

Lesson 16: Solving and Graphing Inequalities Joined by “And” or “Or”

Classwork

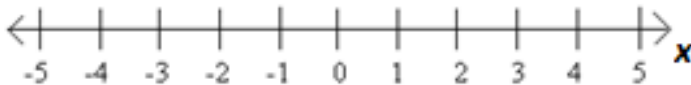
Exercise 1

- Solve $w^2 = 121$, for w . Graph the solution on a number line.
- Solve $w^2 < 121$, for w . Graph the solution on a number line, and write the solution set as a compound inequality.
- Solve $w^2 \geq 121$, for w . Graph the solution on a number line, and write the solution set as a compound inequality.
- Quickly solve $(x + 7)^2 = 121$, for x . Graph the solution on a number line.
- Use your work from part (d) to quickly graph the solution on a number line to each inequality below.
 - $(x + 7)^2 < 121$
 - $(x + 7)^2 \geq 121$

Exercise 2

Consider the compound inequality $-5 < x < 4$.

- Rewrite the inequality as a compound statement of inequality.
- Write a sentence describing the possible values of x .
- Graph the solution set on the number line below.

**Exercise 3**

Consider the compound inequality $-5 < 2x + 1 < 4$.

- Rewrite the inequality as a compound statement of inequality.
- Solve each inequality for x . Then, write the solution to the compound inequality.
- Write a sentence describing the possible values of x .
- Graph the solution set on the number line below.



Exercise 4

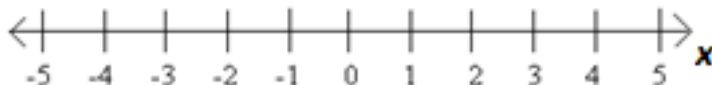
Given $x < -3$ or $x > -1$:

- What must be true in order for the compound inequality to be a true statement?
- Write a sentence describing the possible values of x .
- Graph the solution set on the number line below.

**Exercise 5**

Given $x + 4 < 6$ or $x - 1 > 3$:

- Solve each inequality for x . Then, write the solution to the compound inequality.
- Write a sentence describing the possible values of x .
- Graph the solution set on the number line below.



Exercise 6

Solve each compound inequality for x , and graph the solution on a number line.

a. $x + 6 < 8$ and $x - 1 > -1$

b. $-1 \leq 3 - 2x \leq 10$

c. $5x + 1 < 0$ or $8 \leq x - 5$

d. $10 > 3x - 2$ or $x = 4$

e. $x - 2 < 4$ or $x - 2 > 4$

f. $x - 2 \leq 4$ and $x - 2 \geq 4$

Exercise 7

Solve each compound inequality for x , and graph the solution on a number line. Pay careful attention to the inequality symbols and the “and” or “or” statements as you work.

a. $1 + x > -4$ or $3x - 6 > -12$

b. $1 + x > -4$ or $3x - 6 < -12$

c. $1 + x > 4$ and $3x - 6 < -12$

Problem Set

Solve each inequality for x , and graph the solution on a number line.

1. $x - 2 < 6$ or $\frac{x}{3} > 4$

2. $-6 < \frac{x+1}{4} < 3$

3. $5x \leq 21 + 2x$ or $3(x + 1) \geq 24$

4. $5x + 2 \geq 27$ and $3x - 1 < 29$

5. $0 \leq 4x - 3 \leq 11$

6. $2x > 8$ or $-2x < 4$

7. $8 \geq -2(x - 9) \geq -8$

8. $4x + 8 > 2x - 10$ or $\frac{1}{3}x - 3 < 2$

9. $7 - 3x < 16$ and $x + 12 < -8$

10. If the inequalities in Problem 8 were joined by “and” instead of “or,” what would the solution set become?

11. If the inequalities in Problem 9 were joined by “or” instead of “and,” what would the solution set become?