

B: Solving Single-step Inequalities

You solve all inequalities the same as equations ~~except~~ ^{with} an exception.

* If you multiply -or- divide by a negative value you must reverse the inequality sign !!!

Equation
e.g. $x - 9 \geq 24$
 +9 +9

$$x = 33$$

Inequality

$$x - 9 \geq 24$$

+9 +9

$$x \geq 33$$

* No sign "change"

$$x + 12 = -50$$

-12 -12

$$x = -62$$

$$x + 12 < -50$$

-12 -12

$$x < -62$$

* no sign change

$$2x - 5 > 85$$

+5 +5

$$\frac{2x}{2} > \frac{90}{2} \quad \text{* no change.}$$

$$x > 45$$

$$-5x + 3 \leq -72$$

-3 -3

$$\frac{-5x}{-5} \leq \frac{-75}{-5}$$

$$x \geq 15$$

Divide by -ive so sign "reverses"

$$\frac{2x}{-8} \leq \frac{10}{1}$$

$$2x \leq (-8)(10) \quad \text{* change sign}$$

b/c multiplying by -ive!

$$\frac{2x}{2} \leq \frac{-80}{2}$$

$$x \leq -40$$

Examples:

1. Solve the inequality.

$$a) \frac{12y}{12} \geq \frac{108}{12}$$

$$y \geq 9$$

$$b) \frac{-3.2x}{-3.2} < \frac{-20}{-3.2}$$

$$x > 6.25$$
 reverse sign
dividing by -ive!

2. Verify whether the specific solution is correct for each inequality.

$$a) x - 5 \leq 20 \quad x = 24$$
$$+5 \quad +5$$

$$x \leq 24 \quad * 24 < 25 \therefore \text{it is a solution.}$$

$$b) -\frac{2}{5}x \neq 6 \quad x = -20$$
$$\frac{+2}{-2}x \leq \frac{30}{-2}$$

$$x \geq -15 \quad -20 < -15 \therefore \text{it is not a solution!}$$

$$c) 2x + 20 > 28$$



$$x > 4 \quad \text{solution!}$$

$$2x + 20 > 28$$
$$-20 \quad -20$$

$$\frac{2}{2}x > \frac{8}{2} \quad x > 4$$

Solution is correct.

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