

2.2 and 2.3 Explain – Solving Inequalities - Notes

Essential Question: How do you solve an inequality?

Main Ideas/ Questions	Notes/Examples
<p>What You Will Learn</p>	<ul style="list-style-type: none"> To solve inequalities. To use inequalities to solve real-life problems
<p>What is an inequality?</p>	<p>Definition: a mathematical sentence that compares expressions and contains one of the following symbols</p> <p>< - is less than</p> <p>≤ - is less than or equal to</p> <p>> - is greater than</p> <p>≥ - is greater than or equal to</p>
<p>What is a solution of an Inequality?</p>	<p>Definition: a value that makes an inequality true; can have more than one solution</p> <p>List 2 solutions of the inequalities: 1. $x > 4$ 2. $y < -3$</p> <p>$x = \underline{5}$ $y = \underline{-4}$</p> <p>$x = \underline{6}$ $y = \underline{-5}$</p>
<p>Solving Inequalities</p>	<p>Steps to Solve Inequalities</p> <p>Step 1: Use the distributive property to remove any grouping symbols.</p> <p>Step 2: Simplify the expression on each side of the equation.</p> <p>Step 3: Collect the variables on one side of the equation and the constant terms on the other side.</p> <p>Step 4: Isolate the variable (add/subtract then multiply/divide).</p> <p>***When solving inequalities, you must reverse the inequality sign when multiplying or dividing by a negative.***</p> <p>Practice: Solve the inequality.</p> <div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>3. $\underline{6} - \underline{9} + u < -2$</p> <p>$-3 + u < -2$</p> <p>$+3 \quad +3$</p> <p>$u < 1$</p> </div> <div style="width: 45%;"> <p>4. $3(x + 2) \leq -12$</p> <p>$3x + 6 \leq -12$</p> <p>$-6 \quad -6$</p> <p>$3x \leq -18$</p> <p>$\frac{3}{3} \quad \frac{-18}{3}$</p> <p>$x \leq -6$</p> </div> </div> <p>5. $\frac{k}{-7} > 2$ (-2)</p> <p>$k < -14$</p> <p>6. $\frac{-14}{-7} > \frac{-7y}{-7}$</p> <p>$2 < y$ (or $y > 2$)</p> <p><i>FLIP SYMBOL (Multiplied by a negative)</i></p> <p><i>FLIP! Divided by a negative!</i></p> <p><i>Divided by a positive NO FLIP!</i></p>

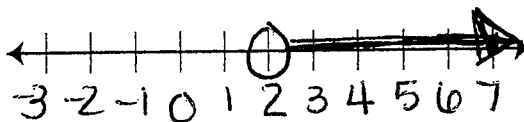
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(No FLIP!
divided by
a positive)

$$\begin{array}{r} 7. \quad 4b - 1 > 7 \\ \quad +1 \quad + \\ \hline 4b > 8 \\ \quad \quad \quad \div 4 \\ \hline b > 2 \end{array}$$

> greater,
so shade
to right
No equal,
so
open
circle!

8. 8th Grade Review: Graph the solution to #7 on a number line.



Write the sentence as an inequality. Then solve the inequality.

9. Six is less than or equal to the sum of a number and 15.

$$\begin{array}{r} 6 \leq x + 15 \\ -15 \quad -15 \\ \hline -9 \leq x \end{array} \quad (\text{or } x \geq -9)$$

10. Six is more than the difference of a number and 1.

$$\begin{array}{r} 6 > d - 1 \\ +1 \quad +1 \\ \hline 7 > d \end{array} \quad (\text{or } d < 7)$$

11. You bike for 2 hours at a speed no faster than 17.6 miles per hour.

(\leq)

a. Write and solve an inequality that represents the possible numbers of miles you bike.

$$\begin{array}{l} d \leq 17.6(2) \\ d \leq 35.2 \end{array}$$

Application

b. The bike portion of an Ironman competition is 112 miles. Your friend says that if you continue to bike at this pace, you will be able to complete the bike portion of the Ironman in less than 6.5 hours. Is your friend correct? Explain.

$$\begin{array}{r} 112 \leq 17.6x \\ \hline 17.6 \quad 17.6 \\ \hline 6.4 \leq x \end{array}$$

Yes, at the pace of 17.6 miles per hour it will take 6.4 hrs which is less than 6.5.

2.2 and 2.3

Assignment – Solving Inequalities

Video Notes: <https://www.youtube.com/watch?v=8qETOpesFok>

In Exercises 1–6, solve the inequality.

1. $3x \leq 9$

2. $-18 < 6t$

3. $\frac{b}{3} \geq -1$

In Exercises 4–6, solve the inequality.

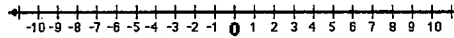
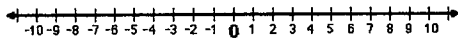
4. $-5j \leq 10$

5. $-4t \geq 4$

6. $\frac{h}{-1} < 7$

7. Graph the solution for #1.

8. Graph the solution to #4.



9. You have \$25 to buy 6 fishing lures. Write and solve an inequality that represents the prices you can pay per fishing lure.

10. Describe and correct the error in solving the inequality.

~~X~~ $5 < \frac{w}{-3}$

$-3 \cdot (5) > -3 \cdot \left(\frac{w}{-3}\right)$

$-15 > w$

The solution is

11. You have \$850 to buy new carpet for the game room. The dimensions of the game room are 20 feet by 12 feet.
- a. Write and solve an inequality that represents the costs per square foot that you can pay for the new carpet. Specify the units of measure in each step.
12. The base of a triangle with a height of 7 units is represented by the formula $b = \frac{2}{7}A$. The base of the triangle is less than 10 units. Write and solve an inequality that represents the possible area A of the triangle.

In Exercises 4–6, solve the inequality.

13. $7a - 5 < 9$

14. $3 - 2(x + 2) \geq 1$

15. $4n - 6 + 2n > -18$

16. Maxwell wants to spend no more than \$125 for flea shampoo for his pet grooming business. He needs to buy 30 bottles of shampoo and the shipping cost is a flat fee of \$24.95.

a) Write an inequality. _____

b) What's the most expensive shampoo he can buy from the choices below?

A \$2 per bottle

B \$3 per bottle

C \$4 per bottle

D \$5 per bottle

17. Are $x \leq \frac{2}{3}$ and $-3x \leq -2$ equivalent? Explain your reasoning.