Linear Inequations Ex 15.3 Q4

We have,

$$\frac{|x-2|}{x-2} > 0 \qquad \ldots(i)$$

Case I: When $|x-2| \geq 0$

$$x \geq 2$$

$$\Rightarrow \quad \frac{x-2}{x-2} \geq 0$$

$$\Rightarrow \quad x-2 \geq 0$$

$$\Rightarrow \quad x \geq 2 \qquad \ldots(ii)$$

Case II: when $|x-2| < 0$

$$x < 2$$

$$\Rightarrow \quad -\frac{(x-2)}{x-2} > 0$$

$$\Rightarrow \quad -(x-2) > 0$$

$$\Rightarrow \quad -x+2 < 0$$

$$\Rightarrow \quad -x < -2$$

$$\Rightarrow \quad x > 2 \qquad \ldots(iii)$$

Combining (ii) and (iii) we get $(2, \infty)$ as the solution set.

Linear Inequations Ex 15.3 Q5

We have,

$$\frac{1}{|x|-3}-\frac{1}{2}<0 \qquad \ldots(i)$$

Case I: when $|x| \geq 0 \Rightarrow x \geq 0$

$$\Rightarrow \quad \frac{1}{x-3}-\frac{1}{2}<0$$

$$\Rightarrow \quad \frac{2-(x-3)}{2(x-3)}<0$$

$$\Rightarrow \quad \frac{2-x+3}{2x-6}<0$$

$$\Rightarrow \quad \frac{-x+5}{2x-6}<0$$

$$\Rightarrow \quad -x+5<0$$
$$\Rightarrow \quad -x<-5$$
$$\Rightarrow \quad x>5 \qquad \ldots(ii)$$

Case II: when $|x|<0, \quad x<0$

$$\Rightarrow \quad \frac{1}{-x-3}-\frac{1}{2}<0$$
$$\Rightarrow \quad \frac{2-(-x-3)}{2(-x-3)}<0$$
$$\Rightarrow \quad 2+x+3<0$$
$$\Rightarrow \quad x+5<0$$
$$\Rightarrow \quad x<-5 \qquad \ldots(iii)$$

Combining (ii) and (iii) we get $(-\infty,-5) \cup (-3,3) \cup (5,\infty)$ as the solution set.

Linear Inequations Ex 15.3 Q6

We have,

$$\frac{|x+2|-x}{x} < 0$$

$$\frac{|x+2|-x}{x} - 2 < 0$$

$$\frac{|x+2|-x-2x}{x} < 0$$

$$\frac{|x+2|-3x}{x} < 0 \qquad \ldots(i)$$

Case I: when $|x+2| \geq 0$

$i.e,\ \ x \geq -2$

$$\Rightarrow \quad \frac{x+2-3x}{x} < 0$$

$$\Rightarrow \quad -2x+2 < 0$$

$$\Rightarrow \quad -2x < -2 \quad \text{and} \quad x > 0$$

$$\Rightarrow \quad x > 1 \quad \ldots(ii)$$

Case II: $|x+2| < 0$

$i.e,\ x < -2$

$$\Rightarrow \quad -(x+2) - 3x < 0$$

$$\Rightarrow \quad -x-2-3x < 0$$

$$\Rightarrow \quad -4x-2 < 0$$

$$\Rightarrow \quad -4x < 2$$

$$\Rightarrow \quad x > \frac{-1}{2} \ldots\ldots\ldots\ldots(iii)$$

and $\quad x < 0$

Combining (ii) and (iii) we get $(-\infty, 0) \cup (1, \infty)$ as the solution set.

********** END **********