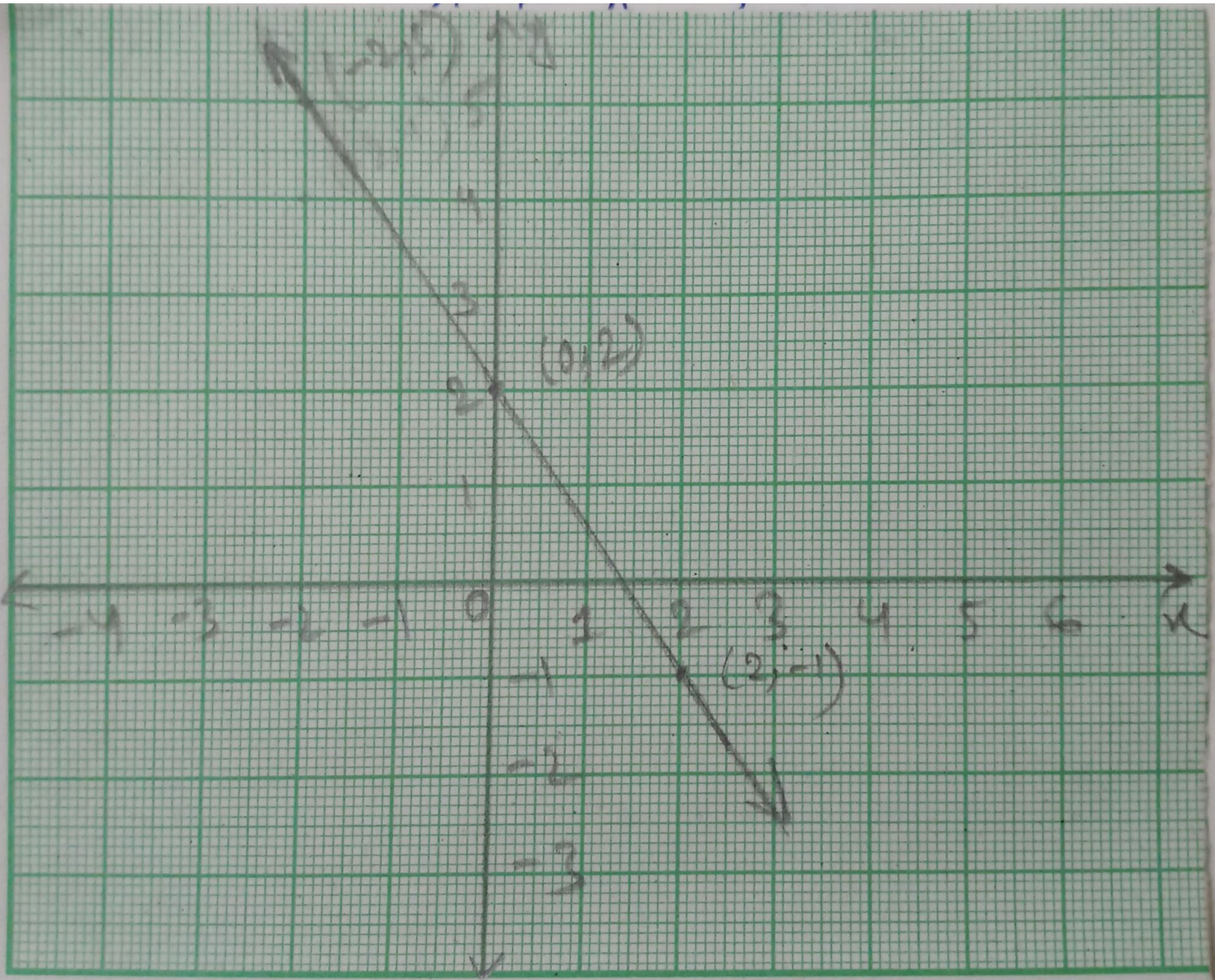
and

$9x+6y-12=0$ --(ii)

$6y = 12-9x$

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

x	2	0	-2
y	-1	2	5



2) (ii)

Here, given two lines are same.
So, their solutions are same.

Thus, we have an infinite number of solution of lines (i) and (ii).

