

4.6 Taking Sides

A Practice Understanding Task



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Joaquin and Serena work together productively in their math class. They both contribute their thinking and when they disagree, they both give their reasons and decide together who is right. In their math class right now, they are working on inequalities. Recently they had a discussion that went something like this:

Joaquin: The problem says that "6 less than a number is greater than 4." I think that we should just follow the words and write: $6 - n > 4$.

Serena: I don't think that works because if n is 20 and you do 6 less than that you get $20 - 6 = 14$. I think we should write $n - 6 > 4$

Joaquin: Oh, you're right. Then it makes sense that the solution will be $n > 10$, which means we can choose any number greater than 10.

Below are a few more of the conversations that Joaquin and Serena had. Read through each one and decide which one is correct, which one is wrong and explain what you are thinking for each problem.

1. The inequality to graph is $x \geq -7$.

Joaquin thinks that the graph should have an open dot at -7.

Serena thinks that the graph should have a closed dot at -7.

Explain who is correct and why.

Serena is correct b/c equal to makes a closed dot.

2. The problem is $3x + 1 > 0$

Serena says the problem is always true because multiplying a number by 3 and then adding 1 to it makes it greater than 0.

$$x > -\frac{1}{3}$$

Is she right? Explain why or why not.

False b/c x can be a negative #, less than 0

3. The word problem is "4 greater than x ."

Joaquin says that they should write $4 > x$.

Serena says that they should write $4 + x$.

Explain who is correct and why.

Serena is correct b/c 4 greater means 4 more not 4 is greater than x

4. Joaquin has this amazing idea about inequalities and equations.

If $45 + 47 = t$, then $t = 45 + 47$

If $45 + 47 < t$, then $t < 45 + 47$

Is he right? Explain how you know

He is right in part 1 \rightarrow Reflexive Property

The inequality not correct b/c when you swap the t in the inequality you have to swap everything

5. Serena got to thinking about what Joaquin said in #4 and thought about similarities and differences. Serena wonders about this equation: $\frac{-x}{3} = 4$ and the inequality $\frac{-x}{3} > 4$.

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| <p>What are the similarities in solving these two?</p> <p>Multiply by 3 ^{1st}</p> <p>Then divide by -1</p> | <p>What are the differences in solving these two?</p> <p>You get 1 solution when you solve $\frac{-x}{3} = 4 \rightarrow x = -12$</p> <p>Inequality $\rightarrow \frac{-x}{3} > 4 \rightarrow x < -12$</p> <p>$\frac{-x}{3} < 4 \rightarrow x > -12$ tons of answers</p> |
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6.

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| <p>Joaquin solved $-15q \leq 135$ by adding 15 to both sides. Serena said that was wrong. Who is correct and why?</p> <p>Serena \rightarrow divide by -15</p> <p>$q \geq -9$</p> | <p>Joaquin's solution was $q \leq 150$. He checked his work by substituting 150 for q in the original inequality. Does this prove that Joaquin is right? Explain why or why not.</p> <p>$-15(150) \leq 135$</p> <p>$-2250 \leq 135$</p> <p>No, he needs to check #5 that 12 greater than or = to -9</p> | <p>Joaquin is still skeptical and believes he is right. Find a number that satisfies his solution but does not satisfy the original inequality.</p> <p>$-10, -11, -12, -13$</p> <p>all to negative ∞</p> |
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7. Serena is checking her work with Joaquin and finds that they disagree. Here is what Serena wrote:

$$3x + 3 \leq -2x + 5$$

$$3x \leq -2x + 2$$

$$x \leq 2$$

Is this right or wrong? How do you know? Fix it!

WRONG \rightarrow Add 2x rather than subtract it

$$\frac{5x}{5} \leq \frac{2}{5} \quad \boxed{x \leq \frac{2}{5}}$$

8. They are having problems solving the following inequality: $-4(3m - 1) \geq 2(m + 3)$. Show them how to do it correctly and list out all the properties you use. Divide

$$-12m + 4 \geq 2m + 6$$

~~-4~~ Distribute

$$-12m \geq 2m + 2$$

-4 Subtract

$$-14m \geq 2$$

Subtract

$$m \leq \frac{-1}{7}$$

9. Do the following have solutions? What are they? How would you graph them on a number line?

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| <p>$4s + 6 \geq 6 + 4s$</p> <p>All real #s</p> <p>plug any # \leftarrow 1 2 3</p> | <p>$3r + 5 > 3r - 2$</p> <p>-3r -3r</p> <p>$5 > -2$</p> <p>true bc 5 is greater than -2</p> | <p>$4(n + 1) < 4n - 3$</p> |
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10. The partners are given a literal inequality $ax + b > c$ to solve for x . Joaquin says it will solve just like an equation. Serena says that they need to be careful because if a is a negative number, then the solution will be different. What do you believe? Solve it.