Vocabulary

● Review

1. Write **I** if the math sentence is an *inequality*. Write **E** if it is an *equation*.

_____ $15 > -12$ _____ $18 \leq 35$ _____ $5x = 15$ _____ $9 > 3x$

2. Write the *inequality* symbol that matches each description.

greater than ▢ less than or equal to ▢ greater than or equal to ▢

● Vocabulary Builder

compound (noun or adjective) ᴋᴀʜᴍ **pownd**

Main Idea: A **compound** (noun) is a whole formed by a union of two or more parts. A **compound** inequality (adjective) consists of two distinct inequalities joined by the word *and* or the word *or*.

Example: You read $3 < x < 6$ as "x is less than 6 *and* greater than 3."

● Use Your Vocabulary

3. Cross out each inequality that is NOT a *compound inequality*.

$-2 > x$ or $x > 3$ $\qquad$ $x \geq 0$ $\qquad$ $5 < x \leq 10$ $\qquad$ $9 < x$

4. Draw a line from each description in Column A to the inequality it describes in Column B.

Column A	Column B
all numbers less than 9 or greater than 5	$x < 5$ or $x > 9$
all numbers less than 9 and greater than 5	$x < 9$ or $x > 5$
all numbers less than 5 and greater than 9	$x < 5$ and $x > 9$
all number less than 5 or greater than 9	$5 < x < 9$

5. **Reasoning** Which inequality in Exercise 4 describes an empty set? Explain.

_____

_____

Problem 1 Writing a Compound Inequality

Got It? Write a compound inequality to represent the phrase below. Graph the solutions.

> **all real numbers that are greater than or equal to −4 and less than 6**

6. Write the phrase as two phrases.

all real numbers that are   and   all real numbers that are

7. Write an inequality to represent each statement from Exercise 6. Then write a compound inequality.

x ☐ ☐ x ☐ ☐

x ☐ ☐ and x ☐ ☐

8. Circle the graph of the compound inequality.

A solution of a compound inequality involving *and* is any number that makes *both* inequalities true.

Problem 2 Solving a Compound Inequality Involving *And*

**Got It?** What are the solutions of $-2 < 3y - 4 < 14$? Graph the solutions.

9. Use the justifications at the right to solve the compound inequality.

☐ $< 3y - 4$ and ☐ < 14		Write two inequalities joined by *and*.
☐ $+$ ☐ $< 3y - 4 +$ ☐ and ☐ $+$ ☐ $< 14 +$ ☐		Addition Property of Inequality
☐ $< 3y$ and ☐ < 18		Add.
$\dfrac{☐}{☐} < \dfrac{☐}{☐}$ and $\dfrac{☐}{☐} < \dfrac{18}{☐}$		Division Property of Inequality
$\dfrac{☐}{☐} < y$ and ☐ $<$ ☐		Simplify.
☐ $< y <$ ☐		Write the solutions as a single inequality.

10. Underline the correct symbol(s) and words to complete the sentence.

Because the compound inequality includes $<\ /\ >\ /\ \ge\ /\ \le$, the graph of the compound

inequality will include closed dots / open dots / one closed and one open dot .

11. Graph the compound inequality on the number line at the right.

Lesson 3-6
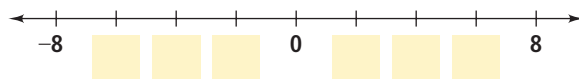
Got It? Reasoning To earn a B in your algebra class, you must achieve an unrounded test average between 84 and 86, inclusive. You scored 78, 78, and 79 on the first three (out of four) tests. Is it possible for you to earn a B in the course? Assume that 100 is the maximum grade you can earn on the test. Explain.

12. Let $x =$ the score of the fourth test. Write a compound inequality.

$$\boxed{} \le \frac{78 + 78 + 79 + x}{4} \le \boxed{}$$

13. Now solve the compound inequality.

14. Is it possible for you to earn a B in the course? Explain.

_____

_____

_____

A solution of a compound inequality involving *or* is any number that makes *either* inequality true.

✓ **Problem 4** **Solving a Compound Inequality Involving *Or***

Got It? What are the solutions of $-2y + 7 < 1$ or $4y + 3 \le -5$? Graph the solutions.

15. Complete the steps to solve the inequalities.

$$-2y + 7 < 1 \qquad \text{or} \qquad 4y + 3 \le -5$$

$$-2y + 7 - \boxed{} < 1 - \boxed{} \qquad \text{or} \qquad 4y + 3 - \boxed{} \le -5 - \boxed{}$$

$$-2y < \boxed{} \qquad \text{or} \qquad 4y \le \boxed{}$$

$$\frac{-2y}{\boxed{}} > \frac{\boxed{}}{\boxed{}} \qquad \text{or} \qquad \frac{4y}{\boxed{}} \le \frac{\boxed{}}{\boxed{}}$$

$$y \boxed{}\boxed{} \qquad \text{or} \qquad y \boxed{}\boxed{}$$

16. Graph the compound inequality on the number line below.
(*Hint:* Will you use open dots, closed dots, or one of each?)

```
←——+——+——+——+——+——+——+——+——→
   -8              0              8
```

You can use an inequality to describe an *interval* along the number line. In *interval notation*, you use three special symbols.

brackets	**parentheses**	**infinity**
Use [or] with ≤ or ≥ to indicate that the interval's endpoints are included.	Use (or) with < or > to indicate that the interval's endpoints are *not* included.	Use ∞ when the interval continues forever in a *positive* direction. Use −∞ when the interval continues forever in a *negative* direction.

Problem 5 Using Interval Notation

Got It? **What is the graph of $(-2, 7]$? How do you write $(-2, 7]$ as an inequality?**

Underline the correct word or words to complete each sentence.

17. In $(-2, 7]$, the parenthesis to the left of -2 means -2 is / is not included in the interval.

18. In $(-2, 7]$, the bracket to the right of 7 means 7 is / is not included in the interval.

19. Use your answers to Exercises 17 and 18 to write a compound inequality.

☐ ☐ x ☐ ☐

20. Graph the inequality.

Lesson Check • Do you UNDERSTAND?

Error Analysis A student writes the inequality $x \geq 17$ in interval notation as $[17, \infty]$. **Explain why this is incorrect.**

21. Circle the correct interval notation for the inequality $x \geq 17$.

$(17, \infty)$	$(17, \infty]$	$[17, \infty)$	$(-\infty, 17]$ or $[17, \infty)$

22. Explain the student's error.

_____

Math Success

Check off the vocabulary words that you understand.

☐ compound inequality   ☐ inclusive   ☐ interval   ☐ interval notation

Rate how well you can *write and graph compound inequalities.*

Need to review 0 2 4 6 8 10 Now I get it!

Lesson 3-6