6.3: Solve Multi-Step Inequalities

Goals: *Solve Multi-Step Inequalities
*Identify when an inequality has no solution or any number can be a solution

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To Solve Multi-Step Inequalities: Same as solving a multi-step equation- follow reverse PEMDAS. Just need to remember that when you multiply or divide by a negative to solve, you would still reverse the inequality sign.

Ex: $3x - 7 < 8$

$+7 \quad +7$

$\frac{3x}{3} < \frac{15}{3}$

$x < 5$

Solve:

Ex: $2x - 5 \le 23$

$x \le 14$

Ex: $6y + 5 \ge 11$

$y \ge 1$

Ex: $-0.6(x - 5) \le 15$

$x \ge -20$

Ex: $-\frac{1}{4}(p - 12) > -2$

$p < 20$

Ex: $6x - 7 > 2x + 17$

$x > 6$

RECALL from Ch. 3

Solve each equation:

Ex: $4(2x + 3) = 2(4x + 5)$

$8x + 3 = 8x + 10$

$-8x \quad -8x$

$3 = 10$

No Solution

Ex: $3(4x + 6) = 2(6x + 9)$

$12x + 18 = 12x + 18$

$-12x \quad -12x$

$18 = 18$

Any Number

The same principle applies with inequalities:

This means that: if you get a true statement, then "<u>any number</u>" is the solution, if you get a false statement, then there is "<u>no solution</u>"

Solve:

Ex: $14x + 5 < 7(2x - 3)$

$14x + 5 < 14x - 21$

$-14x \quad -14x$

$5 < -21$

No Solution

Ex: $12x - 1 > 6(2x - 1)$

$12x - 1 > 12x - 6$

$-12x \quad -12x$

$-1 > -6$

Any Number

Ex: $5x - 12 \le 3x - 4$

$-3x \quad -3x$

$2x - 12 \le -4$

$+12 \quad +12$

$\frac{2x}{4} \le \frac{8}{4}$

$x \le 2$

Ex: $5(m + 5) < 5m + 17$

$5m + 25 < 5m + 17$

$-5m \quad -5m$

$25 < 17$

No Solution

Ex: $1-8s \le -4(2s-1)$

Any number

Ex: $-7x+2<-5$

$x > 1$

Ex: A gas station charges \$0.10 less per gallon if a customer purchases a car wash. What are the possible amounts of gallons of gasoline you can buy if you want to spend at most \$20?

$1.99x + 8 \le 20$

$x \le 6.03$

About 6 gallons or less

Ex: You are saving money for a summer camp that costs \$1800. You have \$500 saved so far and 14 more weeks to save. What are the possible average amounts you need to save per week to have the total needed for camp?

$500 + 14x \ge 1800$

$x \ge 92.86$

At least \$92.86 each week.