Name: _____   Date: _____

Chapter 9 Math Link Introduction

This worksheet will help you with the Math Link introduction on page 5.

1. Using the term *less than or equal to*,
   a) verbally describe the restriction on the number of people in each gondola
   b) verbally describe the restriction on the total number of people that the Ferris wheel could carry

2. a) Research a modern Ferris wheel.
   • State a fact about its design.
   • State a fact about its capacity.
   b) Describe a restriction on a modern Ferris wheel using a term such as *greater than or equal to* or *less than or equal to*.
   Example: The capacity of the ride is less than or equal to the number of seats in all of the gondolas.

3. Think about other amusement park rides you may have seen.
   a) What reasons might designers have for restricting the number of people on a ride at one time? Give two reasons.
   b) What other types of restrictions might designers put in place? List two types.
   c) Describe a restriction verbally and algebraically.
   Example:
   Verbally: A ride has a sign that shows all riders must be greater than 150 cm tall.
   Algebraically: $h > 150$ cm, where h is the height of the rider

Get Ready

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Use Symbols to Describe Relationships

Mathematicians use symbols for operations and to show relationships between quantities. For example,

× represents multiplication   > represents is greater than
÷ represents division   = represents is equal to
< represents is less than   ≠ represents is *not* equal to

1. Translate each word statement into symbols.

   a) 5 is greater than 2.

   b) 7 is less than 20.

   c) 5 multiplied by 3.

   d) 9 is equal to $\dfrac{18}{2}$.

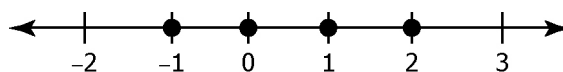**2.** Write each mathematical statement in words.

   a) 4 < 8

   b) 8 > 2
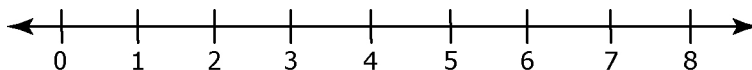
   c) 14 ÷ 2

   d) $4 \neq \dfrac{8}{3}$

Use *Between*

Between can be used to describe a physical relationship or location, such as "Paul is *between* Sue and Shasta in line." Similarly *between* can be used in mathematics. For example, "What are all of the integers *between* −2 and 3?" The answer is −1, 0, 1, and 2. Note that *between* does not include −2 and 3.

3. List all of the whole numbers satisfying the following. Use the number line to help you.
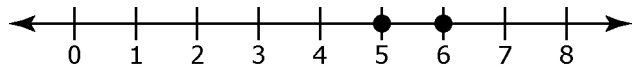
   a) between 6 and 3   **b)** between −2 and 2

   c) between 4.6 and 7.1   **d)** less than 4

Use Inequality Symbols

An inequality expresses a relationship between numbers or quantities. Two inequality symbols are < and >.

The inequality 5 < 6 means 5 is less than 6. This same information can be shown as 6 > 5, which means 6 is greater than 5.

4. Write two expressions showing the relationship between the given numbers. Use both the less than, <, and greater than, >, symbols.

   a) 1 and 7

   b) 4 and –1

   c) 3 and 3.5

   d) 0 and 1

5. List the whole numbers satisfying each statement.

   a) $x < 4$

   b) between 4 and 8

   c) $t > 11$

   d) $a < 15$

Solve Equalities

When you are asked to solve an equation, you are being asked to find all values for the unknown that make a true statement.

Solve $2x - 1 = 7$.

Solution
$$2x - 1 + 1 = 7 + 1$$
$$2x = 8$$
$$x = 4$$

Check:
$$2(4) - 1 = 7$$
$$8 - 1 = 7$$
$$7 = 7$$

6. Solve each equation. Then, verify your answer.

   a) $x + 4 = 6$ **b)** $-2x + 1 = 9$

   c) $-5x - 3 = -8$ **d)** $3x - 5 = 4$
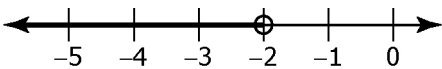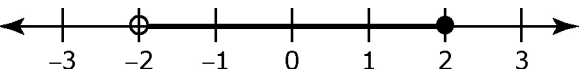
Chapter 9 Warm-Up

Chapter 9 Problems of the Week

1. For what value(s) of x is $\frac{1}{x} > 1$ true? Express your answer as an inequality. Explain your thinking.	**2.** Given that a, b, and c are whole numbers, if $a < b$, is $ac < bc$ always true? Explain.
3. Consider the following pattern: Daniel fills a hole with sand. He starts with a pail that contains 10 kg of sand. The next pail has 5 kg of sand, the next pail has 2.5 kg, and so on, to an infinite number of pails. At what point will the hole contain > 20 kg of sand? Explain your thinking.	**4.** Write the mathematical statements. Then, solve for x. **a)** The opposite of four multiplied by x then decreased by two-and-one-half is less than or equal to the opposite of ten. **b)** Twice x increased by three is less than one half decreased by x. **c)** Negative five times x increased by three-and-one-half is equal to the opposite of x increased by thirteen-and-one-half.

5. If $x > 7$, and $y < 9$, and $z \leq 8$, what is the inequality that expresses $x = y = z$? Express your answer using a number line.

Section 9.1 Extra Practice

1. Write a word statement to express the meaning of each inequality.

Inequality	Word Statement
a) $m > -2$	
b)	
c)	
d) $m \geq 2$	

2. Circle true or false for each of the following statements. If the statement is false, rewrite it to make it true.

a) True / False A closed circle indicates that the boundary point is not a possible value.

_____

_____

b) True / False The inequality $-4 < x$ means x is greater than -4.

_____

_____

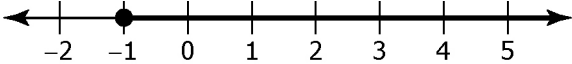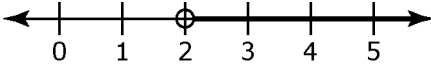**c) True / False** A boundary point is always shown on a number line using an open circle.

_____

_____

For #3 to #6, fill in the missing information.

a) Represent the inequality verbally using a real-life context.
b) Represent the inequality graphically.
c) Represent the inequality algebraically.

a) Verbally	b) Graphically	c) Algebraically
Example: The height of a rocket that is launched 1 m below sea level		$h \geq -1$, where h is the height of the rocket
3. The temperature below −4 ºC		
4.		$2 \geq x$
5.		
6.		$0 \leq x \leq 5$

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Section 9.1 Math Link

This worksheet will help you with the Math Link on page 15.

For safety reasons, some amusement park rides have age and height restrictions for riders.

1. Choose an amusement park ride you have seen or design one of your own.

   a) State the name of the ride. _____

   b) Describe the ride. _____

   _____

   _____

2. For your ride, consider the safety restrictions or conditions that you might impose on riders. Use the chart to record your answers.
   • In column 1, list at least three restrictions verbally using terms of your choice. You might choose from terms such as *height*, *age*, and *weight*.
   • In column 2, represent each restriction algebraically using a different variable for each. Example: *a* as a variable for age

Verbally	Algebraically
Example: Less than 12 years of age	$a < 12$
a)	
b)	
c)	
d)	

3. Sketch a sign using words and graphics that clearly informs riders about each of your restrictions in #2.