Name_____ Date_____

Evaluate the expression when $x = 3$ and $y = 5$.

1. $2xy$

2. $\dfrac{6y}{x}$

3. $4y - x$

4. $y^2 - 7x + 2$

Evaluate the expression when $x = \dfrac{1}{4}$ and $y = 8$.

5. $3xy$

6. $16x + 5y$

7. $\dfrac{y}{2x}$

8. $2(10 - 24x) + y^2$

9. After m months, you paid $25 + 10m$ for your computer. How much did you pay after 6 months?

Chapter 7

Fair Game Review (continued)

Write the phrase as an expression.

10. three more than twice a number k

11. half of a number q plus eight

12. a number p decreased by six

13. nine times a number x

14. five divided by a number n

15. one plus the product of a number y and three

16. Each classmate contributes $2 for charity. Write an expression for the amount of money raised by your class.

17. You save half of the money from your paycheck plus an extra six dollars to buy a new bike. Write an expression for the amount of money you save from each paycheck.

Name_____ Date _____

7.1 Writing Equations in One Variable
**For use with Activity 7.1**

Essential Question   How does rewriting a word problem help you solve the word problem?

---

1 **ACTIVITY:** Rewriting a Word Problem

Work with a partner. Read the problem several times. Think about how you could rewrite the problem, leaving out information that you do not need to solve the problem.

Given Problem (63 words)

Your minivan has a flat, rectangular area in the back. When you fold down the rear seats of the van and move them forward, the width of the rectangular area in the van is increased by 2 feet, as shown in the diagram.
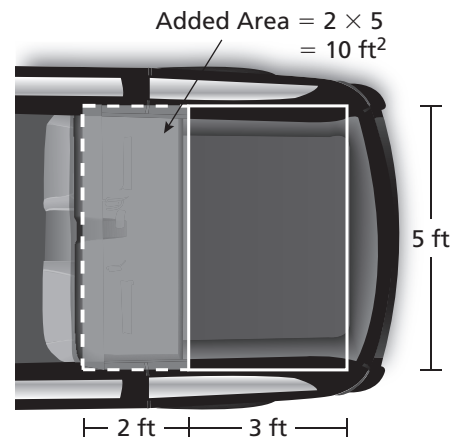

5 ft

├2 ft┼ 3 ft ─┤
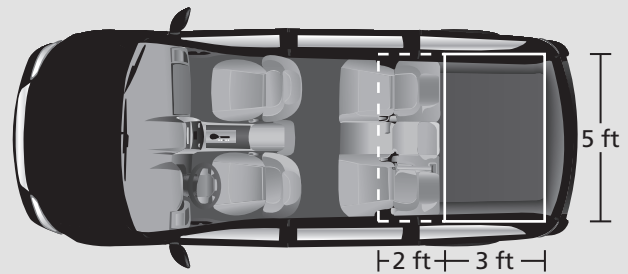
By how many square feet does the rectangular area increase when the rear seats are folded down and moved forward?

Rewritten Problem (28 words)

When you fold down the back seats of a minivan, the added area is a 5-foot by 2-foot rectangle. What is the area of this rectangle?

Can you make the problem even simpler?

Added Area = 2 × 5
         = 10 ft²

5 ft

├ 2 ft ┼ 3 ft ─┤

Explain why your rewritten problem is easier to read.

Name _____ Date _____

7.1 **Writing Equations in One Variable** (continued)

2 **ACTIVITY:** Rewriting a Word Problem

Work with a partner. Rewrite each problem using fewer words. Leave out information that you do not need to solve the problem. Then solve the problem.

a. **(63 words)**

A supermarket is having its grand opening on Saturday morning. Every fifth customer will receive a $10 coupon for a free turkey. Every seventh customer will receive a $3 coupon for 2 gallons of ice cream. You are the manager of the store and you expect 400 customers. How many of each type of coupon should you plan to give away?

b. **(71 words)**

You and your friend are at a football game. The stadium is 4 miles from your home. You each brought $5 to spend on refreshments. During the third quarter of the game, you say, "I read that the greatest distance that a baseball has been thrown is 445 feet 10 inches." Your friend says, "That's about one and a half times the length of the football field." Is your friend correct?