(iii) Given,

$\frac{x}{2} + \frac{y}{4} = 1$ --(i) and

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

$2x + y = 4$

$y = 4 - 2x$

x	2	0	-1
y	0	4	6

$\frac{x}{2} + \frac{y}{4} = 2$ --(ii)

$\frac{2x+y}{4} = 2$

$2x + y = 8$

$y = 8 - 2x$.

x	4	0	1
y	0	8	6

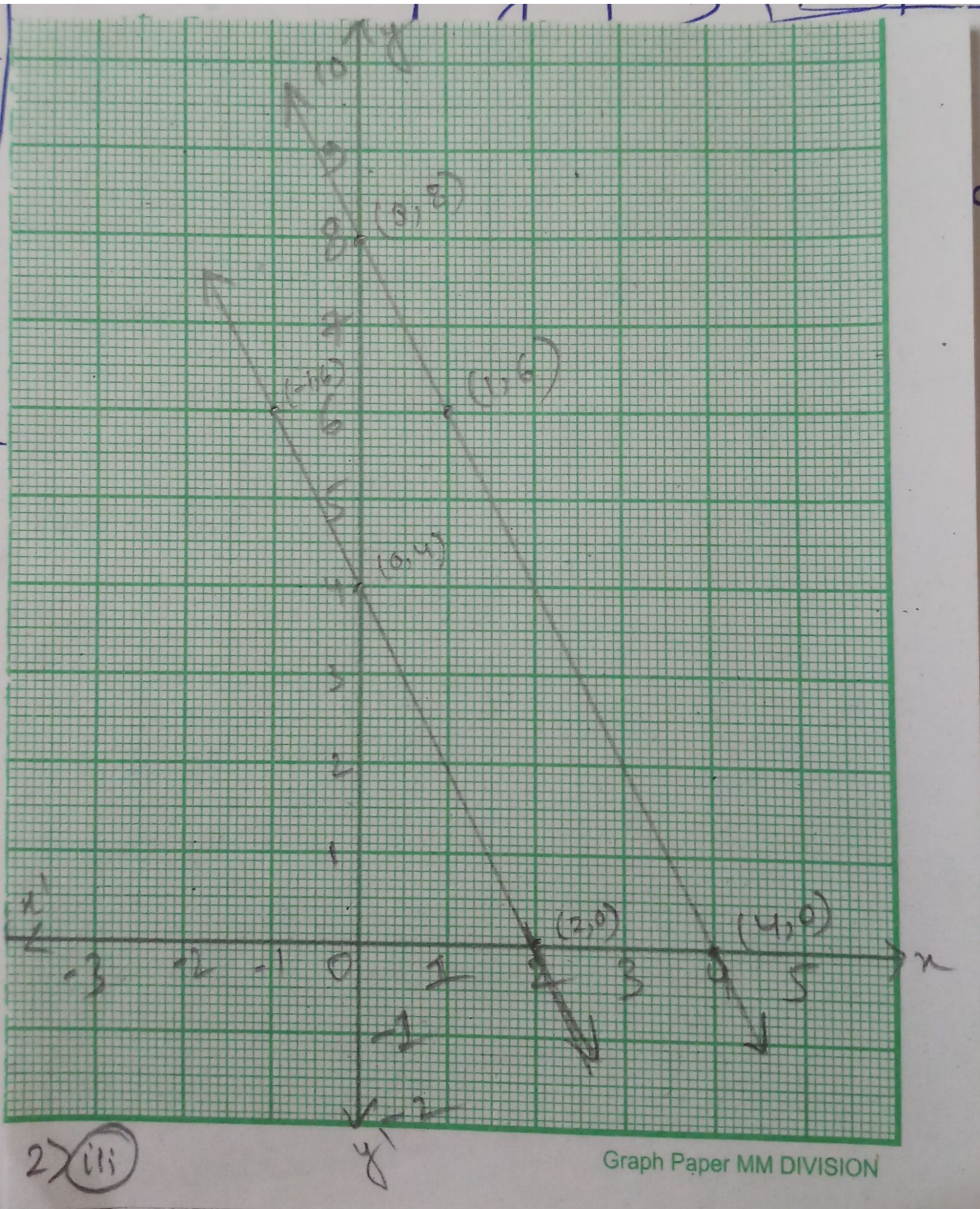
By from figure,

Given two lines (i) and (ii) are parallel.

then two lines no meet of any points.

Thus, the gives two lines no solutions.

no solution.



