Linear Inequalities

Key Points:

- A linear inequality is similar to a linear equation , The only difference is that, instead of an equal sign (=), we have an inequality sign ($<, \leq, >, \geq$).

- Interval notation is a method to indicate the solution set to an inequality.

- The steps for solving a linear inequality are almost identical to that of solving a linear equation, except for one; multiplying and dividing by a negative number reverses an inequality.

Example: $\boldsymbol{2(x-5)>14}$

To solve, we first expand out the multiplication on the left-hand side:

$$2(x-5)>14 \rightarrow 2x-10>14$$

Then, we add 10 to both sides:

$$2x-10>14 \rightarrow 2x>24$$

Then, divide by 2 on both sides to yield the final answer:

$$2x>24 \rightarrow \boldsymbol{x>12}$$

In interval notation, our solution is $\boldsymbol{(12,\infty)}$.

Linear Inequality Video

Practice Exercises

Solve each equation for the given variable. Write your final answer in interval notation:

1. $5x - 8 \leq 12$
2. $-2x + 5 > x - 7$
3. $\frac{x-1}{3} + \frac{x+2}{5} \leq \frac{3}{5}$
4. $-4 < 3x + 2 \leq 18$

Answers:

1. $(-\infty, 4]$
2. $(-\infty, 4)$
3. $(-\infty, 1]$
4. $(-2, \frac{16}{3}]$