GUIDED NOTES – 2.7 LINEAR INEQUALITIES AND ABSOLUTE VALUE INEQUALITIES

LEARNING OBJECTIVES

In this section, you will:

- Use interval notation.
- Use properties of inequalities.
- Solve inequalities in one variable algebraically.
- Solve absolute value inequalities.

USING INTERVAL NOTATION

- Indicating solutions to an inequality can be achieved in several ways, such as number line, set-builder notation, and interval notation. Interval notation is when solution sets are indicated with

  _____ .

- Please fill out the table below.

Set Indicated	Set-Builder Notation	Interval Notation
All numbers between a and b, but not including a or b.		
All numbers greater than a, but not including a.		
All numbers less than b, but not including b.		
All numbers greater than a, including a.		
All numbers less than b, including b.		
All real numbers between a and b, including a.		
All real numbers between a and b, including b.		
All real numbers between a and b, including a and b.		
All real numbers less than a or greater than b.		
All real numbers.		

Try It: Read Example 1 in the text, then answer the following.

Use interval notation to indicate all real numbers between and including -3 and 5.

Try It: Read Example 2 in the text, then answer the following.

Express all real numbers less than -2 or greater than or equal to 3 in interval notation.

USING THE PROPERTIES OF INEQUALITIES

Study the box in your textbook section titled "properties of inequalities."

- Given $a < b$, please fill out the following properties.

Addition Property: If $a < b$, then _____.

Multiplication Property: If $a < b$ and _____, then _____.

If $a < b$ and _____, then _____.

- Remember that these properties also apply to $a \leq b$, $a > b$, and $a \geq b$.

Try It: Read Example 3 in the text, then answer the following.

Solve: $3x - 2 < 1$.

Try It: Read Example 4 in the text, then answer the following.

Solve: $4x + 7 \geq 2x - 3$

Homework: *You should now be ready to attempt problems 1-3 in "Homework – Section 2.7" on WeBWorK.*

SOLVING INEQUALITIES IN ONE VARIABLE ALGEBRAICALLY

Try It: Read Example 5 in the text, then answer the following.

Solve the inequality and write the answer using interval notation: $-x + 4 < \frac{1}{2}x + 1$.

Try It: Read Example 6 in the text, then answer the following.

Solve the inequality and write the answer in interval notation: $-\frac{5}{6}x \le \frac{3}{4} + \frac{8}{3}x.$

Homework: *You should now be ready to attempt problems 4-6 in "Homework – Section 2.7" on WeBWorK.*

UNDERSTANDING COMPOUND INEQUALITIES

- A _____ includes two inequalities in one statement. There are two ways to solve compound inequalities. List the two ways below.

    1.

    2.

Try It: Read Example 7 in the text, then answer the following.

Solve the compound inequality: $4 < 2x - 8 \le 10.$

Try It: Read Example 8 in the text, then answer the following.

Solve the compound inequality: $3y < 4 - 5y < 5 + 3y.$

<u>SOLVING ABSOLUTE VALUE INEQUALITIES</u>

Study the box in your textbook section titled "absolute value inequalities."

- Given an algebraic expression X, and $k > 0$, an absolute value inequality is an inequality of the form

$$|X| < k \text{ is equivalent to } \underline{\hspace{3cm}}$$

$$|X| > k \text{ is equivalent to } \underline{\hspace{3cm}}$$

*Remember these statements also apply to $|X| \leq k$ and $|X| \geq k$.

Try It: Read Example 9 in the text, then answer the following.

Describe all x-values within a distance of 3 from the number 2.

Homework: *You should now be ready to attempt problems 7-9 in "Homework – Section 2.7" on WeBWorK.*

Try It: Read Example 10 in the text, then answer the following.

Solve $|x - 4| \leq 10$.

Homework: *You should now be ready to attempt problems 10-15 in "Homework – Section 2.7" on WeBWorK.*