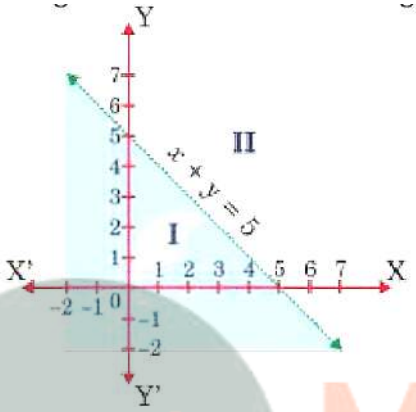
NCERT Solutions for Class-XI Maths

Chapter-6 Exercise-6.2

NCERT Math Class 11

1. Solve the following inequality graphically in two-dimensional plane: $x + y < 5$.

1. The graphical representation of $x + y = 5$ is given as dotted line in the figure below.



This line divides the xy-plane in two half planes, I and II. Select a point (not on the line), which lies in one of the half planes, to determine whether the point satisfies the given inequality or not.

We select the point as $(0,0)$.

It is observed that, $0 + 0 < 5$ or, $0 < 5$, which is true

Therefore, half plane II is not the solution region of the given inequality. Also, it is evident that any point on the line does not satisfy the given strict inequality.

Thus, the solution region of the given inequality is the shaded half plane I excluding the points on the line. Hence, the shaded region shows the graphical solutions of the given inequality.

2. Solve the following inequality graphically in two-dimensional plane: $2x + y \geq 6$

2. Given: $2x + y \geq 6$

Consider: $2x + y = 6$

X	0	3
Y	6	0

Now draw a solid line $2x + y = 6$ in the graph ($\because 2x + y = 6$ is included in the given question)

Now Consider $2x + y \geq 6$

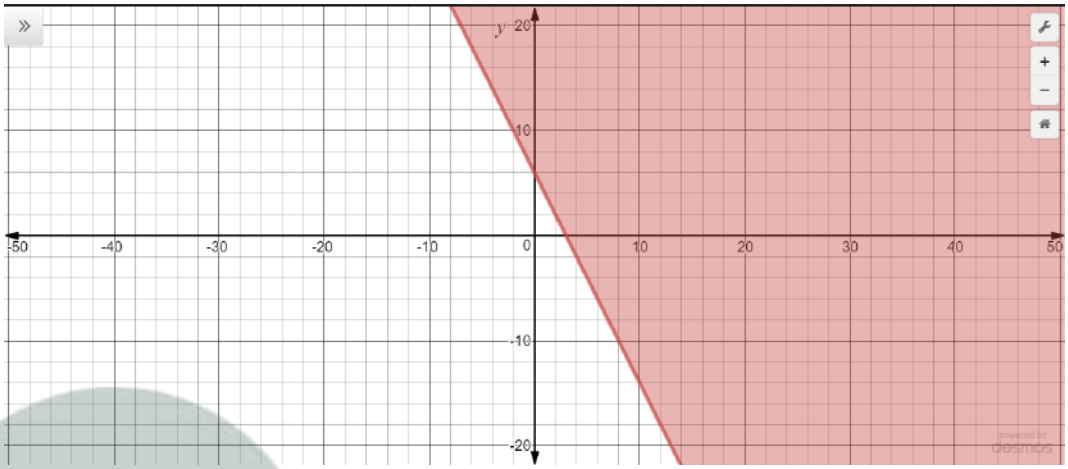
Select a point (0,0)

$\Rightarrow 2 \times (0) + 0 \geq 6$

$\Rightarrow 0 \geq 5$ (this is false)