2 (iii)

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3(iv) Given

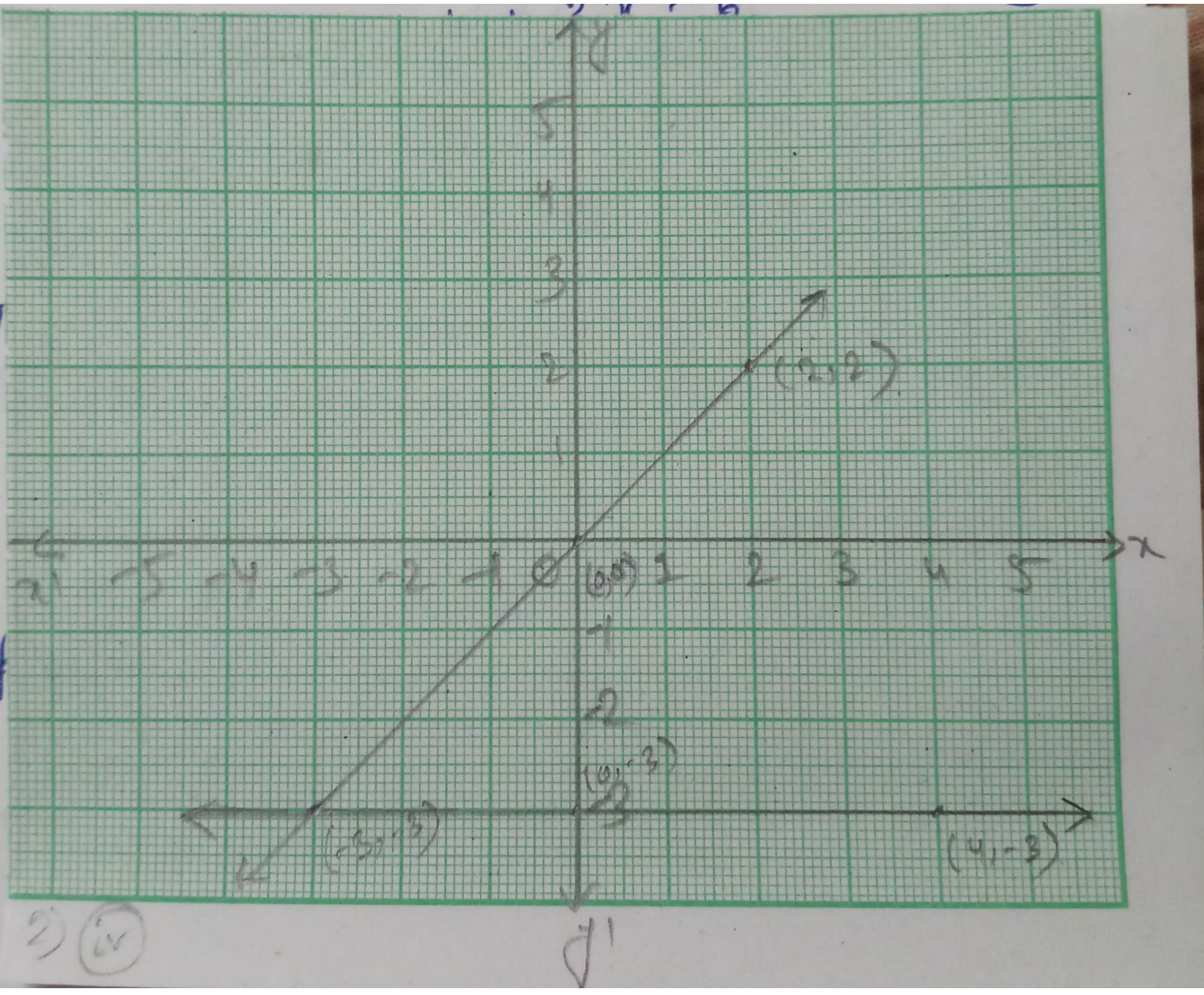
$x - y = 0$ ... (i) and $y + 3 = 0$ ... (ii)

$\Rightarrow y = x$

$y = -3$

x	2	0	-3
y	2	0	-3

x	4	0	-3
y	-3	-3	-3



2) (iv)

In the graph figure, given two lines (i) and (ii) are meet a point $(-3, -3)$.

Then, $(-3, -3)$ is the solutions of the lines (i) and (ii).

Therefore the value of $x = -3$ and $y = -3$.

