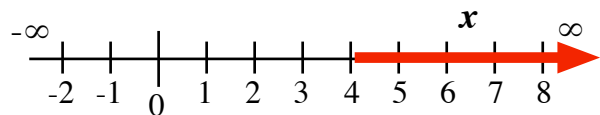**GRAPHING ON THE NUMBER LINE**

When an inequality contains a variable, such as $x > 4$, then the variable, x, represents all real numbers that make the inequality true. The collection of all of the solutions of an inequality is called the **solution set**.

For $x > 4$, the solution set is *all* real numbers to the right of 4, not just the integers.

> For example, if the price of a hat, x, is more than \$4.00, such as $x > 4.00$, we are not restricted to only dollar amounts, such as \$5.00 or \$6.00. We must consider prices that contain pennies as well, such as \$4.01, \$4.26, and \$5.33. In other words, we must consider all real numbers greater than 4.

To represent the solution set on the number line, we use a thick line extending to the right of 4.

The arrow on this thick line indicates that we consider all values to the right of 4, not just the ones we can see on the number line.

> **Note:** There is an x above the thick line to indicate that it covers possible values of x.

To indicate that 4 is not a possible value of x, we use an open circle at 4. This means that 4 is not in the solution set.
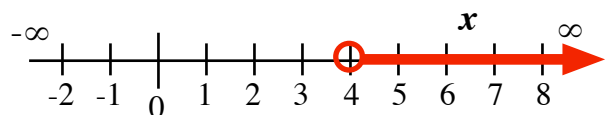

If we need to include 4 in the solution set for x, the inequality would have to allow for the variable to be equal to 4, namely $x \geq 4$.
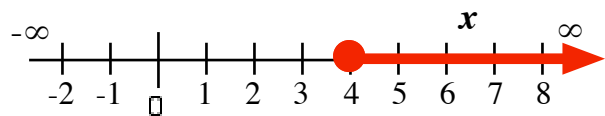
To show that 4 is included, we use a closed (solid) circle at 4.

To be able to graph inequalities more efficiently, we can abbreviate the number line and include only the most important features, namely the origin (0) and the starting number in the inequality.
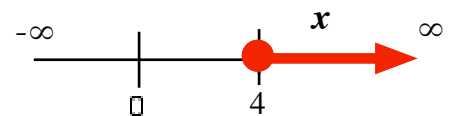
Abbreviating the number line this way allows us to represent inequalities with larger starting values.

The graphs for the other two inequality signs, $<$ and $\leq$, appear in a similar fashion but point the other direction.