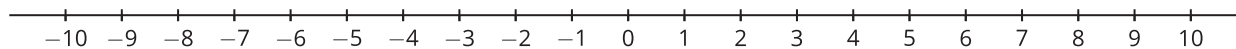


# Unit 2 Lesson 19: Solutions to Inequalities in One Variable

## 1 Find a Value, Any Value (Warm up)

### Images for Launch



### Student Task Statement

1. Write some solutions to the inequality  $y \leq 9.2$ . Be prepared to explain what makes a value a solution to this inequality.
2. Write one solution to the inequality  $7(3 - x) > 14$ . Be prepared to explain your reasoning.

## 2 Off to an Orchard

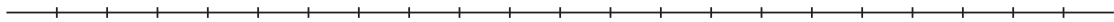
### Student Task Statement

A teacher is choosing between two options for a class field trip to an orchard.

- At Orchard A, admission costs \$9 per person and 3 chaperones are required.
- At Orchard B, the cost is \$10 per person, but only 1 chaperone is required.
- At each orchard, the same price applies to both chaperones and students.



1. Which orchard would be cheaper to visit if the class has:
  - a. 8 students?
  - b. 12 students?
  - c. 30 students?
2. To help her compare the cost of her two options, the teacher first writes the equation  $9(n + 3) = 10(n + 1)$ , and then she writes the inequality  $9(n + 3) < 10(n + 1)$ .
  - a. What does  $n$  represent in each statement?
  - b. In this situation, what does the equation  $9(n + 3) = 10(n + 1)$  mean?
  - c. What does the solution to the inequality  $9(n + 3) < 10(n + 1)$  tell us?
  - d. Graph the solution to the inequality on the number line. Be prepared to show or explain your reasoning.



### 3 Part-Time Work (Optional)

#### Student Task Statement

To help pay for his tuition, a college student plans to work in the evenings and on weekends. He has been offered two part-time jobs: working in the guest-services department at a hotel and waiting tables at a popular restaurant.

- The job at the hotel pays \$18 an hour and offers \$33 in transportation allowance per month.
- The job at the restaurant pays \$7.50 an hour plus tips. The entire waitstaff typically collects about \$50 in tips each hour. Tips are divided equally among the 4 waitstaff members who share a shift.

1. The equation  $7.50h + \frac{50}{4}h = 18h + 33$  represents a possible constraint about a situation.

a. Solve the equation and check your solution.

b. Here is a graph on a number line.



Put a scale on the number line so that the point marked with a circle represents the solution to the equation.

2. Does one job pay better if:

- The student works fewer hours than the solution you found earlier? If so, which job?
- The student works more hours than the solution you found earlier? If so, which job?

Be prepared to explain or show how you know.

3. Here are two inequalities and two graphs that represent the solutions to the inequalities.

○ Inequality 1:  $7.50h + \frac{50}{4}h < 18h + 33$

○ Inequality 2:  $7.50h + \frac{50}{4}h > 18h + 33$

**A**



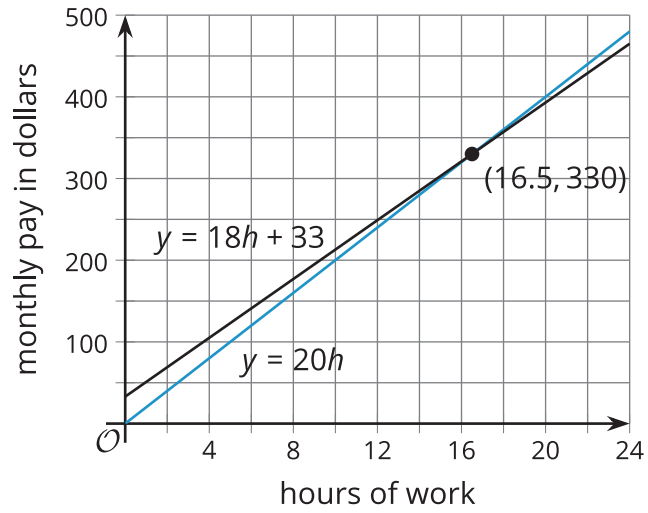
**B**



a. Put the same scale on each number line so that the circle represents the number of hours that you found earlier.

b. Match each inequality with a graph that shows its solution. Be prepared to explain or show how you know.

### Activity Synthesis



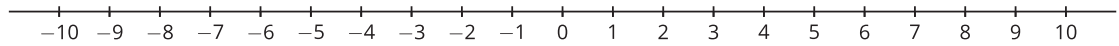
## 4 Equality and Inequality

### Student Task Statement

1. Solve this equation and check your solution:  $-\frac{4(x+3)}{5} = 4x - 12$ .

2. Consider the inequality:  $-\frac{4(x+3)}{5} \leq 4x - 12$ .

- Choose a couple of values less than 2 for  $x$ . Are they solutions to the inequality?
- Choose a couple of values greater than 2 for  $x$ . Are they solutions to the inequality?
- Choose 2 for  $x$ . Is it a solution?
- Graph the solution to the inequality on the number line.



## 5 More or Less? (Optional)

### Student Task Statement

Consider the inequality  $-\frac{1}{2}x + 6 < 4x - 3$ . Let's look at another way to find its solutions.

1. Use graphing technology to graph  $y = -\frac{1}{2}x + 6$  and  $y = 4x - 3$  on the same coordinate plane.
2. Use your graphs to answer the following questions:
  - a. Find the values of  $-\frac{1}{2}x + 6$  and  $4x - 3$  when  $x$  is 1.
  - b. What value of  $x$  makes  $-\frac{1}{2}x + 6$  and  $4x - 3$  equal?
  - c. For what values of  $x$  is  $-\frac{1}{2}x + 6$  less than  $4x - 3$ ?
  - d. For what values of  $x$  is  $-\frac{1}{2}x + 6$  greater than  $4x - 3$ ?
3. What is the solution to the inequality  $-\frac{1}{2}x + 6 < 4x - 3$ ? Be prepared to explain how you know.