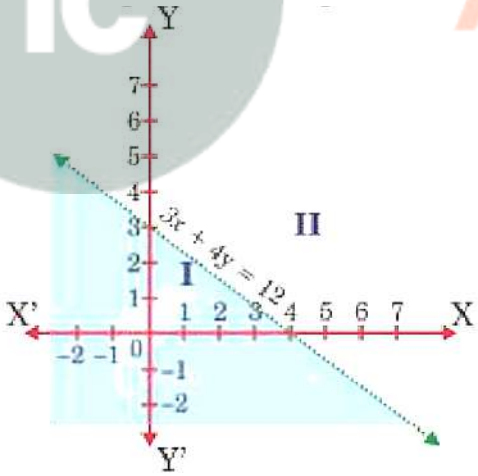
$\therefore$ Solution region of the given inequality is above the line $2x + y = 6$. (Away from the origin)

The graph is as follows:



3. Solve the following inequality graphically in two-dimensional plane: $3x + 4y \leq 12$.

3. The graphical representation of $3x + 4y = 12$ is given in the figure below.



This line divides the xy-plane in two half planes, I and II.

Select a point (not on the line), which lies in one of the half planes, to determine whether the point satisfies the given inequality or not.

We select the point as $(0,0)$.

It is observed that, $3(0)+4(0) \leq 12$ or $0 \leq 12$, which is true

Therefore, half plane II is not the solution region of the given inequality. Also, it is evident that any point on the line satisfies the given inequality.

Thus, the solution region of the given inequality is the shaded half plane I including the points on the line. Hence, the shaded region shows the graphical solutions of the given inequality.

4. $y + 8 \geq 2x$

4. Given: $y + 8 \geq 2x$

Consider: $y + 8 = 2x$

X	0	4
Y	-8	0

Now draw a solid line $y + 8 = 2x$ in the graph ($\because y + 8 = 2x$ is included in the given question)

Now Consider $y + 8 \geq 2x$

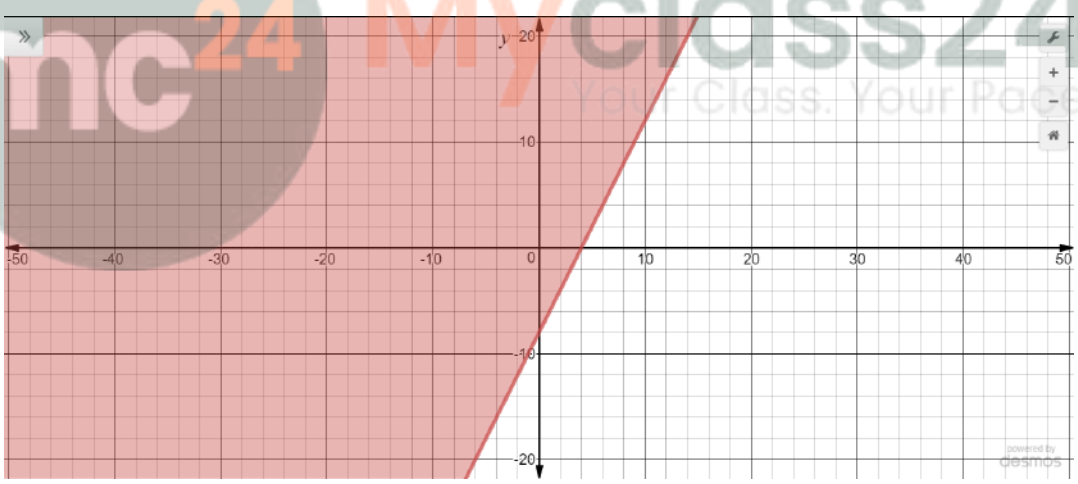
Select a point (0,0)

$\Rightarrow (0) + 8 \geq 2 \times (0)$

$\Rightarrow 0 \leq 8$ (this is true)

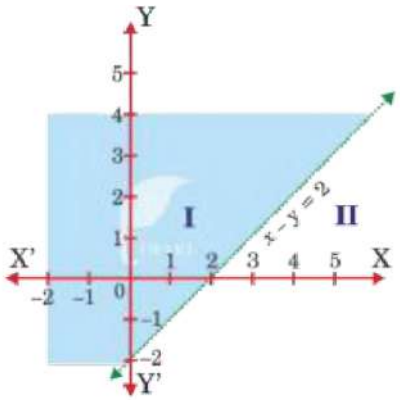
$\therefore$ Solution region of the given inequality is above the line $y + 8 = 2x$. (That is origin is included in the region)

The graph is as follows:



5. Solve the following inequality graphically in two-dimensional plane: $x - y \leq 2$.

5. The graphical representation of $x - y = 2$ is given in the figure below.



This line divides the xy-plane in two half planes.