Name_____ Date _____

7.1 **Writing Equations in One Variable** (continued)

c. (90 words)

> You are visiting your cousin who lives in the city. To get back home, you take a taxi. The taxi charges $2.10 for the first mile and $0.90 for each additional mile. After riding 13 miles, you decide that the fare is going to be more than the $20 you have with you. So, you tell the driver to stop and let you out. Then you call a friend and ask your friend to come pick you up. After paying the driver, how much of your $20 is left?

What Is Your Answer?

3. IN YOUR OWN WORDS How does rewriting a word problem help you solve the word problem? Make up a word problem that has more than 50 words. Then show how you can rewrite the problem using at most 25 words.

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Big Ideas Math Green **153**
Record and Practice Journal

Name _____ Date _____

Practice
For use after Lesson 7.1
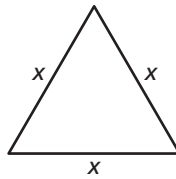
Write the word sentence as an equation.

1. 27 is 3 times a number y.

2. The difference of a number x and 4 is 3.

3. 8 more than a number p is 17.

4. Half of a number q is 14.

Write an equation that can be used to find the value of *x*.

5. Perimeter of rectangle: 32 cm
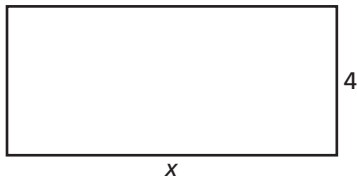
6. Perimeter of triangle: 20 in.

7. You spend $16 on 3 notebooks and x binders. Notebooks cost $2 each and binders cost $5 each. Write an equation you can use to find the number of binders you bought.

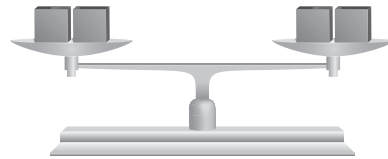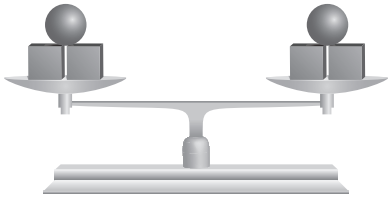Name_____ Date _____

7.2 Solving Equations Using Addition or Subtraction
For use with Activity 7.2

Essential Question How can you use addition or subtraction to solve an equation?

When two sides of a scale weigh the same, the scale will balance.
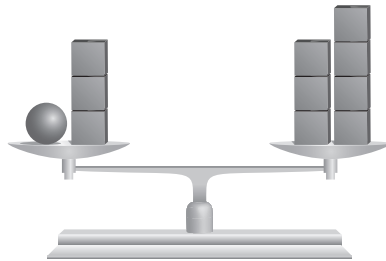
When you add or subtract the same amount on each side of the scale, it will still balance.

1 ACTIVITY: Solving an Equation

Work with a partner.

a. Use a model to solve $n + 3 = 7$.

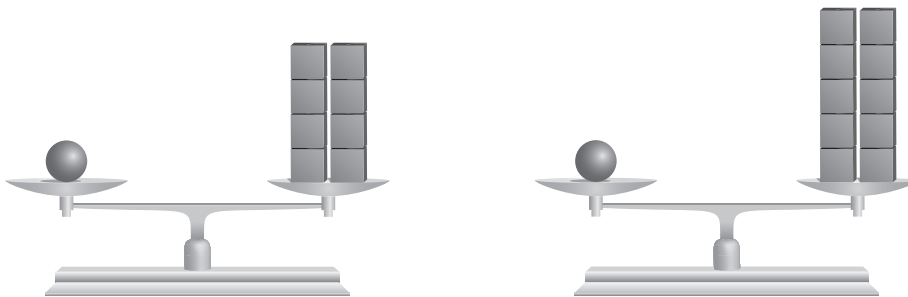- Explain how the model represents the equation $n + 3 = 7$.

- How much does one ⚫ weigh? How do you know?

  The solution is $n =$ _____.

b. Describe how you could check your answer in part (a).