(v) given

$y = 2x + 1 \cdots$ (i) and $y + 3x - 6 = 0 \cdots$ (ii)

$y = 2x + 1$

$y = 6 - 3x$

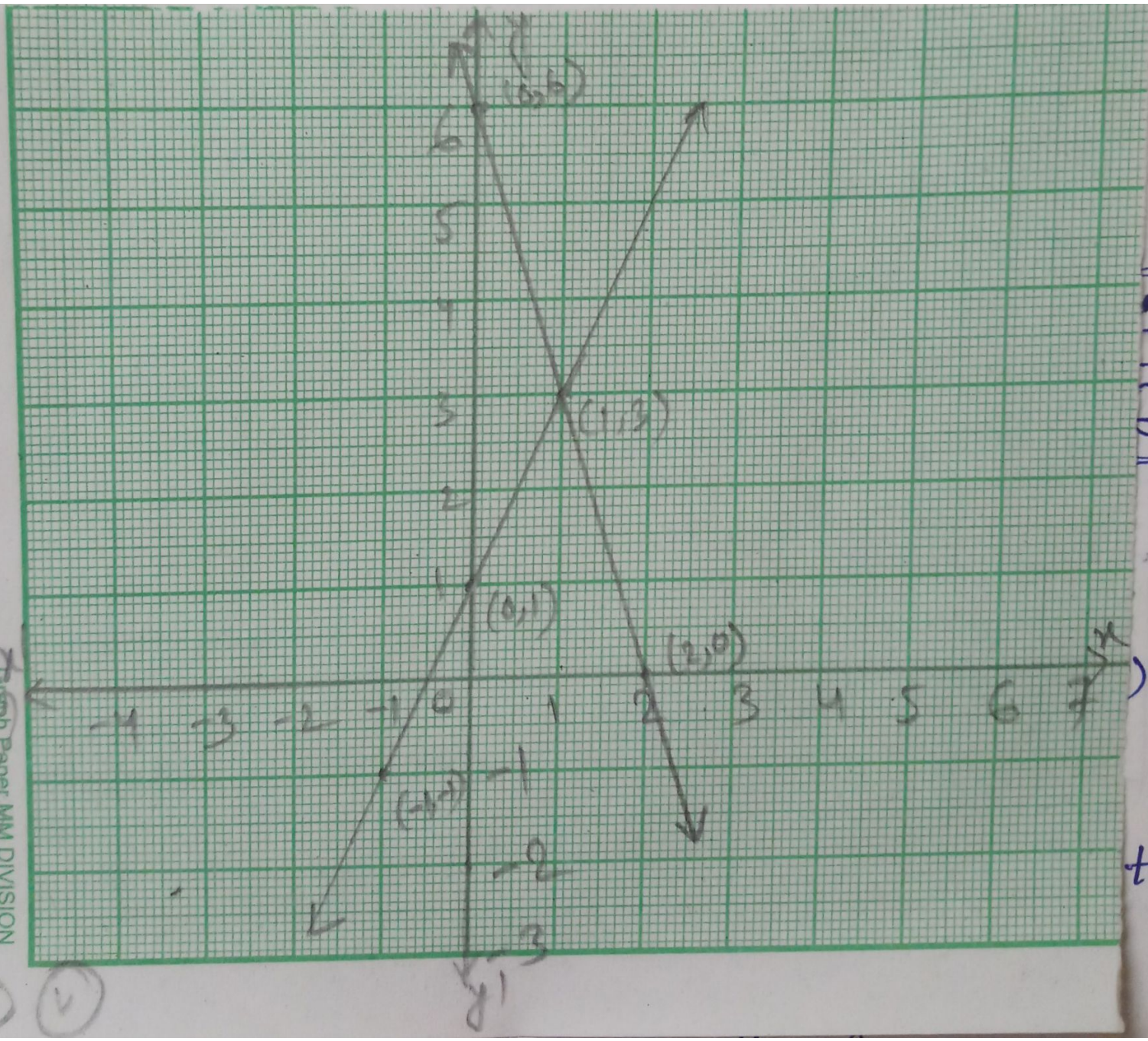
x	1	0	-1
y	3	1	-1

x	1	0	2
y	3	6	0

In the graph figure, given two lines (i) and (ii) are meet a point $(1, 3)$.

Then, $(1, 3)$ is the solution of the given two lines (i) and (ii).

Thus, the value of $x = 1$ and $y = 3$.


