

**RD Sharma**  
**Solutions**  
**Class 11 Maths**  
**Chapter 15**  
**Ex 15.2**

### Linear Inequations Ex 15.2 Q1

Consider the first inequation,

$$x + 3 > 0$$

$$x > -3 \quad \dots (i)$$

Consider the second inequation,

$$2x < 14$$

$$x < \frac{14}{2} = 7$$

$$x < 7 \quad \dots (ii)$$

From (i) and (ii),  $(-3, 7)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q2

Consider the first inequation,

$$\begin{aligned}2x - 7 &> 5 - x \\ \Rightarrow 2x + x &> 5 + 7 \\ \Rightarrow 3x &> 12 \\ \Rightarrow x &> \frac{12}{3} \\ \Rightarrow x &> 4 \dots\dots\dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}11 - 5x &\leq 1 \\ \Rightarrow -5x &\leq 1 - 11 \\ \Rightarrow -5x &\leq -10 \\ \Rightarrow 5x &\geq 10 \\ \Rightarrow x &\geq 2 \dots\dots\dots (ii)\end{aligned}$$

From (i) and (ii),  $(4, \infty)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q3

Consider the first inequation,

$$\begin{aligned}x - 2 &> 0 \\ x &> 2 \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}3x &< 18 \\ x &< 6 \dots (ii)\end{aligned}$$

From (i) and (ii),  $(2, 6)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q4

Consider the first inequation,

$$\begin{aligned}2x + 6 &\geq 0 \\ 2x &\geq -6 \\ x &\geq \frac{-6}{2} \\ x &\geq -3 \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}4x - 7 &< 0 \\ 4x &< 7 \\ x &< \frac{7}{4} \dots (ii)\end{aligned}$$

From (i) and (ii),  $\left[-3, \frac{7}{4}\right)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q5

Consider the first inequation,

$$\begin{aligned}3x - 6 &> 0 \\3x &> 6 \\x &> 2 \quad \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}2x - 5 &> 0 \\2x &> 5 \\x &> \frac{5}{2} \quad \dots (ii)\end{aligned}$$

From (i) and (ii),  $\left[\frac{5}{2}, \infty\right)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q6

Consider the first inequation,

$$\begin{aligned}2x - 3 &< 7 \\2x &< 7 + 3 \\2x &< 10 \\x &< 5 \quad \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}2x &> -4 \\x &> \frac{-4}{2} \\x &> -2 \quad \dots (ii)\end{aligned}$$

From (i) and (ii),  $[-2, 5]$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q7

Consider the first inequation,

$$\begin{aligned}2x + 5 &\leq 0 \\2x &\leq -5 \\x &\leq \frac{-5}{2} \quad \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}x - 3 &\leq 0 \\x &\leq 3 \quad \dots (ii)\end{aligned}$$

From (i) and (ii),  $\left(-\infty, \frac{-5}{2}\right]$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q8

$$5x - 1 < 24$$

$$5x < 24 + 1$$

$$5x < 25$$

$$x < \frac{25}{5}$$

$$x < 5 \dots (1)$$

And

$$5x + 1 > -24$$

$$5x > -24 - 1$$

$$5x > -25$$

$$x > -5 \dots (2)$$

From equation (1) and (2),

$$-5 < x < 5$$

$$\Rightarrow (-5, 5)$$



### Linear Inequations Ex 15.2 Q9

Consider the first inequation,

$$3x - 1 \geq 5$$

$$3x \geq 5 + 1$$

$$3x \geq 6$$

$$x \geq 2 \dots (i)$$

Consider the second inequation,

$$x + 2 > -1$$

$$x > -1 - 2$$

$$x > -3 \dots (ii)$$

From (i) and (ii),  $[2, \infty)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q10

Consider the first inequation,

$$11 - 5x > -4$$

$$-5x > -4 - 11$$

$$-5x > -15$$

$$5x < 15$$

$$x < 3 \dots (i)$$

Consider the second inequation,

$$4x + 13 \leq -11$$

$$4x \leq -11 - 13$$

$$4x \leq -24$$

$$x \leq -6 \dots (ii)$$

From (i) and (ii),  $[-\infty, -6]$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q11

Consider the first inequation,

$$4x - 1 \leq 0$$

$$4x > -1$$

$$-5x \leq -15$$

$$x \leq \frac{1}{4} \quad \dots (i)$$

Consider the second inequation,

$$3 - 4x < 0$$

$$-4x < -3$$

$$-x < \frac{-3}{4}$$

$$x > \frac{3}{4} \quad \dots (ii)$$

From (i) and (ii), there is no solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q12

Consider the first inequation,

$$x + 5 > 2(x + 1)$$

$$x > 2x + 2 - 5$$

$$x > 2x - 3$$

$$x - 2 > -3$$

$$-x > -3$$

$$x < 3 \quad \dots (i)$$

Consider the second inequation,

$$2 - x < 3(x + 2)$$

$$2 - x < 3x + 6$$

$$-x - 3x < 6 - 2$$

$$-4x < 4$$

$$x > -1 \quad \dots (ii)$$

From (i) and (ii),  $(-1, 3)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q13