7.2 **Solving Equations Using Addition or Subtraction (continued)**

c. Which model below represents the solution of $n + 1 = 9$? How do you know?

2 **ACTIVITY:** Solving Equations

Work with a partner. Solve the equation using the method in Activity 1.

a. $n + 5 = 10$ **b.** $x + 2 = 11$

c. $6 = y + 3$ **d.** $8 = m + 8$

3 **ACTIVITY:** Solving Equations Using Mental Math

Work with a partner. Write a question that represents the equation. Use mental math to answer the question. Then check your solution.

Equation	Question	Solution	Check
a. $x + 1 = 5$			
b. $4 + m = 11$			
c. $8 = a + 3$			
d. $x - 9 = 21$			
e. $13 = p - 4$			

What Is Your Answer?

4. REPEATED REASONING In Activity 3, how are parts (d) and (e) different from parts (a)–(c)? Did your process to find the solution change? Explain.

7.2 **Solving Equations Using Addition or Subtraction** (continued)

5. Decide whether the statement is *true* or *false*. If false, explain your reasoning.

    a. In an equation, you can use any letter as a variable.

    b. The goal in solving an equation is to get the variable by itself.

    c. In the solution, the variable must be on the left side of the equal sign.

    d. If you add a number to one side, you should subtract it from the other side.

6. **IN YOUR OWN WORDS** How can you use addition or subtraction to solve an equation? Give two examples to show how your procedure works.

7. Are the following equations equivalent? Explain your reasoning.

$$x - 5 = 12 \qquad \text{and} \qquad 12 = x - 5$$

Name _____ Date _____

7.2 Practice
For use after Lesson 7.2

Tell whether the given value is a solution of the equation.

1. $34 + x = 46$; $x = 12$

2. $y - 9 = 14$; $y = 22$

3. $6d = 54$; $d = 9$

4. $\dfrac{n}{3} = 13$; $n = 39$

Solve the equation. Check your solution.

5. $7 + k = 11$

6. $p - 24 = 13$

7. $b - 16 = 7$

8. $\dfrac{2}{5} + m = \dfrac{5}{6}$

9. In the heavyweight class of professional wrestling, the junior weight limit is 190 pounds. This is 15 pounds heavier than the light heavyweight limit. Write and solve an equation to find the weight limit of the light heavyweight class.
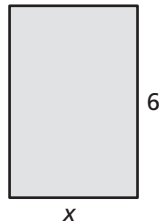
Name_____ Date _____

Essential Question How can you use multiplication or division to solve an equation?

1 **ACTIVITY:** Find Missing Dimensions

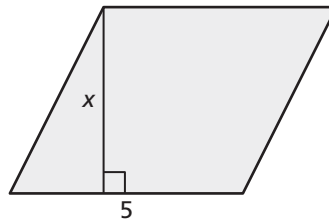**Work with a partner. Describe how you would find the value of *x*. Then find the value and check your result.**
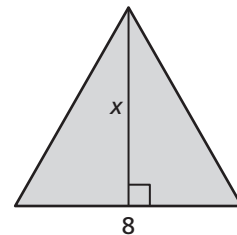
a. rectangle

Area = 24 square units

6

x

b. parallelogram

Area = 20 square units

x

5

c. triangle

Area = 28 square units

x

8

2 **ACTIVITY:** Using an Equation to Model a Story

Work with a partner.

a. Use a model to solve the problem.

Three people go out to lunch. They decide to share the $12 bill evenly. How much does each person pay?

• What equation does the model represent? Explain how this represents the problem.
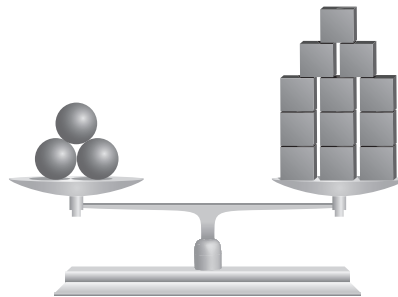
• How much does one ● weigh? How do you know?

Each person pays _____.

b. Describe how you can check your answer in part (a).

7.3 **Solving Equations Using Multiplication or Division** (continued)

3 **ACTIVITY:** Using Equations to Model a Story

Work with a partner.

