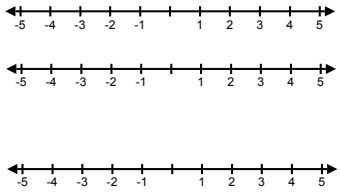
6.4 Solve ompound Inequalities

Objective: You will solve compound inequalities

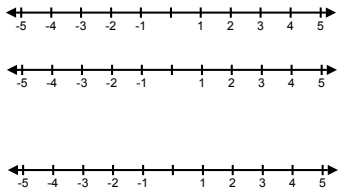
What is a Compound Inequality ?

A **compound inequality** consists of two separate inequalities joined by *and* or *or*.

$x < 3$ **AND** $x \geq -2$



$x < -3$ **OR** $x \geq 2$



Your Turn !

You Try: Skill #44

Translate the verbal phrase into an inequality. Then graph the inequality.

(a) All real numbers that are less than -1 *or* greater than or equal to 4

(b) All real numbers that are greater than or equal to -3 *and* less than 5

Don't forget to show your work and write down your answer !

Skill #44: Write and Graph Compound Inequality from a Verbal Description

EXAMPLE 1 Write and graph compound inequalities

Translate the verbal phrase into an inequality. Then graph the inequality.

a. All real numbers that are greater than -2 *and* less than 3

b. All real numbers that are less than 0 *or* greater than or equal to 2

Skill #45: Write and Graph a Real-World Compound Inequality

EXAMPLE 2 Write and graph a real-world compound inequality

CAMERA CARS A crane sits on top of a camera car and faces toward the front. The crane's maximum height and minimum height above the ground are shown. Write and graph a compound inequality that describes the possible heights of the crane.

Your Turn !

You Try: Skill #45

INVESTING An investor buys shares of a stock and will sell them if the change c in value from the purchase price of a share is less than $-\$3.00$ or greater than $\$4.50$. Write and graph a compound inequality that describes the changes in value for which the shares will be sold.

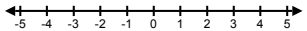
Don't forget to show your work and write down your answer !

Your Turn !

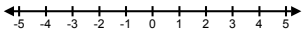
You Try: Skill #46

Solve the inequality. Graph your solution.

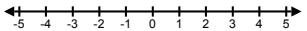
(a) $-7 < x - 5 < 4$



(b) $10 \le 2y + 4 \le 24$



(c) $-7 < -z - 1 < 3$

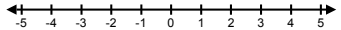


Don't forget to show your work and write down your answer !

Skill #46: Solve a Compound Inequality with AND by Separation.

EXAMPLE 3 **Solve a compound inequality with *and***

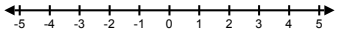
Solve $2 < x + 5 < 9$. Graph your solution.



Skill #47: Solve a Compound Inequality with AND without Separation

EXAMPLE 4 **Solve a compound inequality with *and***

Solve $-5 \le -x - 3 \le 2$. Graph your solution.

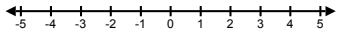


Your Turn !

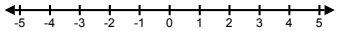
Skill #47

Solve the inequality. Graph your solution.

(a) $-14 < x - 8 < -1$



(b) $-1 \le -5t + 2 \le 4$

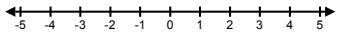


Don't forget to show your work and write down your answer !

Skill #48: Solve a Compound Inequality with OR

EXAMPLE 5 **Solve a compound inequality with *or***

Solve $2x + 3 < 9$ *or* $3x - 6 > 12$. Graph your solution.

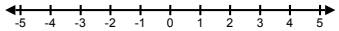


Your Turn !

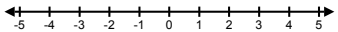
You Try: Skill #48

Solve the inequality. Graph your solution.

(a) $3h + 1 < -5$ *or* $2h - 5 > 7$



(b) $4c + 1 \le -3$ *or* $5c - 3 > 17$

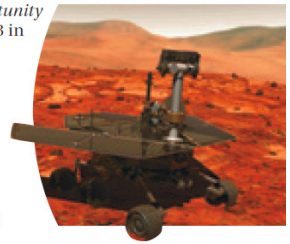


Don't forget to show your work and write down your answer !

Skill #49: Solve a multi-Step Problem

EXAMPLE 6 **Solve a multi-step problem**

ASTRONOMY The Mars Exploration Rovers *Opportunity* and *Spirit* are robots that were sent to Mars in 2003 in order to gather geological data about the planet. The temperature at the landing sites of the robots can range from −100°C to 0°C.



- Write a compound inequality that describes the possible temperatures (in degrees Fahrenheit) at a landing site.
- Solve the inequality. Then graph your solution.
- Identify three possible temperatures (in degrees Fahrenheit) at a landing site.

Your Turn !

You Try: Skill #49

$$C = \frac{5}{9}(F - 32)$$

MARS Mars has a maximum temperature of −7°C at the equator and a minimum temperature of −133°C at the winter pole.

- Write and solve a compound inequality that describes the possible temperatures (in degrees Fahrenheit) on Mars.
- Graph your solution. Then identify three possible temperatures (in degrees Fahrenheit) on Mars.

Don't forget to show your work and write down your answer !