NAME

Module 5   Solving Linear Inequalities of
                One Variable
Lesson 5   Solving Conjunction Inequalities

independent practice

Solve and graph.

1. $x > -4$ and $x < 3$ $\underline{\ \textbf{-4 < x < 3}\ }$

2. $x \geq -4$ and $x > 0$ $\underline{\ \textbf{x > 0}\ }$

3. $x \leq 5$ and $x \geq 8$ $\underline{\ \varnothing\ }$

4. $x \geq 3$ and $x \geq 7$ $\underline{\ \textbf{x ≥ 7}\ }$

5. $x \geq 0$ and $x \leq -5$ $\underline{\ \varnothing\ }$

6. $x > -1$ and $x < 5$ $\underline{\ \textbf{-1 < x < 5}\ }$

7. $x > 4$ and $x < 2$ $\underline{\ \varnothing\ }$

8. $x \geq 2$ and $x < 4$ $\underline{\ \textbf{2 ≤ x < 4}\ }$

9. $x \geq 2$ and $x > 5$ $\underline{\ \textbf{x > 5}\ }$

10. $x < 3$ and $x < 0$ $\underline{\ \textbf{x < 0}\ }$
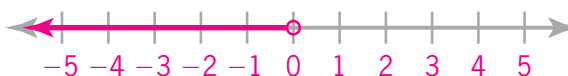
11. $x - 4 < 4$ and $x + 3 < 5$ $\underline{\ \textbf{x < 2}\ }$

12. $x + 3 < 5$ and $x - 4 > -8$ $\underline{\ \textbf{-4 < x < 2}\ }$

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13. $3x > 15$ and $-2x \le -12$ **x ≥ 6**

$$\begin{array}{ccccccccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \end{array}$$

14. $-\frac{1}{3}x > 1$ and $2x > -18$ **−9 < x < −3**

$$\begin{array}{ccccccccccc} -10 & -9 & -8 & -7 & -6 & -5 & -4 & -3 & -2 & -1 & 0 \end{array}$$

15. $2x - 1 < 7$ and $3x + 4 > 13$ **3 < x < 4**

$$\begin{array}{ccccccccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \end{array}$$

16. $-2x + 2 < 12$ and $4 - x > 5$ **−5 < x < −1**

$$\begin{array}{ccccccccccc} -8 & -7 & -6 & -5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 \end{array}$$

17. $0 < x + 4 \le 6$ **−4 < x ≤ 2**

$$\begin{array}{ccccccccccc} -5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & 5 \end{array}$$

18. $-10 \le x - 5 \le -6$ **−5 ≤ x ≤ −1**

$$\begin{array}{ccccccccccc} -7 & -6 & -5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array}$$

19. $-5 \le 2x + 3 < 7$ **−4 ≤ x < 2**

$$\begin{array}{ccccccccccc} -7 & -6 & -5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 \end{array}$$

20. $-8 < -\frac{1}{2}x - 6 < -4$ **4 > x > −4 or −4 < x < 4**

$$\begin{array}{ccccccccccc} -5 & -4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 & 5 \end{array}$$

Journal

1. What do you think is the difference between the following conjunctions:

        $x < 0$ **and** $x > 5$ $x < 0$ **or** $x > 5$

Explain the difference between the words "and" and "or." Which word is more restrictive? How do you think the solutions to the conjunctions above are different?

2. A student wrote the conjunction $0 < x > 5$. Explain how the student's notation should be simplified.

3. A student wrote the conjunction $5 < x < 2$. Explain why the student's statement is incorrect.

4. Explain how to use a graph to find the solution to a conjunction. How can you tell when a conjunction has no solution?

5. In the opening scene, Newt was not allowed into Club Roxy because he did not satisfy both requirements for admission, which are analogous to the inequalities of a conjunction. Think of a real-life situation that you can compare to a conjunction (i.e., a situation in which both of two requirements must be met).

Cumulative Review

Solve.

1. $6x + 2 = x + 17$ **x = 3**

2. $x - 2 = -3x + 6$ **x = 2**

3. $10x - 3 = 3x - 1$ **x = $\frac{2}{7}$**

4. $2(x + 1) - 23 = -5x$ **x = 3**

5. $3x - 4 = 2(2x - 3) + 8$ **x = –6**

6. $3x - 14 = 2(x - 1) + x$ **∅**

7. In a triangle with a perimeter of 34 m, the first side is 3 m shorter than the second. The third side is 4 m longer than the second. Find the length of the longest side.

The longest side is 15 m long.

8. In an isosceles triangle, each base angle has half the measure of the vertex angle. Find the measure of each base angle.

Each base angle measures 45°.

9. How many pounds of coffee costing $2.25 per pound should be mixed with 6 lb of coffee costing $3.50 per pound to make a mixture that costs $3.00 per pound?

4 pounds of the $2.25 per pound coffee are needed.

10. A family drove to a reunion at an average speed of 50 mph. They returned over the same road at an average speed of 40 mph. If the total drive time was 9 hours, find the distance to the reunion.

The reunion was 200 miles away.

Possible Journal Answers

1. The difference is the word that joins the two inequalities. The word "and" is more restrictive, since both inequalities must be satisfied in order for it to be true. If the word "or" joins the inequalities, only one inequality must be true in order for the compound inequality to be true.

2. The statement $0 < x > 5$ represents the conjunction $x > 0$ and $x > 5$. The solution to this conjunction is $x > 5$. The solution should be written as $x > 5$.

3. The statement $5 < x < 2$ represents the conjunction $x > 5$ and $x < 2$. There is no number which satisfies both inequalities so $5 < x < 2$ is an incorrect statement. The statement $5 < x < 2$ implies that $5 < 2$ by the transitive property of inequality which is a false statement.

4. To use a graph to find the solution to a conjunction, solve each inequality for x. Next, graph the solutions on the same number line. The solution to the conjunction can be found by identifying the portion of the number line in which both graphs lie. If the graphs do not intersect, the conjunction has no solution.

5. To ride a certain ride at an amusement park, riders must be at least 10 years old and at least 55 inches tall.