- **What is the unknown?**
- **Write an equation that represents each problem.**
- **What does the variable in your equation represent?**
- **Explain how you can solve the equation.**
- **Answer the question.**

Problem	Equation
a. Three robots go out to lunch. They decide to share the $11.91 bill evenly. How much does each robot pay?	_____
b. On Earth, objects weigh 6 times what they weigh on the Moon. A robot weighs 96 pounds on Earth. What does it weigh on the Moon?	_____
c. At maximum speed, a robot runs 6 feet in 1 second. How many feet does the robot run in 1 minute?	_____
d. Four identical robots lie on the ground head-to-toe and measure 14 feet. How tall is each robot?	_____

7.3   **Solving Equations Using Multiplication or Division** (continued)

What Is Your Answer?

4. Complete each sentence by matching.

- The inverse operation of addition
- The inverse operation of subtraction
- The inverse operation of multiplication
- The inverse operation of division

- is multiplication.
- is subtraction.
- is addition.
- is division.

5. IN YOUR OWN WORDS How can you use multiplication or division to solve an equation? Give two examples to show how your procedure works.

Name _____ Date _____

7.3 **Practice**
For use after Lesson 7.3

Solve the equation. Check your solution.

1. $7k = 77$

2. $\dfrac{p}{5} = 10$

3. $3 = \dfrac{m}{12}$

4. $4a = 36$

5. $5 \bullet x = 12$

6. $4.2 = \dfrac{c}{8}$

7. You earn $5 for every friendship bracelet you sell. Write and solve an equation to find the number of bracelets you have to sell to earn $85.

8. You practice the piano for 30 minutes each day. Write and solve an equation to find the total time t you spend practicing the piano in a week.

Name_____ Date_____

Writing Equations in Two Variables
For use with Activity 7.4

Essential Question   How can you write an equation in two variables?
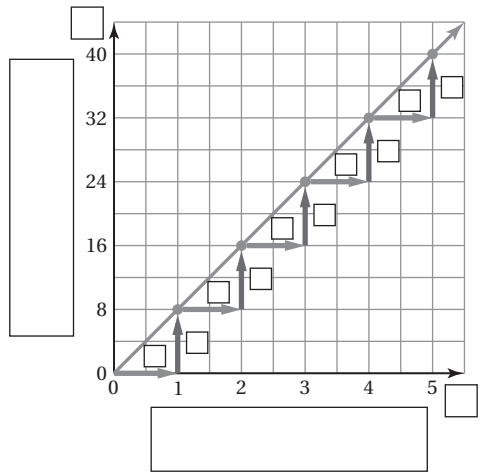
1   **ACTIVITY:** Writing an Equation in Two Variables

Work with a partner. You earn $8 per hour working part-time at a store.

a. Complete the table.

Hours Worked	Money Earned (dollars)
1	
2	
3	
4	
5	

b. Use the values from the table to complete the graph. Then answer each question below and on the next page.

- What does the horizontal axis represent? What variable did you use to identify it?

7.4 **Writing Equations in Two Variables** (continued)

- What does the vertical axis represent? What variable did you use to identify it?

- How are the ordered pairs in the graph related to the values in the table?

- How are the horizontal and vertical distances shown on the graph related to the values in the table?

c. How can you write an equation that shows how the two variables are related?

d. What does the line in the graph represent?

2 **ACTIVITY:** Describing Variables

Work with a partner. Use the equation you wrote in Activity 1.

a. How is this equation different from the equations earlier in this chapter?

b. One of the variables in this equation *depends* on the other variable. Determine which variable is which by answering the following questions:

- Does the amount of money you earn *depend* on the number of hours you work?

- Does the number of hours you work *depend* on the amount of money you earn?

What do you think is the significance of having two types of variables? How do you think you can use these types of variables in real life?

7.4 **Writing Equations in Two Variables** (continued)

3 **ACTIVITY:** Describing a Formula in Two Variables

Work with a partner. Recall that the perimeter of a square is 4 times its side length.

a. Write the formula for the perimeter of a square. Tell what each variable represents.

b. Describe how the perimeter of a square changes as its side length increases by 1 unit. Use a table and a graph to support your answer.

c. In your formula, which variable depends on which?

