

7.5 Writing and Graphing Inequalities

ESSENTIAL QUESTION: How can you use a number line to represent solutions of an inequality?

An inequality is a mathematical sentence that compares expressions. $w + 4 < 11$
It contains the symbols.

SYMBOL	$<$	$>$	\leq	\geq
KEY PHRASES	*Less than * fewer than	*Greater than *More than	*less than or equal to *Is at most * is no more than	*Greater than or equal to * is a least * is no less than

EXAMPLE 1 -> Writing Inequalities

Write the word sentence as an inequality.

1) A number c is less than -4 .

$$c < -4$$

2) A number k plus 5 is greater than or equal to 8.

$$k + 5 \geq 8$$

3) Four times a number q is at most 16.

$$4q \leq 16$$

ON YOUR OWN

Write the word sentence as an inequality.

1) A number n is greater than 1.

$$n > 1$$

2) Twice a number p is fewer than 7.

$$2p < 7$$

3) A number w minus 3 is less than or equal to 10. 4) A number z divided by 2 is at least -6 .

$$w - 3 \leq 10$$

$$\frac{z}{2} \geq -6$$

Solution of an inequality -> value that makes the inequality true.

Inequalities can have more than 1 solution.

Solutions of an inequality is called the solution set.

Value of x	$x + 3 \leq 7$	Is the inequality true?
3	$3 + 3 \stackrel{?}{\leq} 7$ $6 \leq 7 \checkmark$	yes
4	$4 + 3 \stackrel{?}{\leq} 7$ $7 \leq 7 \checkmark$	yes
5	$5 + 3 \stackrel{?}{\leq} 7$ $8 \not\leq 7 \times$	no

EXAMPLE 2->Checking Solutions

Tell whether the given value is a solution of the inequality.

1) $x + 1 > 7; x = 8$

$8 + 1 > 7$
 $9 > 7$
solution

2) $7y < 27; y = 4$

$7 \cdot 4 < 27$
 $28 < 27$
not a solution

3) $\frac{z}{3} \geq 5; z = 15$

$\frac{15}{3} \geq 5$
 $5 \geq 5$ solution

ON YOUR OWN

Tell whether the given value is a solution of the inequality.

1) $b + 4 < 6; b = 3$

$3 + 4 < 6$
 $7 < 6$
not a solution

2) $9 - n \geq 6; n = 3$

$9 - 3 \geq 6$
 $6 \geq 6$
solution

3) $18 \div x \leq 10; x = 3$

$18 \div 3 \leq 10$
 $6 \leq 10$
solution

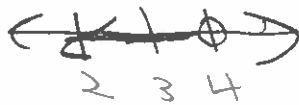
EXAMPLE 3->Graphing an Inequality

Graph the inequality.

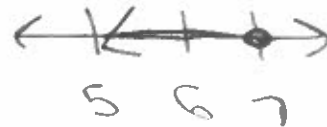
1) $g > 2$



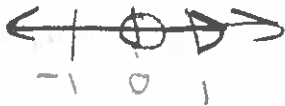
2) $a < 4$



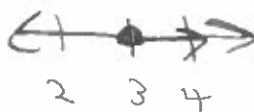
3) $f \leq 7$



4) $n > 0$



5) $p \geq 3$



The graph of an inequality shows all the solutions of the inequality on a number line.

An open circle is used when a number is not a solution. ($<$ or $>$)

A closed circle is used when a number is a solution. (\leq or \geq)

An arrow to the left or right shows that the graph continues in that direction.

EXAMPLE 4->Real Life Application

The NASA Solar Probe Plus can withstand temperatures up to an including ~~600~~²⁶⁰⁰ degrees F. Write and graph an inequality that represents the temperatures the probe can withstand.

$t \leq 2600$

