

## Lesson 13: Inequalities

### Classwork

#### Opening Exercise: Writing Inequality Statements

Tarik is trying to save \$265.49 to buy a new tablet. Right now, he has \$40 and can save \$38 a week from his allowance.

Write and evaluate an expression to represent the amount of money saved after ...

2 weeks

3 weeks

4 weeks

5 weeks

6 weeks

7 weeks

8 weeks

When will Tarik have enough money to buy the tablet?

Write an inequality that will generalize the problem.

### Example 1: Evaluating Inequalities—Finding a Solution

The sum of two consecutive odd integers is more than  $-12$ . Write several true numerical inequality expressions.

The sum of two consecutive odd integers is more than  $-12$ . What is the smallest value that will make this true?

- Write an inequality that can be used to find the smallest value that will make the statement true.

- b. Use if-then moves to solve the inequality written in part (a). Identify where the 0's and 1's were made using the if-then moves.
- c. What is the smallest value that will make this true?

### Exercises

1. Connor went to the county fair with \$22.50 in his pocket. He bought a hot dog and drink for \$3.75 and then wanted to spend the rest of his money on ride tickets, which cost \$1.25 each.
- a. Write an inequality to represent the total spent where  $r$  is the number of tickets purchased.
- b. Connor wants to use this inequality to determine whether he can purchase 10 tickets. Use substitution to show whether he will have enough money.

c. What is the total maximum number of tickets he can buy based upon the given information?

2. Write and solve an inequality statement to represent the following problem:

On a particular airline, checked bags can weigh no more than 50 pounds. Sally packed 32 pounds of clothes and five identical gifts in a suitcase that weighs 8 pounds. Write an inequality to represent this situation.

## Problem Set

1. Match each problem to the inequality that models it. One choice will be used twice.

_____	The sum of three times a number and $-4$ is greater than 17.	a. $3x + -4 \geq 17$
_____	The sum of three times a number and $-4$ is less than 17.	b. $3x + -4 < 17$
_____	The sum of three times a number and $-4$ is at most 17.	c. $3x + -4 > 17$
_____	The sum of three times a number and $-4$ is no more than 17.	d. $3x + -4 \leq 17$
_____	The sum of three times a number and $-4$ is at least 17.	

2. If  $x$  represents a positive integer, find the solutions to the following inequalities.

a. $x < 7$	f. $-x \geq 2$
b. $x - 15 < 20$	g. $\frac{x}{3} < 2$
c. $x + 3 \leq 15$	h. $-\frac{x}{3} > 2$
d. $-x > 2$	i. $3 - \frac{x}{4} > 2$
e. $10 - x > 2$	

3. Recall that the symbol  $\neq$  means *not equal to*. If  $x$  represents a positive integer, state whether each of the following statements is always true, sometimes true, or false.

a. $x > 0$	e. $x \geq 1$
b. $x < 0$	f. $x \neq 0$
c. $x > -5$	g. $x \neq -1$
d. $x > 1$	h. $x \neq 5$

4. Twice the smaller of two consecutive integers increased by the larger integer is at least 25.

Model the problem with an inequality, and determine which of the given values 7, 8, and/or 9 are solutions. Then, find the smallest number that will make the inequality true.

5.

- The length of a rectangular fenced enclosure is 12 feet more than the width. If Farmer Dan has 100 feet of fencing, write an inequality to find the dimensions of the rectangle with the largest perimeter that can be created using 100 feet of fencing.
- What are the dimensions of the rectangle with the largest perimeter? What is the area enclosed by this rectangle

6. At most, Kyle can spend \$50 on sandwiches and chips for a picnic. He already bought chips for \$6 and will buy sandwiches that cost \$4.50 each. Write and solve an inequality to show how many sandwiches he can buy. Show your work and interpret your solution.