What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you write an equation in two variables?

5. The equation $y = 7.75x$ shows how the number of movie tickets is related to the total amount of money spent. Describe what each part of the equation represents.

6. **CHOOSE TOOLS** In Activity 1, you want to know the amount of money you earn after working 30.5 hours during a week. Would you use the table, the graph, or the equation to find your earnings? What are your earnings? Explain your reasoning.

7. Give an example of another real-life situation that you can model by an equation in two variables.

Name _____ Date _____

7.4 Practice
For use after Lesson 7.4

Tell whether the ordered pair is a solution of the equation.

1. $y = 2x$; $(0, 2)$

2. $y = 6x$; $(2, 12)$

3. $y = 2x + 3$; $(3, 9)$

4. $y = x + 4$; $(1, 3)$

Identify the independent and dependent variables.

5. The equation $p = 8.65h$ gives the amount p (in dollars) of pay a clerk receives for working h hours.

6. The equation $P = 4s$ gives the perimeter P (in inches) of a square mouse pad with a side length of s inches.

7. The equation $c = 42t + 42$ gives the total cost c (in dollars) of a grocery bill with a sales tax of t percent (in decimal form).

8. Avocados cost $3 per pound. Write and graph an equation in two variables that represents the cost of buying avocados.
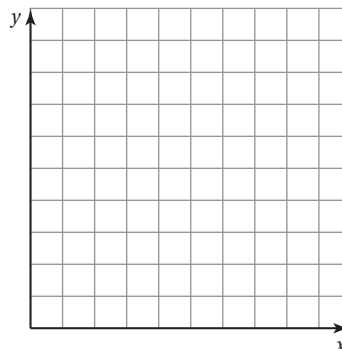
7.5 Writing and Graphing Inequalities
For use with Activity 7.5

Essential Question How can you use a number line to represent solutions of an inequality?

1 ACTIVITY: Understanding Inequality Statements

Work with a partner. Read the statement. Circle each number that makes the statement true, and then answer the questions.

a. **"Your friend is *more than* 3 minutes late."**

   −3 −2 −1 0 1 2 3 4 5 6

   - What do you notice about the numbers that you circled?

   - Is the number 3 included? Why or why not?

   - Write four other numbers that make the statement true.

b. **"The temperature is *at most* 2 degrees."**

   −5 −4 −3 −2 −1 0 1 2 3 4

   - What do you notice about the numbers that you circled?

   - Can the temperature be exactly 2 degrees? Explain.

   - Write four other numbers that make the statement true.

c. **"You need *at least* 4 pieces of paper for your math homework."**

   −3 −2 −1 0 1 2 3 4 5 6

   - What do you notice about the numbers that you circled?

   - Can you have exactly 4 pieces of paper? Explain.

   - Write four other numbers that make the statement true.

7.5 **Writing and Graphing Inequalities** (continued)

d. **"After playing a video game for 20 minutes, you have *fewer than* 6 points."**

$$-2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7$$

- What do you notice about the numbers that you circled?

- Is the number 6 included? Why or why not?

- Write four other numbers that make the statement true.

---

2 **ACTIVITY:** Understanding Inequality Symbols

Work with a partner.

a. **Consider the statement "*x* is a number such that $x < 2$."**

- Can the number be exactly 2? Explain.

- Circle each number that makes the statement true.
  $$-5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$
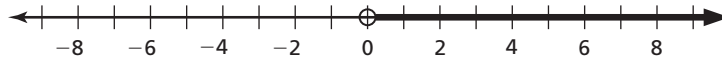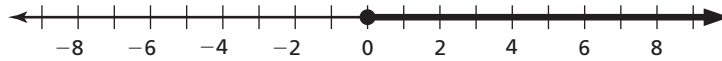- Write four other numbers that make the statement true.

b. **Consider the statement "*x* is a number such that $x \geq 1$."**

- Can the number be exactly 1? Explain.

- Circle each number that makes the statement true.
  $$-5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$
- Write four other numbers that make the statement true.

Name_____ Date _____

3 **ACTIVITY:** How Close Can You Come to 0?

