Solving Linear and Absolute Value Inequalities

Linear Inequalities

Step1: Remove parentheses by using the Distributive Property.
Step 2: Combine like terms.
Step 3: Isolate the variable.

1. Solve each inequality and graph the solution.

a) $-(a+1)-4a \le 2a-8$

$-a-1-4a \le 2a-8$

$-5a-1 \le 2a-8$

$-2a \quad -2a$

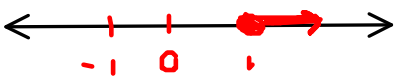
$-7a-1 \le -8$

$+1 \quad +1$

$-7a \le -7$

$-7 \quad -7$

$a \ge 1$



b) $-4 < 6 + \frac{2}{3}x < 8$

LCD = 3

$\frac{12}{3} < \frac{18}{3} + \frac{2x}{3} < \frac{24}{3}$

$12 < 18 + 2x < 24$

$-18 \quad -18 \quad -18$

$\frac{-6}{2} < \frac{2x}{2} < \frac{6}{2}$

$-3 < x < 3$

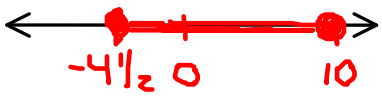
c) $-16 \le 4 - 2x \le 13$

$-4 \quad -4 \quad -4$

$\frac{-20}{-2} \le \frac{-2x}{-2} \le \frac{9}{-2}$

$10 \ge x \ge -4\frac{1}{2}$

$-4\frac{1}{2} \le x \le 10$



d) $3x - 1 < 2x + 4$ or $5x - 2 > 3x + 4$

$3x - 1 < 2x + 4$

$-2x \quad -2x$

$x - 1 < 4$

$+1 \quad +1$

$x < 5$

$5x - 2 > 3x + 4$

$-3x \quad -3x$

$2x - 2 > 4$

$+2 \quad +2$

$\frac{2x}{2} > \frac{6}{2}$

$x > 3$

Absolute Value Inequalities

Step 1: Isolate the absolute value.

Step 2: Set up two inequalities. One inequality is equal to the positive value and the other is equal to the negative value with the inequality symbol reversed.

Step 3: Solve both inequalities.

2. Solve each inequality and graph the solution.

a) $|3t-7| \geq 23$

$3t-7 \geq 23$

$+7 \quad +7$

$\frac{3t}{3} \geq \frac{30}{3}$

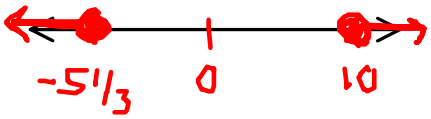
$t \geq 10$

$3t-7 \leq -23$

$+7 \quad +7$

$\frac{3t}{3} \leq \frac{-16}{3}$

$t \leq -5\frac{1}{3}$



$t \geq 10$ OR $t \leq -5\frac{1}{3}$

b) $|6x-1|-4<2$

$+4 \quad +4$

$|6x-1|<6$

$6x-1<6$

$+1 \quad +1$

$\frac{6x}{6} < \frac{7}{6}$

$x < \frac{7}{6}$

$6x-1>-6$

$+1 \quad +1$

$\frac{6x}{6} > \frac{-5}{6}$

$x > -5/6$

$-5/6 < x < 7/6$

c) $|3x-8|+11<6$

$-11 \quad -11$

$|3x-8|<-5$

NO SOLUTION