Select a point (not on the line), which lies in one of the half planes, to determine whether the point satisfies the given inequality or not.

We select the point as $(0,0)$.

It is observed that, $0-0 \le 2$ or $0 \le 2$, which is true

Therefore, the lower half plane is not the solution region of the given inequality. Also, it is clear that any point on the line satisfies the given inequality.

Thus, the solution region of the given inequality is the half plane containing the point $(0,0)$ including the line. Hence, the shaded region shows the graphical solutions of the given inequality.

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6. $2x - 3y > 6$

6. Given: $2x - 3y > 6$

Consider: $2x - 3y = 6$

X	0	3
Y	-2	0

Now draw a dotted line $2x - 3y = 6$ in the graph ($\because 2x - 3y = 6$ is excluded in the given question)

Now Consider $2x - 3y > 6$

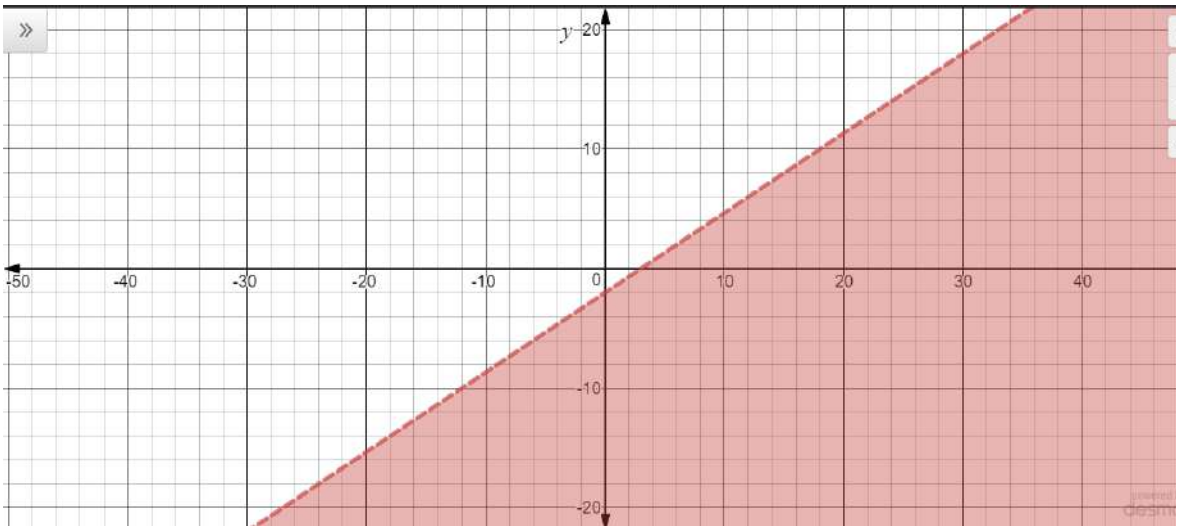
Select a point (0,0)

$\Rightarrow 2 \times (0) - 3 \times (0) > 6$

$\Rightarrow 0 > 5$ (this is false)

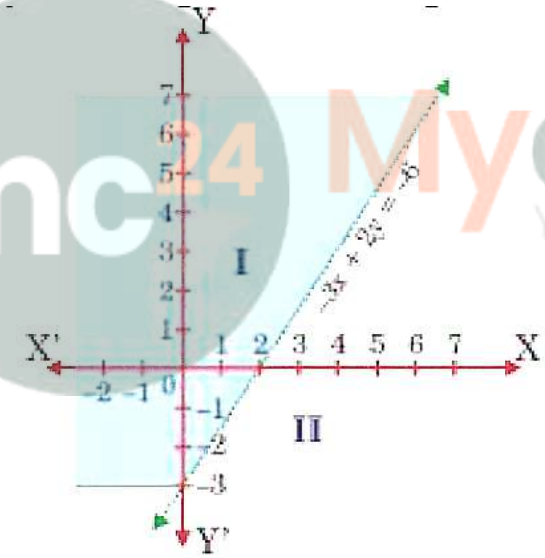
$\therefore$ Solution region of the given inequality is below the line $2x - 3y > 6$. (Away from the origin)

