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6.4: Solve Compound Inequalities

Goals: *Translate the verbal phrase into an inequality and graph
*Solve a compound inequality with "*and*"
*Solve a compound inequality with "*or*"

Compound inequalities:

The graph of a compound inequality with "*and*" is the _____ of the graphs of the inequalities.

The graph of a compound inequality with "*or*" is the _____ of the graphs of the inequalities.

Ex: $x > -2$

$x \leq 1$

$-2 < x$ *and* $x \leq 1 \rightarrow -2 < x \leq 1$

Ex: $x \geq 0$

$x < -1$

$x < -1$ *or* $x \geq 0$

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Translate the verbal phrase into an inequality, then graph the inequality.

Ex: All real numbers that are greater than -2 *and* less than 3

Ex: All real numbers that are less than 0 *or* greater than or equal to 2

Ex: All real numbers that are less than -1 *or* greater than or equal to 4

Ex: All real numbers that are greater than or equal to -3 *and* less than 5

Ex: All real numbers that are greater than or equal to -4 *and* less than 4

Ex: All real numbers that are less than -1 *or* greater than 2

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Ex: A crane sits on top of a camera car and faces toward the front. The crane's maximum height is 18 feet and the minimum height is 4 feet. Write and graph a compound inequality that describes the possible heights of the crane.

Ex: At an auction, the lowest bid for an autographed trading card is $20. The highest bid is $54. Write and graph a compound inequality that describes the possible bids.

***SOLVE* a compound inequality with "*AND*":**

Ex: Solve $2 < x + 5 < 9$ and graph your solution. (Hint: Separate into two separate inequalities)

Solve the compound inequalities below:

Ex: $-1 < x + 1 \leq 7$

Ex: $-7 < x - 5 < 4$

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Ex: $10 \leq 2y + 4 \leq 24$

Ex: $-14 < x - 8 < -1$

Ex: $-7 < -z - 1 < 3$

Ex: $-5 \leq -x - 3 \leq 2$

Ex: $1 < -2x + 3 < 19$

Ex: $-1 \leq -5t + 2 \leq 4$

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Ex: An investor buys shares of 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.

***SOLVE* a compound inequality with "*OR*":**

Ex: $2x + 3 < 9$ ***or*** $3x - 6 > 12$

Ex: $3x - 2 \leq -11$ ***or*** $2x + 8 > 16$

Ex: $3h + 1 < -5$ ***or*** $2h - 5 > 7$

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Ex: $4c + 1 \leq -3$ ***or*** $5c - 3 > 17$

Ex: The Mars Exploration Rovers *Opportunity* and *Spirit* are robots that were sent to Mars in 2003 in order to gather geographical data about the planet. The temperature at the landing sites of the robots can range from $-100\,^\circ$ C or 0° C.

a) Write a compound inequality that describes the possible temperatures (in degrees Fahrenheit) at a landing site. (Hint: Use the formula $C = \frac{5}{9}(F - 32)$)

b) Solve the inequality and graph your solution.

c) Identify three possible temperatures (in degrees Fahrenheit) at a landing site.