

## SOLVING INEQUALITIES

## OBJECTIVE

1. SWBAT solve simple and compound inequalities in one variable.

## NOTES

## COMMON TYPES OF INEQUALITIES

**SIMPLE**

☞ Contains one inequality symbol.

☞ ex.  $2x+6 \leq 5$ **COMPOUND (AND)**

☞ Contains two inequality symbols written as one “three-sided” inequality.

☞ ex.  $-4 < 2x+6 \leq 5$ **COMPOUND (OR)**

☞ Composed of two simple inequalities joined with ‘or’.

☞ ex.  $2x+6 \leq 5$  or  $x-4 > 5$ **GENERAL RULES**

☞ Solve inequalities the same way you would solve equations, treating the inequality symbol like an equal sign.

☞ When solving the “three-sided” inequalities, isolate  $x$  in the middle, and perform any operations to all 3 sides.

☞ If you multiply or divide both sides of an inequality by a negative, you must reverse the inequality symbol(s).

## EXAMPLES

Solve each inequality. Write your answer in interval notation.

1.  $3x+7 \leq -2$

2.  $5-4x \leq 25$

3.  $-3 \leq 2x+1 < 7$

4.  $-7 < 5-3x \leq 5$

5.  $3x < -9$  or  $x-8 > -1$

6.  $6-x \leq 2$  or  $2x \leq x+2$

**PRACTICE 4-3**

NAME \_\_\_\_\_

**[SHOW YOUR WORK]**

Solve each inequality. Write your answer in interval notation.

1.  $4x + 7 > 23$

2.  $8 - x \leq 10$

3.  $5x + 1 < 3x + 7$

4.  $-3(x + 2) \geq 15$

5.  $-1 < 3 - 2x \leq 11$

6.  $6 \leq 5x - 9 \leq 21$

7.  $-15 < 3 + x < -3$

8.  $-2 \leq 7 - 3x \leq 10$

9.  $x + 1 < 13$  or  $x - 1 \geq 13$

10.  $8x \leq 32$  or  $-x < -15$

11.  $3x + 5 \leq 23$  or  $-4x + 1 < -39$

12.  $2x < 6$  or  $-x + 4 \leq -5$

13. Susan is planning a wedding reception. The bride and groom estimate that at least 150 guests will attend. The reception hall has a maximum capacity of 300 people, which would include guests, the bride and groom, the photographer, the 5 caterers, and the 4 members of the band. Provide Susan with an interval for the possible number of guests at the reception.

Isolate the indicated variable in the equation.

**REVIEW 4-1**

14. Isolate  $b$ :  $d = \sqrt{b^2 - 4ac}$

15. Isolate  $h$ :  $S = wh + (w + h)q$

Find all real solutions to the system.

**REVIEW 4-2**

16. 
$$\begin{cases} y = 8x + 17 \\ y = x^2 + 2x + 1 \end{cases}$$

17. 
$$\begin{cases} y = 3x - 10 \\ y = 2x^2 - 5x - 4 \end{cases}$$

★ 18. Solve the inequality.  $x^2 - 7x - 18 \leq 0$