Work with a partner.

a. Which number line shows $x > 0$? Which number line shows $x \geq 0$? Explain your reasoning.

```
←—+——+——+——+——+——+——●——+——+——+——+——+——→
  −8    −6    −4    −2    0    2    4    6    8
```

```
←—+——+——+——+——+——+——⊕——+——+——+——+——+——→
  −8    −6    −4    −2    0    2    4    6    8
```

b. Write the least positive number you can think of that is still a solution of the inequality $x > 0$. Explain your reasoning.

What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you use a number line to represent solutions of an inequality?

5. Write an inequality. Graph all solutions of your inequality on a number line.

6. Graph the inequalities $x > 9$ and $9 < x$ on different number lines. What do you notice?

Name _____ Date _____

7.5 **Practice**
For use after Lesson 7.5

Write the word sentence as an inequality.

1. A number n is at least 4.

2. A number x is less than 12.

Tell whether the given value is a solution of the inequality.

3. $4x \leq 20;\ x = 2$

4. $y + 5 > 8;\ y = 1$

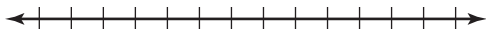**Graph the inequality on a number line.**

5. $x < 5$

6. $w \geq -\dfrac{1}{4}$

7. You buy tickets to a professional football game. You are allowed to buy at most 4 tickets. Write and graph an inequality to represent the number of tickets you are allowed to buy.

Name_____ Date_____

Solving Inequalities Using Addition or Subtraction
For use with Activity 7.6

Essential Question   How can you use addition or subtraction to solve an inequality.

1 **ACTIVITY:** Writing an Inequality

Work with a partner. In 3 years, your friend will still not be old enough to vote.

   a. Which of the following represents your friend's situation?
   What does x represent? Explain your reasoning.

$x + 3 < 18$	$x + 3 \leq 18$	$x + 3 > 18$	$x + 3 \geq 18$

   b. Graph the possible ages of your friend on a number line. Explain how you decided what to graph.

2 **ACTIVITY:** Writing an Inequality

Work with a partner. Baby manatees are about 4 feet long at birth. They grow to a maximum length of 13 feet.

   a. Which of the following can represent a baby manatee's growth?
   What does x represent? Explain your reasoning.

$x + 4 < 13$	$x + 4 \leq 13$	$x - 4 > 13$	$x - 4 \geq 13$

   b. Graph the solution on a number line. Explain how you decided what to graph.

7.6 **Solving Inequalities Using Addition or Subtraction** (continued)

3 **ACTIVITY:** Solving Inequalities

Work with a partner. Complete the following steps for Activity 1. Then repeat the steps for Activity 2.

- Use your inequality from part (a). Replace the inequality symbol with an equal sign.

- Solve the equation.

- Replace the equal sign with the original inequality symbol.

- Graph this new inequality.

- Compare the graph with your graph in part (b). What do you notice?

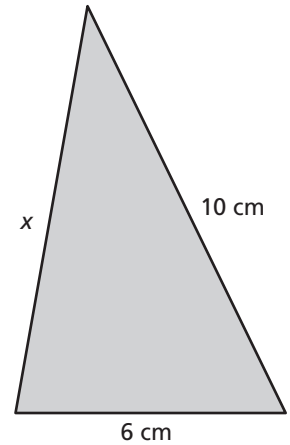**7.6** **Solving Inequalities Using Addition or Subtraction** (continued)

4 **ACTIVITY:** The Triangle Inequality

Work with a partner. Draw different triangles whose sides have lengths 10 cm, 6 cm, and x cm.

a. Which of the following describes how *small x* can be? Explain your reasoning.

| $6 + x < 10$ | $6 + x \leq 10$ |

| $6 + x > 10$ | $6 + x \geq 10$ |

10 cm

x

6 cm

b. Which of the following describes how *large x* can be?

| $x - 6 < 10$ | $x - 6 \leq 10$ | $x - 6 > 10$ | $x - 6 \geq 10$ |

c. Graph the possible values of x on a number line.

What Is Your Answer?

5. **IN YOUR OWN WORDS** How can you use addition and subtraction to solve an inequality?

