

Solve the following inequalities and graph your solution.

1.) $-2(2 - 2x) - 4(x + 5) \leq -24$

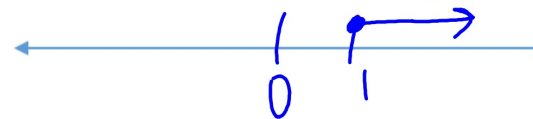
$$\begin{aligned} -4 + \cancel{4x} - \cancel{4x} - 20 &\leq -24 \\ -24 &\leq -24 \end{aligned}$$

\mathbb{R}



2.) $-5n + 6 \geq -7(5n - 6) - 6n$

$$\begin{aligned} -5n + 6 &\geq -35n + 42 - 6n \\ -5n + 6 &\geq -41n + 42 \\ 36n + 6 &\geq 42 \\ 36n &\geq 36 \\ n &\geq 1 \end{aligned}$$



Write an inequality to model each situation.

3.) An octopus can be up to 10 ft. long.

$$x \leq 10$$

4.) A hummingbird migrates more than 1850 miles.

$$m > 1850$$

5.) Your average in algebra class must be 94 or greater to receive an A.

$$\begin{aligned} 94 &\leq x \\ x &\geq 94 \end{aligned}$$

6.) You must read at least 25 pages for this weekend.

$$x \geq 25$$

Section 3.4:

Today's Objectives --

- I can solve multi-step inequalities with variables on one and/or both sides.
- I can graph inequalities and be able to identify solutions to inequalities.
- I can model situations by using inequalities.

The following steps **DON'T** affect the direction of the inequality:

- Adding the same number to both sides
- Subtracting the same number from both sides
- Multiplying both sides by the same positive number
- Dividing both sides by the same positive number

The following steps **DO** affect the direction of the inequality:

- Multiplying both sides by the same **negative** number
- Dividing both sides by the same **negative** number

When solving INEQUALITIES:

- Take all the same steps as if it were an EQUATION
- If you multiply or divide both sides by a **NEGATIVE** you must **FLIP** the inequality symbol.

Solve the following inequalities. Check your solution.

1.) $7b + 3 - 5b + 10 > 11 + 2(b + 4)$

$$\begin{aligned} 2b + 13 &> 11 + 2b + 8 \\ 2\cancel{b} + 13 &> 2\cancel{b} + 19 \\ 13 &> 19 \text{ False} \\ &\emptyset \end{aligned}$$

$$\begin{aligned} 2.) \left(\frac{4}{3}r - 3\right) &< \left(r + \frac{2}{3} - \frac{1}{3}r\right) \\ 4r - 9 &< 3r + 2 - 1r \\ 4r - 9 &< 2r + 2 \\ 2r - 9 &< 2 \\ 2r &< 11 \\ r &< 11/2; 5.5 \end{aligned}$$

3.) $3(3r + 1) - (r + 4) \leq 13$

$$\begin{aligned} 9r + 3 - r - 4 &\leq 13 \\ 8r - 1 &\leq 13 \\ 8r &\leq 14 \\ r &\leq 1.75; \frac{14}{8} \end{aligned}$$

$$\begin{aligned} 4.) \left(\frac{1}{2}n - \frac{1}{8}\right) &\geq \left(\frac{3}{4} + \frac{5}{6}n\right) \quad n \leq -2.625 \\ 12n - 3 &\geq 18 + 20n \\ -3 &\geq 18 + 8n \\ -21 &\geq 8n \\ -\frac{21}{8} &\geq n \quad -2.6252n \end{aligned}$$

Problem Solving using Inequalities:

- 1.) **Expenses** The sophomore class is planning a picnic. The cost of a permit to use a city park is \$250. To pay for the permit, there is a fee of \$.75 for each sophomore and \$1.25 for each guest who is not a sophomore. Two hundred sophomores plan to attend. Write and solve an inequality to find how many guests must attend for the sophomores to pay for the permit.

$S = \text{soph.}$
 $g = \text{guest}$

$$.75S + 1.25g \geq 250$$

$$.75(200) + 1.25g \geq 250$$

$$150 + 1.25g \geq 250$$

$$1.25g \geq 100$$

$$g \geq 80$$

- 2.) **Geometry**: The school band needs a banner to carry in a parade. The banner committee decides that the length of the banner should be 18 feet. What are the possible widths of the banner if they can use no more than 48 feet of trim?

$$P = 2l + 2w$$

$$2(18) + 2w \leq 48$$

$$36 + 2w \leq 48$$

$$2w \leq 12$$

$$w \leq 6$$

- 3.) To make a second banner, the committee decided to make the length 12 feet. They have 40 feet of a second type of trim. Write and solve an inequality to find the possible widths of the second trim.

$$2(12) + 2w \leq 40$$

$$24 + 2w \leq 40$$

$$2w \leq 16$$

$$w \leq 8$$

- 4.) On a trip from Virginia to Florida, the Simpson family wants to travel at least 420 miles in 8 hours of driving. What must be their average rate of speed?

$$d = r \cdot t$$

$$8r \geq 420$$

$$r \geq 52.5 \text{ mph}$$

Classwork -

Section 3.4

Pages: 155 - 156

Problems: 7, 9, 11, 47, 48, 49, 75, 76

IXL #8 - K.3 & K.4 due Friday at 6pm!