

# Algebra I

## Notes Section 54

### Solve Multi-Step Inequalities

#### Big Ideas

1. How to solve compound inequalities.
2. How to graph compound inequalities.
3. How to differentiate between an intersection or a union.

#### VOCABULARY

**Compound Inequality:** \_\_\_\_\_

**Intersection:** \_\_\_\_\_

**Union:** \_\_\_\_\_

**EXAMPLE 1** Translate the verbal phrase into an inequality. Then graph the inequality.

- a) All real numbers that are greater than  $-2$  and less than  $3$

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- b) All real numbers that are less than  $0$  or greater than or equal to  $2$

\_\_\_\_\_ 

- c) All real numbers that are greater than or equal to  $-3$  and less than  $5$

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**EXAMPLE 2** 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.



**EXAMPLE 3** Solve and graph your solution.

a)  $2 < x + 5 < 9$

b)  $10 \leq 2y + 4 \leq 24$

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



**EXAMPLE 4** Solve and graph your solution.

a)  $2x + 3 < 9$  or  $3x - 6 > 12$

b)  $4c + 1 \leq -3$  or  $5c - 3 > 17$



**EXAMPLE 5** 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  $-100^{\circ}\text{C}$  to  $0^{\circ}\text{C}$ .

a) Write a compound inequality that describes the possible temperatures (in degrees F) at a landing site.

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b) Solve the inequality.

c) Identify 3 possible temperatures.

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