6. Describe a real-life situation that you can represent with an inequality. Write the inequality. Graph the solution on a number line.

Name _____ Date _____

7.6 Practice
For use after Lesson 7.6

Solve the inequality. Graph the solution.

1. $x + 6 \leq 15$

2. $y - 3 > 2$

3. $z + 1.5 \geq 2$

4. $p - \dfrac{1}{5} < \dfrac{7}{10}$

5. Your teacher gives you an assignment and says you have at most 2 weeks to complete the assignment. You are still working on the assignment after 5 days. Write and solve an inequality to represent how much more time you have to meet the requirement.

Name_____ Date _____

7.7 Solving Inequalities Using Multiplication or Division
For use with Activity 7.7

Essential Question How can you use multiplication or division to solve an inequality?

1 ACTIVITY: Writing an Inequality

Work with a partner. A store has a clearance rack of shirts that each cost the same amount. You buy 2 shirts and have money left after paying with a $20 bill.

a. Which of the following represents your purchase? What does x represent? Explain your reasoning.

| $2x < 20$ | $2x \leq 20$ |

| $2x > 20$ | $2x \geq 20$ |

b. Graph the possible values of x on a number line. Explain how you decided what to graph.

c. Can you buy a third shirt? Explain your reasoning.

2 ACTIVITY: Writing an Inequality

Work with a partner. One of your favorite stores is having a 75% off sale. You have $20. You want to buy a pair of jeans.

a. Which of the following represents your ability to buy the jeans with $20? What does x represent? Explain your reasoning.

| $\frac{1}{4}x < 20$ | $\frac{1}{4}x \leq 20$ |

| $\frac{1}{4}x > 20$ | $\frac{1}{4}x \geq 20$ |

7.7 **Solving Inequalities Using Multiplication or Division (continued)**

b. Graph the possible values of x on a number line. Explain how you decided what to graph.

c. Can you afford a pair of jeans that originally costs $100? Explain your reasoning.

3 **ACTIVITY: Solving Inequalities**

Work with a partner. Complete the following steps for Activity 1. Then repeat the steps for Activity 2.

- Use your inequality from part (a). Replace the inequality symbol with an equal sign.

- Solve the equation.

- Replace the equal sign with the original inequality symbol.

- Graph this new inequality.

- Compare the graph with your graph in part (b). What do you notice?

Name_____ Date_____

4 **ACTIVITY:** Matching Inequalities

Work with a partner. Match the inequality with its graph.

a. $3x < 9$ **b.** $3x \leq 9$ **c.** $\dfrac{x}{2} \geq 1$

d. $6 < 2x$ **e.** $12 \leq 4x$ **f.** $\dfrac{x}{2} < 2$
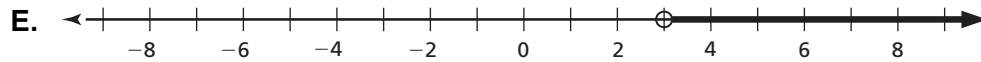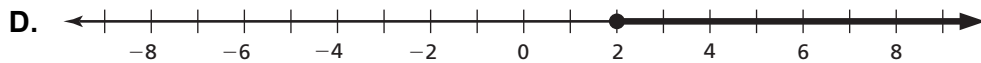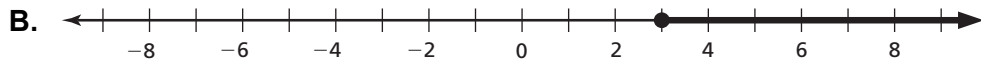
A.

B.

C.

D.

E.

F.

What Is Your Answer?

5. **IN YOUR OWN WORDS** How can you use multiplication or division to solve an inequality?

Name _____ Date _____

Solve the inequality. Graph the solution.

1. $12q \geq 36$

2. $\dfrac{t}{4} > 6$

Graph the numbers that are solutions to both inequalities.

3. $6a \leq 42$ and $a + 4 > 7$

4. $d - 8 \leq 2$ and $9d < 81$

5. Each table in a banquet room seats 8 people. The room can seat no more than 360 people. Write and solve an inequality to represent the number of tables in the banquet room.