The graph is as follows:



7. Solve the following inequality graphically in two-dimensional plane: $-3x+2y\geq -6$.

7. The graphical representation of $-3x+2y=-6$ is given in the figure below.



This line divides the *xy*-plane in two half planes.

Select a point (not on the line), which lies in one of the half planes, to determine whether the point satisfies the given inequality or not.

We select the point as $(0,0)$.

It is observed that, $-3(0)+2(0)\geq -6$ or $0\geq -6$, which is true

Therefore, the lower half plane is not the solution region of the given inequality. Also, it is evident that any point on the line satisfies the given inequality.

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Thus, the solution region of the given inequality is the half plane containing the point $(0,0)$ including the line. Hence, the shaded region shows the graphical solutions of the given inequality.

8. $3y - 5x < 30$

8. Given: $3y - 5x < 30$

Consider: $3y - 5x = 30$

X	0	-6
Y	10	0

Now draw a dotted line $3y - 5x = 30$ in the graph ($\because 3y - 5x = 30$ is excluded in the given question)

Now Consider $3y - 5x < 30$

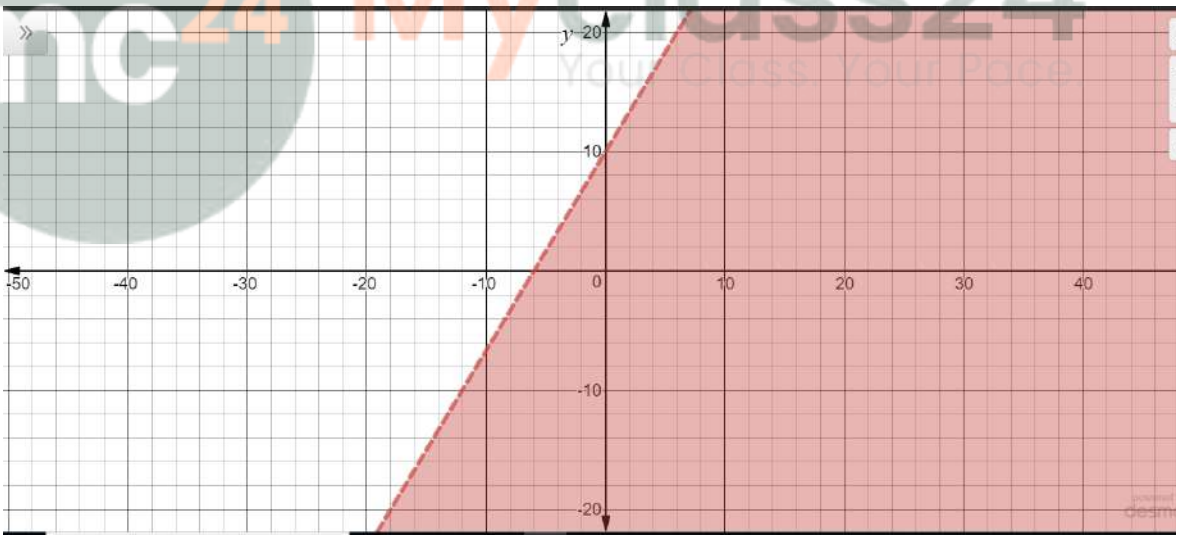
Select a point (0,0)

$\Rightarrow 3 \times (0) - 5 \times (0) < 30$

$\Rightarrow 0 < 30$ (this is true)

