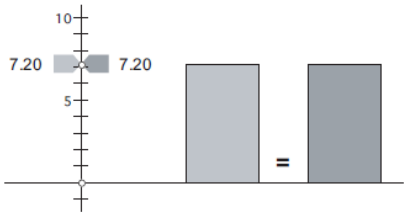
Properties of Inequality

A good general rule for equations is that if you do the same thing to both sides, they will always remain equal. This rule applies to addition, subtraction, multiplication, division, and any other operation. It would be very convenient if we could apply the same rule to inequalities. Before we jump to any conclusions, however, let's check to see how inequalities behave.

EQUALITY RULES

1. Open **Properties of Inequality.gsp.**

The two bars represent values on two sides of an equation. The numbers they represent are shown on the number line. On the left side are four buttons for the four elementary arithmetic operations.



2. Press the *Add* button. This adds 2.6 to both sides of the equation.

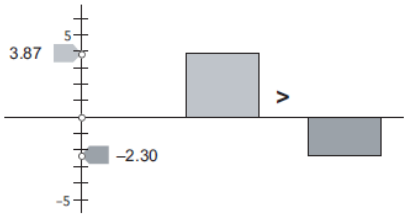
To change the parameters next to the buttons, select a number and press the + or − key, or double-click the number to type a new value.

3. Edit the value of the number next to the *Add* button. Change it to –3.8. Press the button again. This time, you are adding –3.8 to both sides.

Q1 Experiment with all four arithmetic buttons. Try at least one positive and one negative number with each of them. Using only these buttons, is it possible to make the heights of the bars different from each other? Explain.

INEQUALITY RULES

4. On the number line, drag the red marker so that it is higher than the blue marker. Notice the change in the symbol between the two bars. Now the red value is greater than the blue value.



Q2 Once again, use all four arithmetic buttons with positive and negative numbers. Which operations can you use without changing the inequality sign?

Q3 Which operations change the inequality sign? What is a general rule to follow in these cases?