Linear Inequalities

1. **Solve the following inequalities and show the graph of solution on number line :**

   (i) $5x + 3 > 6x - 7$

   (ii) $\frac{7-3x}{5} \leq \frac{x}{2} - 8$

   (iii) $\frac{x}{5} < \frac{3x-2}{4} - \frac{5x-3}{3}$

   (iv) $\frac{2x-3}{4} + 8 \geq \frac{4x}{3} + 2$

2. **Solve the following inequalities :**

   (i) $\frac{x-3}{x+5} > 0$ **(ii)** $\frac{x-2}{x-4} \leq 0$ **(iii)** $\frac{x-3}{x-5} < 3$ **(iv)** $\frac{x+3}{x+7} \geq 2$

3. **Solve the following inequations :**

   (i) $-8 \leq 5x - 3 < 7$ **(ii)** $7 \leq \frac{3x+11}{2} \leq 11$

   (iii) $4x + 3 \geq 2x + 17,\ 3x - 5 < -2$ **(iv)** $\frac{x-4}{7} < 3,\ \frac{2x+5}{-3} > 4$

4. **In drilling world's deepest hole, it was found that the temperature T in degree celsius, x km below the surface of earth was given by :**

   $$T = 30 + 25(x - 3), \quad 3 < x < 15.$$

   At what depth will the temperature be between $200^{\circ}C$ and $300^{\circ}C$.

5. **A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 8% .**

6. **Solve the following linear inequalities graphically :**

   (i) $2x - 7y + 9 \geq 0$.

   (ii) $x \geq 3$, $y \geq 2$.

   (iii) $2x + y \geq 6,\ 3x + 4y \leq 12$

   (iv) $3x + 2y \geq 24,\ 3x + y \leq 15,\ x \geq 4$

   (v) $x + y \leq 10,\ x + y \geq 4,\ x \leq 8,\ y \leq 8\ ,\ x \geq 0\ , y \geq 0$

   (vi) $x + y \leq 12,\ x + y \geq 4,\ x \leq 9\ , y \leq 9\ , x \geq 0\ , y \geq 0$

   (vii) $3x + 5y \leq 15\ , 5x + 3y \leq 15\ , x \geq 0\ \ , y \geq 0$

   (viii) $x + 2y \leq 10\ , 3x + 4y \leq 24\ , x \geq 0\ \ , y \geq 0$

   (ix) $x + y \geq 5\ , 5x + 7y \leq 35\ , x - y \geq 0\ , x \geq 0\ \ , y \geq 0$

   (x) $x + y \geq 6\ \ , 3x + 2y \leq 18\ \ , x - 2y \leq 0\ \ , x \geq 0\ \ , y \geq 0$

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