Indicator 25 Class Notes by Mrs. Joshi
Solutions to Inequalities on a Number Line-(AL Standard 20, 20a, 20b)

I can write and solve one-step inequalities that represent real-world or mathematical problems.
I can represent solutions of inequalities on a number line and interpret the solution in the context of the problem

An **inequality** is a mathematical sentence that compares expressions. It contains the symbols $<$, $>$, $\leq$, or $\geq$. To write an inequality, look for the following phrases to determine where to place the inequality symbol.

Inequality Symbols				
Symbol	$<$	$>$	$\leq$	$\geq$
Key Phrases	• is less than • is fewer than	• is greater than • is more than	• is less than or equal to • is at most • is no more than	• is greater than or equal to • is at least • is no less than

EXAMPLE 1 Writing Inequalities

Write each word sentence as an inequality.

a. A number c is less than -4.

A number c is less than -4.

c $<$ -4

An inequality is $c < -4$.

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

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

$k + 5$ $\geq$ 8

An inequality is $k + 5 \geq 8$.

c. Four times a number q is at most 16.

Four times a number q is at most 16.

$4q$ $\leq$ 16

An inequality is $4q \leq 16$.

Indicator 25 Class Notes by Mrs. Joshi

EXAMPLE 2 Checking Solutions

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

a. $x + 1 > 7;\ x = 8$

$x + 1 > 7$ Write the inequality.

$8 + 1 \stackrel{?}{>} 7$ Substitute 8 for x.

$9 > 7$ ✓ Add. 9 is greater than 7.

So, 8 is a solution of the inequality.

b. $7y < 27;\ y = 4$

$7y < 27$ Write the inequality.

$7(4) \stackrel{?}{<} 27$ Substitute 4 for y.

$28 \not< 27$ ✗ Multiply. 28 is *not* less than 27.

So, 4 is *not* a solution of the inequality.

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

$5 \geq \frac{z}{3}$ Write the inequality.

$5 \stackrel{?}{\geq} \frac{15}{3}$ Substitute 15 for z.

$5 \geq 5$ ✓ Divide. 5 is greater than or equal to 5.

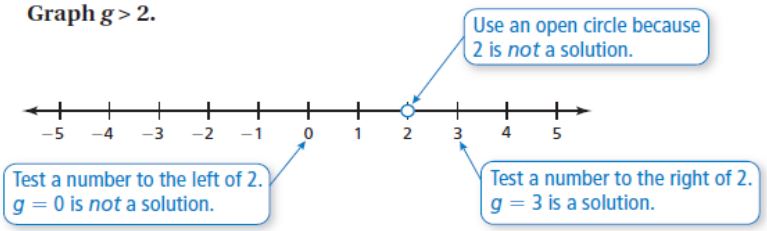
So, 15 is a solution of the inequality.

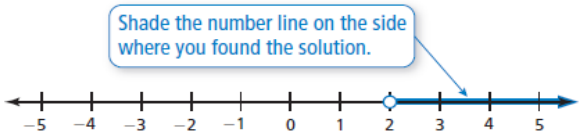
Indicator 25 Class Notes by Mrs. Joshi

The **graph of an inequality** shows all of the solutions of the inequality on a number line. An open circle ○ is used when a number is *not* a solution. A closed circle ● is used when a number is a solution. An arrow to the left or right shows that the graph continues in that direction.

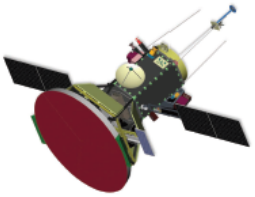
EXAMPLE 3 Graphing an Inequality

Graph $g > 2$.





EXAMPLE 4 Real-Life Application



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

Words temperatures | up to and including | 2600°F

Variable Let t be the temperatures the probe can withstand.

Inequality t | $\leq$ | 2600

∴ An inequality is $t \leq 2600$.