(0,5)
(1,2)
(0,1)
(2,0)
(-1,2)
X
Y
X'
Y'
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
-1
-2
-3
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(vi) given,

$x = -3$ --(i) and $y = 3$ --(ii)

$x = -3$

x	-3	-3	-3
y	0	2	-2

$y = 3$

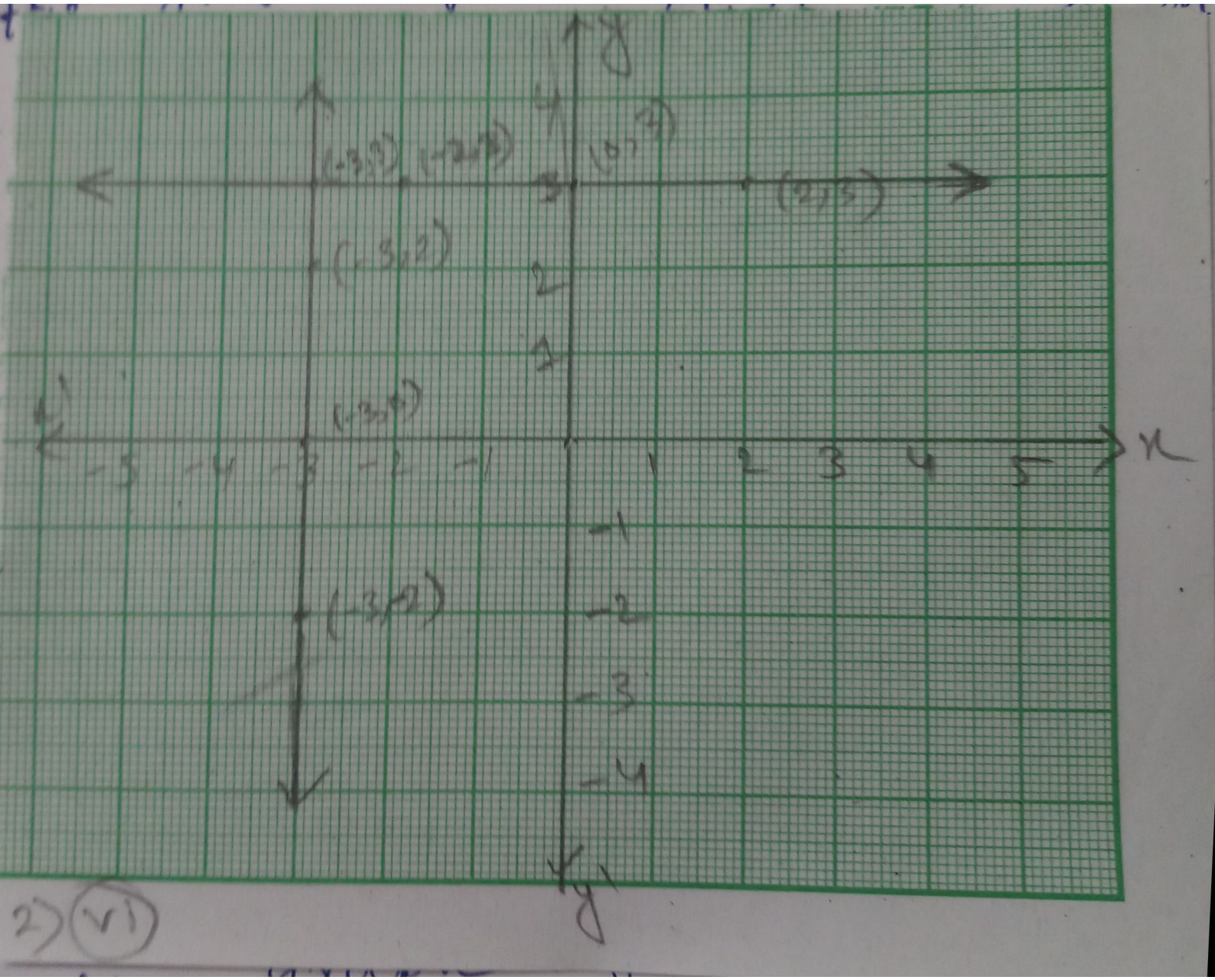
x	2	0	-2
y	3	3	3

In the graph figure, given two lines (i) and (ii) meet a point $(-3, 3)$.

$(-3, 3)$ is the solution of the lines (i) and (ii)

Therefore, the ~~solu~~ value of $x = -3$

$y = 3$.



2) (vi)

(3) Two cars are 100 miles apart. If they drive towards each other they will meet in 1 hour. If they drive in the same direction they will meet in 2 hours. Find their speed by using graphical method.

⇒ Let two cars speed are x and y.

