

Important Questions for Class 11 Maths Chapter 5 - Linear Inequalities

Question 1:

Solve $3x+8>2$, when

(i) x is an integer

(ii) x is a real number

Solution:

Given Linear inequality: $3x+8>2$

The given inequality can also be written as:

$$3x+8 - 8 > 2 - 8 \dots(1)$$

In the above inequality, -8 is multiplied on both the sides, as it does not change the definition of the given expression.

Now, simplify the expression (1)

$$\Rightarrow 3x > -6$$

Now, both the sides, divide it by 3

$$\Rightarrow 3x/3 > -6/3$$

$$\Rightarrow x > -2$$

(i) x is an integer

Hence, the integers greater than -2 are $-1,0,1,2,\dots$ etc

Thus, when x is an integer, the solutions of the given inequality are $-1,0,1,2,\dots$

Hence, the solution set for the given linear inequality is $\{-1,0,1,2,\dots\}$

(ii) x is a real number

If x is a real number, the solutions of the given inequality are all the real numbers, which are greater than -2 .

Therefore, in the case of x is a real number, the solution set is $(-2, \infty)$

Question 2:

The cost and revenue functions of a product are given by $C(x) = 20x + 4000$ and $R(x) = 60x + 2000$, respectively, where x is the number of items produced and sold. How many items must be sold to realise some profit?

Solution:

Given that,

$$\text{Cost, } C(x) = 20x + 4000$$

$$\text{Revenue, } R(x) = 60x + 2000$$

We know that, profit = Revenue – Cost

Now, substitute the given data in the above formula,

$$\text{Profit} = R(x) - C(x)$$

$$\text{Profit} = (60x + 2000) - (20x + 4000)$$

Now, simplify it:

$$\text{Profit} = 60x + 2000 - 20x - 4000$$

$$\text{Profit} = 40x - 2000$$

To earn some profit, $40x - 2000 > 0$

$$\Rightarrow 40x > 2000$$

$$\Rightarrow x > 2000/40$$

$$\Rightarrow x > 50$$

Thus, the manufacturer should sell more than 50 items to realise some profit.

Question 3:

Solve the given linear inequalities $3x - 2 < 2x + 1$ and show the graph of the solution in the number line.

Solution:

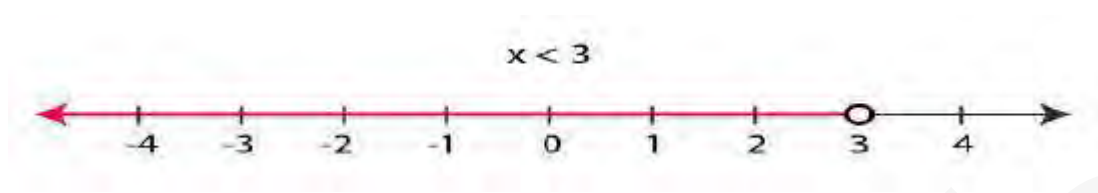
Given linear inequality: $3x - 2 < 2x + 1$

Bring the x terms on one side and constant terms on another side

$$\Rightarrow 3x - 2x < 1 + 2$$

$$\Rightarrow x < 3$$

Therefore, the graphical representation for the solution of a linear inequality in number line is as follows:



Question 4:

Ravi scored 70 and 75 marks in the first two-unit test. Calculate the minimum marks he should get in the third test to have an average of at least 60 marks.

Solution:

Assume that x be the marks obtained by Ravi in the third unit test.

It is given that the student should have an average of at least 60 marks.

From the given information, we can write the linear inequality as:

$$(70+75+x)/3 \geq 60$$

Now, simplify the expression:

$$\Rightarrow (145 + x) \geq 180$$

$$\Rightarrow x \geq 180 - 145$$

$$\Rightarrow x \geq 35$$

Hence, the student should obtain a minimum of 35 marks to have an average of at least 60 marks.