

Grade 6 - Inequalities on the Number Line - Lesson

Common Core 6.EE.B.5, 6.EE.B.8 · maths-pdf.fr/en/

An inequality compares values, and its solutions are all the numbers that make it true. The inequality $x > 3$ has infinitely many solutions. To graph it, draw an open circle at 3 and shade to the right. Use a closed circle when the number is included, as in "at least" or "no more than."

Grade 6 · Common Core State Standards: **6.EE.B.5, 6.EE.B.8**

Key facts

- An inequality uses $<$, $>$, $\leq$, or $\geq$ and usually has infinitely many solutions.
- Open circle: the number is not included ($<$ or $>$).
- Closed circle: the number is included ($\leq$ or $\geq$).
- Shade right for greater values and left for lesser values.
- At least means $\geq$ and at most or no more than means $\leq$.

What is an inequality?

An **inequality** compares two values that may not be equal. Instead of an equals sign it uses $<$, $>$, $\leq$, or $\geq$. The inequality $x > 3$ says that x is any number greater than 3.

Solution of an inequality

A **solution** of an inequality is any value of the variable that makes it true. Many inequalities have **infinitely many solutions**. For $x > 3$, the numbers 3.1, 4, and 1,000 all work.

How do you graph an inequality?

1. Draw a number line and mark the number in the inequality.
2. Use an *open* circle for $<$ or $>$; use a *closed* circle for $\leq$ or $\geq$.
3. Shade the side with the solutions: right for greater, left for less.



$x > 3$: open circle at 3, shade right.



$x \leq 2$: closed circle at 2, shade left.

How do you write an inequality from words?

Look for key phrases. "More than" and "greater than" mean $>$. "At least" and "no less than" mean $\geq$. "Less than" means $<$. "At most" and "no more than" mean $\leq$.

Words	Symbol	Circle
less than	$<$	open
greater than	$>$	open
at most, no more than	$\leq$	closed
at least, no less than	$\geq$	closed

Choose the symbol and the circle from the words.

How do you use inequalities in real situations?

Inequalities describe limits and goals. A highway speed limit of 65 miles per hour gives $s \leq 65$. A child must be taller than 48 inches to ride, so $h > 48$. To test a value, substitute it. Is 48 a solution of $h > 48$? No, because $48 > 48$ is false.



Legal speeds: $s \leq 65$ miles per hour.

Here is a quick way to avoid mistakes. Pick a test number on the shaded side of your graph and substitute it into the inequality. If the statement is true, the shading is correct. Then test the number at the circle. If the inequality uses $\leq$ or $\geq$, the number at the circle makes the statement true, so the circle must be closed. If it uses $<$ or $>$, that number makes the

statement false, so the circle must be open.

Remember that an inequality like $x > 3$ is not a single answer. It describes a whole set of numbers, and the graph shows all of them at once.

Questions about inequalities on the number line

What is the difference between an equation and an inequality?

An equation says two quantities are equal and usually has one solution. An inequality compares quantities and usually has infinitely many solutions.

When do you use an open circle on a number line?

Use an open circle for $<$ or $>$, when the number itself is not a solution. Use a closed circle for $\leq$ or $\geq$.

What does at least mean in math?

At least means the number or anything greater, so it is written with $\geq$. For example, at least 8 points is $p \geq 8$.

How do you check whether a number is a solution?

Substitute the number into the inequality and see whether the statement is true. For $x + 3 > 9$ and $x = 6$, $9 > 9$ is false.

How many solutions does $x > 5$ have?

It has infinitely many solutions, because every number greater than 5, including decimals, makes it true.