Then by given condition,

$$\frac{100}{x+y} = 1$$

$$x + y = 100 \quad \text{---(i)}$$

$$y = 100 - x$$

x	100	0	50
y	0	100	50

and $$\frac{100}{x-y} = 2$$

$$x - y = 50 \quad \text{---(ii)}$$

$$y = x - 50$$

x	50	100	60
y	0	50	10

In the graph figure,

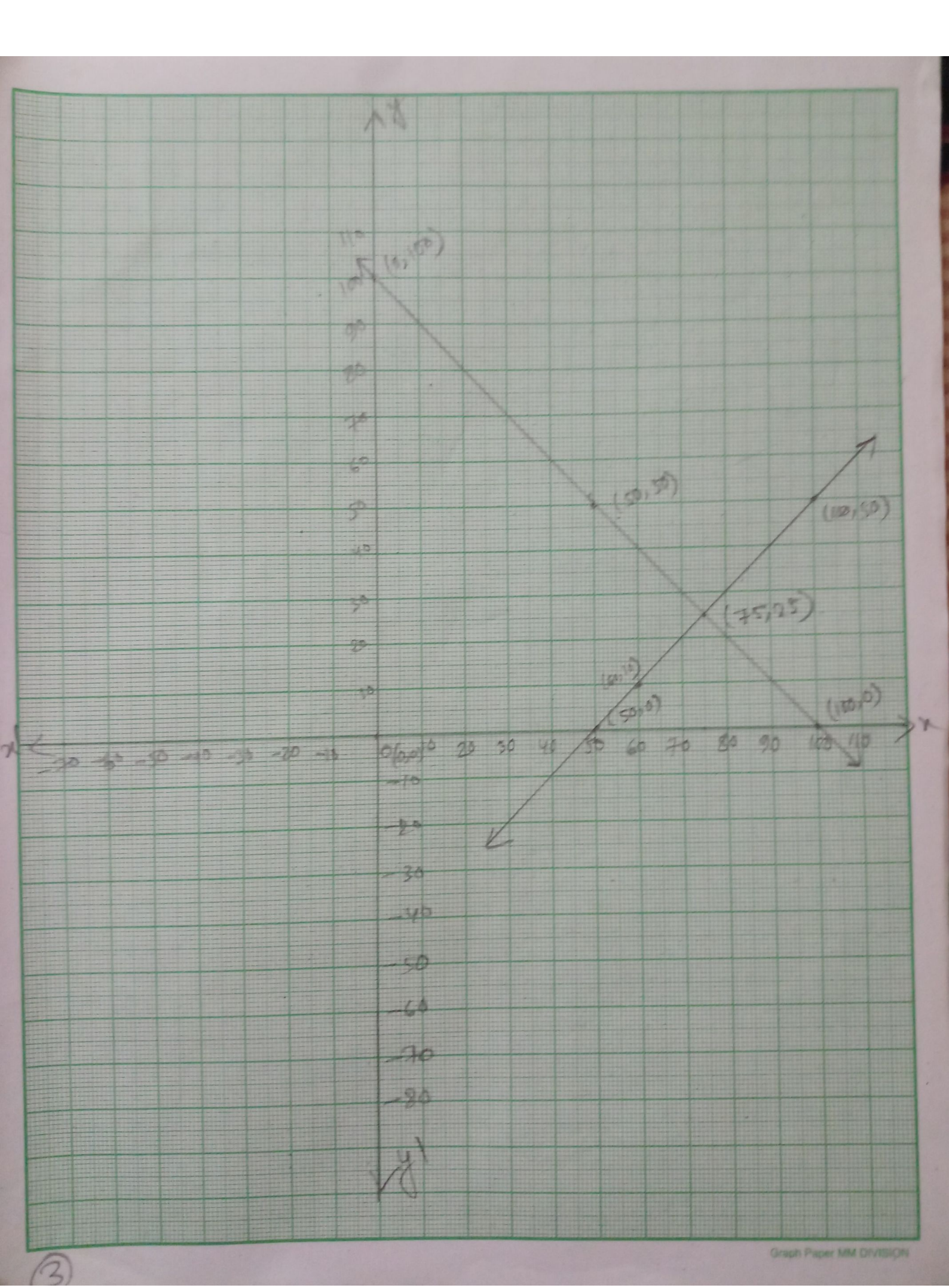
Two lines (i) and (ii) meet a point (75, 25).

(75, 25) is the solution of the lines (i) and (ii).

Thus, the value of $x = 75$, $y = 25$.

Therefore, Two cars speed are

75 km/h and 25 km/h.



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