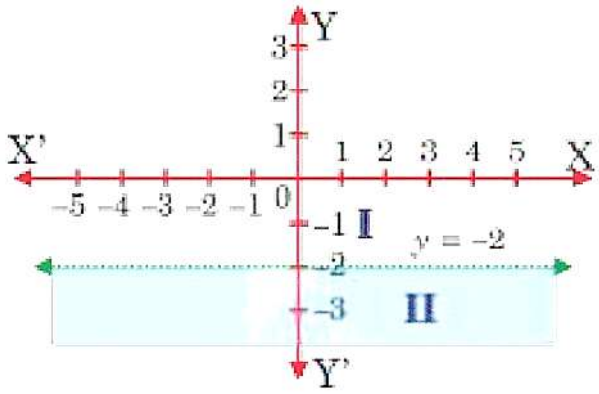
$\therefore$ Solution region of the given inequality is below the line $3y - 5x < 30$. (That is origin is included in the region)

The graph is as follows:



9. Solve the following inequality graphically in two-dimensional plane: $y < -2$.

9. The graphical representation of $y = -2$ is given as dotted line in the figure below.



This line divides the xy-plane in two half planes.

Select a point (not on the line), which lies in one of the half planes, to determine whether the point satisfies the given inequality or not.

We select the point as $(0,0)$.

It is observed that, $0 < -2$, which is false

Also, it is evident that any point on the line does not satisfy the given inequality.

Hence, every point below the line, $y = -2$ (excluding all the points on the line), determines the solution of the given inequality.

Hence, the shaded region shows the graphical solutions of the given inequality.

10. $x > -3$

10. Given: $x > -3$

Consider: $x = -3$

Now draw a dotted line $x = -3$ in the graph ($\because x = -3$ is excluded in the given question)

Now Consider $x > -3$

Select a point (0,0)

$\Rightarrow 0 > -3$

$\Rightarrow 0 > -3$ (this is true)

$\therefore$ Solution region of the given inequality is right to the line $x > -3$. (That is origin is included in the region)

The graph is as follows:

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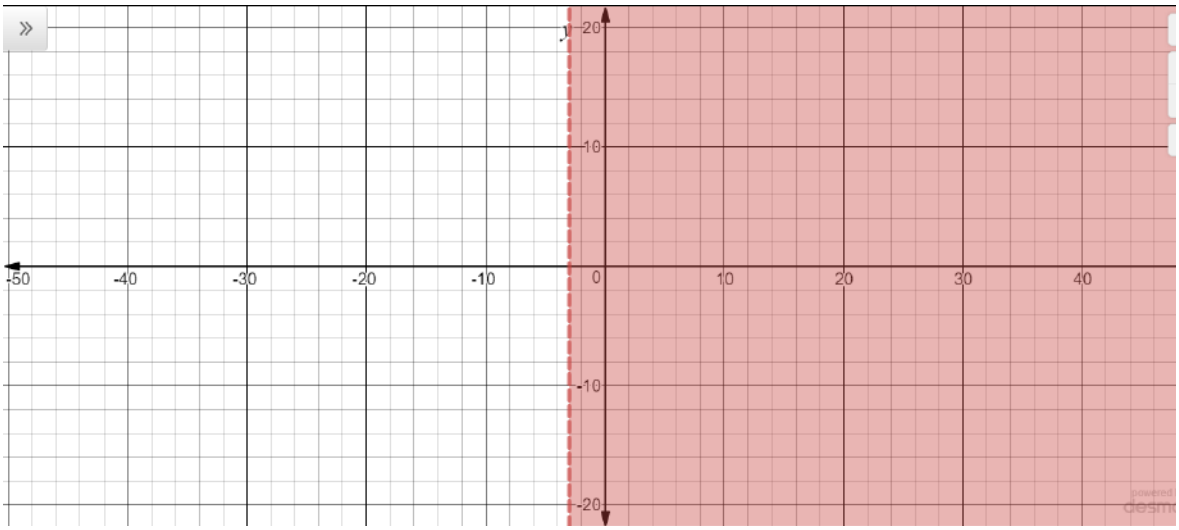

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