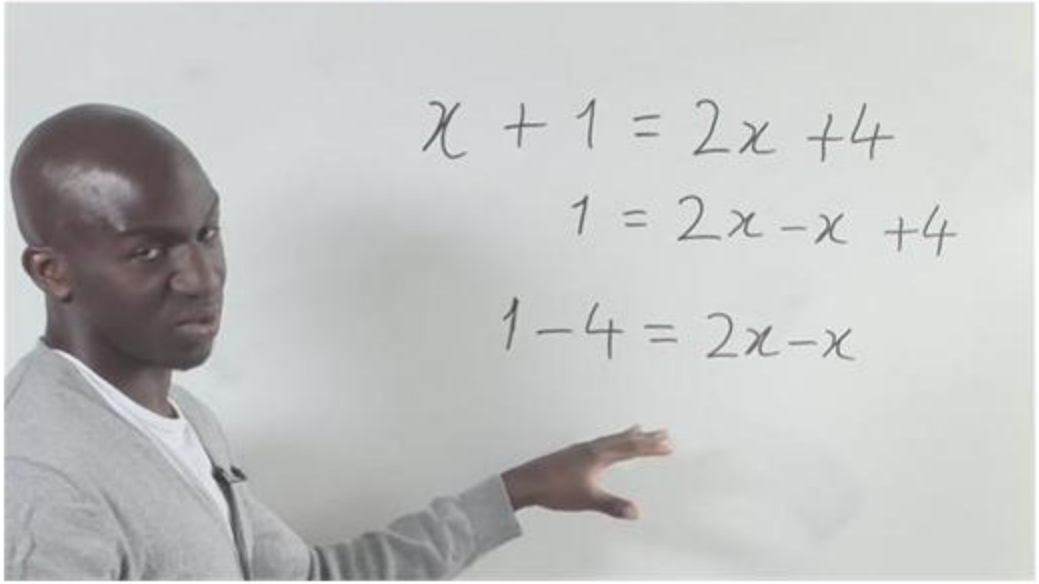
Solving Multi-Step Inequalities

(and inequalities on both sides)



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Reviewing Multi-Step Equations

$$17 = \frac{w}{5} + 13$$

$$5h + 2(11 - h) = -5$$

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Reviewing Multi-Step Equations

$$17 = \frac{w}{5} + 13$$

$w = 20$

$$5h + 2(11 - h) = -5$$

$h = -9$

Solving Multi-Step Inequalities

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The steps for solving two-step and multi-step equations can be applied to linear inequalities.

For inequalities, be sure to reverse the inequality symbol when multiplying or dividing by a negative number!!

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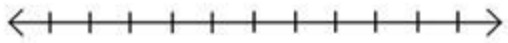
Example

$$3x - 7 < 8$$



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Example

$$3x - 7 < 8$$

$+7 \quad +7$

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

$x < 5$

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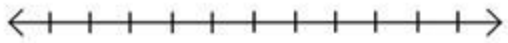
Example

$$-0.6(x - 5) \leq 15$$



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Example

$$-0.6(x - 5) \leq 15$$

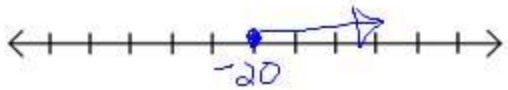
$-0.6x + 3 \leq 15$

$-3 \quad -3$

$\frac{-0.6x}{-0.6} \leq \frac{12}{-0.6}$

switch sign

$x \geq -20$



Solving Multi-Step Inequalities

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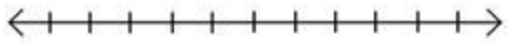
Try this one

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



Solving Multi-Step Inequalities

(and inequalities on both sides)

Try this one

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

$-2x \qquad -2x$

$$4x - 7 > 7$$

$+7 \qquad +7$

$$\frac{4x}{4} > \frac{24}{4}$$

$x > 6$

Solving Multi-Step Inequalities

(and inequalities on both sides)

Inequalities do not always have a solution.

An inequality can also be true for all real numbers.

$\mathbb{R}$

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$\mathbb{R}$

Example

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

When we solve this equation, we get a value that is not true. Therefore, there is no solution.

Solving Multi-Step Inequalities

(and inequalities on both sides)

Inequalities do not always have a solution.

An inequality can also be true for all real numbers. $\mathbb{R}$

Example

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

This equation is a true statement.

Therefore, it will be true for all values of x.

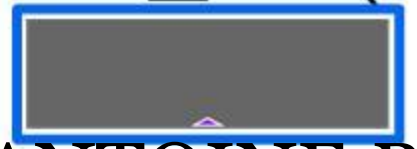
Solving Multi-Step Inequalities

(and inequalities on both sides)

Determine if these equations have solutions

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

$$1 - 8s \leq -4(2s - 1)$$



Solving Multi-Step Inequalities

(and inequalities on both sides)

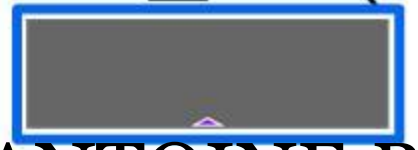
Determine if these equations have solutions

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

no solution

$$1 - 8s \leq -4(2s - 1)$$

$\mathbb{R}$



Solving Multi-Step Inequalities

(and inequalities on both sides)

A blank CD can hold 70 minutes of music. So far you have burned 25 minutes of music onto the CD. You estimate that each song lasts 4 minutes. What are the possible numbers of additional songs that you can burn onto the CD?

Solving Multi-Step Inequalities

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A blank CD can hold 70 minutes of music. So far you have burned 25 minutes of music onto the CD. You estimate that each song lasts 4 minutes. What are the possible numbers of additional songs that you can burn onto the CD?

$70 \geq 4s + 25$

$-25 \quad -25$

$\frac{45}{4} \geq \frac{4s}{4}$ $11.25 \geq s$

11 songs