Consider the first inequation,

$$2(x - 6) < 3x - 7$$

$$\Rightarrow 2x - 12 < 3x - 7$$

$$\Rightarrow -5 < x \quad \dots (i)$$

Consider the second inequation,

$$11 - 2x < 6 - x$$

$$-2x + x < 6 - 11$$

$$-x < -5$$

$$x > 5 \quad \dots (ii)$$

From (i) and (ii),  $(5, \infty)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q14

Consider the first inequation,

$$\begin{aligned}5x - 7 &< 3(x + 3) \\5x - 7 &< 3x + 9 \\5x - 3x &< 9 + 7 \\2x &< 16 \\x &< 8 \quad \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}1 - \frac{3x}{2} &\geq x - 4 \\-\frac{3x}{2} - x &\geq -4 - 1 \\-\frac{3x - 2x}{2} &\geq -5 \\-5x &> -10 \\x &\leq 2 \quad \dots (ii)\end{aligned}$$

From (i) and (ii),  $(-\infty, 2)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q15

Consider the first inequation,

$$\begin{aligned}\frac{2x - 3}{4} - 2 &\geq \frac{4x}{3} - 6 \\ \frac{2x - 3 - 8}{4} &\geq \frac{4x - 18}{3} \\ 3(2x - 11) &\geq 4(4x - 18) \\ 6x - 33 &\geq 16x - 72 \\ 6x - 16x &\geq -72 + 33 \\ -10x &\geq -39 \\ x &\leq \frac{39}{10} \quad \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}2(2x + 3) &< 6(x - 2) + 10 \\ 4x + 6 &< 6x - 12 + 10 \\ 4x - 6x &< -12 - 6 + 10 \\ -2x &< -8 \\ x &> 8 \quad \dots (ii)\end{aligned}$$

From (i) and (ii), there is no solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q16

Consider the first inequation,

$$\frac{7x - 1}{2} < -3$$

$$7x - 1 < -6$$

$$7x < -6 + 1$$

$$7x < -5$$

$$x < \frac{-5}{7} \quad \dots \text{(i)}$$

Consider the second inequation,

$$\frac{3x + 8}{5} + 11 < 0$$

$$\frac{3x + 8 + 55}{5} < 0$$

$$\frac{3x + 63}{5} < \frac{0}{1}$$

$$3x + 63 < 0$$

$$3x < -63$$

$$x < -21 \quad \dots \text{(ii)}$$

From (i) and (ii),  $(-\infty, -21)$  is the solution set of the simultaneous equations.

**Linear Inequations Ex 15.2 Q17**



Consider the first inequation,

$$\frac{2x+1}{7x-1} > 5$$

$$\frac{2x+1}{7x-1} - 5 > 0$$

$$\frac{2x+1-5(7x-1)}{7x-1} > 0$$

$$2x+1-35x+5 > 0$$

$$-33x+6 > 0$$

$$-33x > -6$$

$$x < \frac{6}{33}, \quad x > \frac{1}{7} \quad \dots(i)$$

Consider the second inequation,

$$\frac{x+7}{x-8} > 2$$

$$\frac{x+7}{x-8} - 2 > 0$$

$$\frac{x+7-2(x-8)}{x-8} > 0$$

$$\frac{x+7-2x+16}{x-8} > 0$$

$$x > 8, \quad x < 23 \quad \dots(ii)$$

From (i) and (ii), there is no solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q18

Consider the first inequation,

$$\frac{x}{2} < 0$$

$$x < 0 \quad \dots(i)$$

Consider the second inequation,

$$\frac{-x}{2} < 3$$

$$-x < 6$$

$$x > -6 \quad \dots(ii)$$

From (i) and (ii),  $(-6, 0)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q19

Consider the first inequation,

$$\begin{aligned}10 &\leq -5(x - 2) \\2 &\leq -(x - 2) \\2 &\leq -x + 2 \\2 - 2 &\leq -x \\0 &\leq -x \\x &\leq 0 \quad \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}-5(x - 2) &< 20 \\-5x + 10 &< 20 \\-5x &< 20 - 10 \\-5x &< 10 \\-x &< 2 \\x &> -2 \quad \dots (ii)\end{aligned}$$

From (i) and (ii),  $(-2, 0)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q20

Consider the first inequation,

$$\begin{aligned}-5 &< 2x - 3 \\2x - 3 &> -5 \\2x &> -5 + 3 \\2x &> -2 \\x &> -1 \quad \dots (i)\end{aligned}$$

Consider the second inequation,

$$\begin{aligned}2x - 3 &< 5 \\2x &< 5 + 3 \\2x &< 8 \\x &< 4 \quad \dots (ii)\end{aligned}$$

From (i) and (ii),  $(-1, 4)$  is the solution set of the simultaneous equations.

### Linear Inequations Ex 15.2 Q21

$$\begin{aligned}\frac{4}{x+1} &\leq 3 \leq \frac{6}{x+1} \\ \Rightarrow 4 &\leq 3(x+1) \leq 6 \\ \Rightarrow \frac{4}{3} &\leq (x+1) \leq \frac{6}{3} \\ \Rightarrow \frac{4}{3} - 1 &\leq x \leq 2 - 1 \\ \Rightarrow \frac{1}{3} &\leq x \leq 1\end{aligned}$$

Solution set for given inequation is  $\left[\frac{1}{3}, 1\right]$ .