

### Lesson 3.04 Solving Complex Linear Inequalities

Students will be able to:

- Content Objective: Solve complex linear inequalities.
- Language Objective: Identify the smallest or largest integer value solution to an inequality and explain with mathematical reasoning.



#### Warm Up

Determine which of the following is a solution to the linear inequality shown below.

$$48 - 5x < 8$$

- |             |             |
|-------------|-------------|
| 1) $x = 8$  | 2) $x = -9$ |
| 3) $x = -8$ | 4) $x = 9$  |



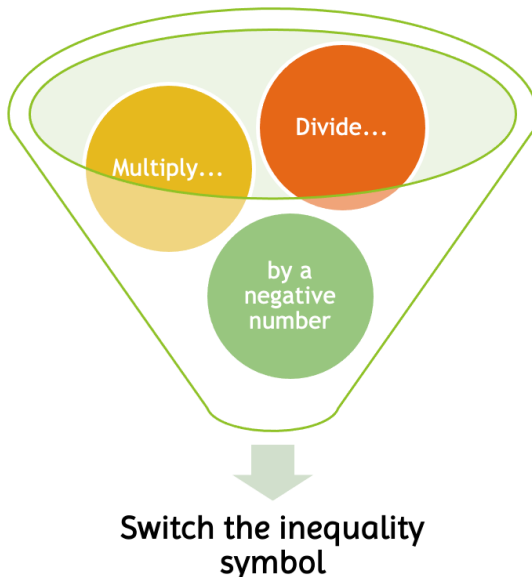
#### Vocabulary Review

**True or false.** Determine whether each statement below is true or false by writing T for F.

- \_\_\_\_\_ Solutions to the inequality  $x > -3$  include  $\{-3, -2, -1, 0, 1, 2, \dots\}$ .
- \_\_\_\_\_ The largest integer that satisfies the inequality  $b < 5$  is 5.
- \_\_\_\_\_ The smallest integer that satisfies the inequality  $y > -7$  is  $-6$ .
- \_\_\_\_\_ When graphing the inequality  $x \geq 4$ , you place a closed point at  $x = 4$  and shade to the right on the number line.
- \_\_\_\_\_ When graphing the inequality  $-1 > x$ , you place an open point on  $-1$  and shade to the right.



#### Graphic Organizer



#### Solve for $x$

$$-3x \geq 12$$

$$\frac{x}{-4} < 2$$

Now that we have reviewed solving simple linear inequalities, let's look at some more complex inequalities.


**Skill 1: Solving Linear Inequalities with Distribution**

Solve the inequality below for  $x$ .

$$3\left(2 - \frac{4}{3}x\right) \geq 4 - x$$

**Unit 3: Inequalities  
Algebra I**


To type a fraction in the calculator, following the steps below:

TI-84	TI-Nspire
- ALPHA	- CTRL
- Y=	- Division
- ENTER	


**Exercise 1: Solving Linear Inequalities with Distribution**

Solve the inequality below for  $x$ .

$$-2\left(-6x - \frac{5}{2}\right) \leq -5(x + 5)$$


**Skill 2: Solving Complex Linear Inequalities**

Solve the inequality below and state the greatest integer solution for  $x$ .

$$\frac{1}{3}x + \frac{5}{3} > \frac{1}{3}\left(\frac{3}{2}x - 1\right)$$

Express your solution in interval notation:

**Exercise 2: Solving Complex Linear Inequalities**

Solve the inequality below for  $x$  and state a solution.

$$\frac{1}{2}(5 - 3x) \leq 2(x - 4)$$

Express your solution in interval notation:

**Write It Out**

Given the inequality  $x > -0.98$ , state the smallest integer solution. Explain your reasoning below.

**Check Point**

Which of the following represents a solution to the linear inequality  $-\frac{4}{5}x - 3 < 5$ ?

- 1)  $-12$
- 2)  $-9$
- 3)  $-10$
- 4)  $-13$



## 3.04- Problem Set

Name: \_\_\_\_\_

1. Solve each of the following linear inequalities below.

a.  $\frac{3}{4}x - \frac{3}{2} \geq \frac{5}{2}$

b.  $7(y - 6) - 1 < 3(2y + 8)$

c.  $.025x + 10.3 \leq -0.8(x + 10)$

d.  $\frac{b-12}{4} > 5b + 1$

2. Which of the following is a solution to the linear inequality  $\frac{-x+4}{3} < 10$ ?

1)  $x = -25$

2)  $x = -26$

3)  $x = -27$

4)  $x = -28$

3. **Solving Literal Equations**Solve the linear inequality below for  $x$  in terms of  $a$  and  $b$ . (Your answer should contain multiple variables)

$$b(x - 2) < ax - 3b$$