LESSON 71

• Division Answers Ending with Zero

Power Up

facts Power Up H

count aloud Count by fives from 2 to 52.

mental math

a. **Number Sense:** 300×30

b. **Number Sense:** 240×10

c. **Number Sense:** Counting by 5s from 5, every number Cailey says ends in 0 or 5. If she counts by 5s from 6, then every number she says ends in what digits?

d. **Percent:** 50% of 120

e. **Powers/Roots:** $\sqrt{64} \div 4$

f. **Money:** Cantrice bought peanuts for $3.75 and a drink for $2.95. What was the total cost?

g. **Estimation:** Estimate the cost of 8 action figures that are each priced at $4.95.

h. **Calculation:** 9^2, -60, $\div 7$, $\times 20$

problem solving Choose an appropriate problem-solving strategy to solve this problem. Cuintan finished his 150-page book on Friday. The day before he had put the book down after reading page 120. If Cuintan read the same number of pages each day, on what day did Cuintan begin reading his book? Explain how you found your answer.

New Concept

Sometimes division answers end with a zero. It is important to continue the division until all the digits inside the division box have been used. Look at the problem at the top of the next page.

Two hundred pennies are separated into 4 equal piles. How many pennies are in each pile?

Thinking Skill

Verify

Why do we write the first digit of the quotient in the tens place?

This problem can be answered by dividing 200 by 4. First we divide 20 by 4. We write a 5 in the quotient. Then we multiply and subtract.

$$\begin{array}{r} 5 \\ 4\overline{)200} \\ 20 \\ \hline 0 \end{array}$$

The division might look complete, but it is not. The answer is not "five pennies in each pile." That would total only 20 pennies. There is another zero inside the division box to bring down. So we bring down the zero and divide again. Zero divided by 4 is 0. We write 0 in the quotient, multiply, and then subtract. The quotient is 50.

$$\begin{array}{r} 50 \\ 4\overline{)200} \\ 20\downarrow \\ \hline 00 \\ 0 \\ \hline 0 \end{array}$$

Check:

$$\begin{array}{r} 50 \\ \times\ \ 4 \\ \hline 200 \end{array}$$

We check our work by multiplying the quotient, 50, by the divisor, 4. The product should equal the dividend, 200. The answer checks. We find that there are 50 pennies in each pile.

Sometimes there will be a remainder with a division answer that ends in zero. We show this in the following example.

Example 1

Divide: $3\overline{)121}$

Thinking Skill

Verify

Why do we write the first digit of the quotient in the tens place?

We begin by finding $3\overline{)12}$. Since 12 divided by 3 is 4, we write "4" above the 2. We multiply and subtract, getting 0, but we are not finished. We bring down the last digit of the dividend, which is 1. Now we divide 01 (which means 1) by 3. Since we cannot make an equal group of 3 if we have only 1, we write "0" on top in the ones place. We then multiply zero by 3 and subtract. The remainder is 1.

$$\begin{array}{r} 4 \\ 3\overline{)121} \\ 12 \\ \hline 0 \end{array}$$

$$\begin{array}{r} \textbf{40 R 1} \\ 3\overline{)121} \\ 12 \\ \hline 01 \\ 0 \\ \hline 1 \end{array}$$

Example 2

Mr. Griffith drove 254 miles in 5 hours. About how many miles did he drive each hour?

To find "about how many miles" Mr. Griffith drove each hour, we can use compatible numbers to estimate. Since 250 is close to 254 and is divisible by 5, we divide 250 by 5 to estimate.

$$250 \text{ miles} \div 5 \text{ hours} = 50 \text{ miles each hour}$$

Mr. Griffith drove **about 50 miles** each hour.

Lesson Practice

Divide:

a. $3\overline{)120}$ **b.** $4\overline{)240}$ **c.** $5\overline{)152}$

d. $4\overline{)121}$ **e.** $3\overline{)91}$ **f.** $2\overline{)41}$

g. **Estimate** The employees in the shipping department of a company loaded 538 boxes into a total of 6 railcars. They put about the same number of boxes into each railcar. About how many boxes are in each railcar? Explain how you found your answer.

Written Practice

Distributed and Integrated

*1. (Inv. 3, 67) A rectangular ceiling is covered with square tiles. The ceiling is 40 tiles long and 30 tiles wide. In all, how many tiles are on the ceiling?

2. (30) There were two hundred sixty seats in the movie theater. All but forty-three seats were occupied. How many seats were occupied?

3. (49, 58) At the grand opening of a specialty food store, five coupons were given to each customer. One hundred fifteen customers attended the grand opening. How many coupons were given to those customers altogether?

*4. (40) A recipe for making fruit punch calls for a cup of pineapple juice for each quart of fruit punch. How many cups of pineapple juice are needed to make a gallon of fruit punch?

*5. (35) **Analyze** What is the value of 5 pennies, 3 dimes, 2 quarters, and 3 nickels?

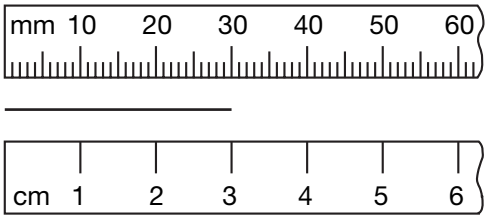
*6. (Inv. 5, 70) a. **Represent** On the last Friday in May, one fourth of the 280 students in a school were away on a field trip. How many students were on the field trip? Draw a picture to solve the problem.

b. What percent of the students were on the field trip?

*7. (70) **Represent** What is $\frac{1}{2}$ of 560? Draw a picture to solve the problem.

*8. (69) **a.** The line segment shown below is how many centimeters long?

b. The segment is how many millimeters long?



*9. (55) The first four multiples of 9 are 9, 18, 27, and 36. What are the first four multiples of 90?

10. (56) **Represent** Compare: $\frac{2}{3}$ ◯ $\frac{2}{5}$. Draw and shade two congruent rectangles to show the comparison.

*11. (57) Badu can ride her bike an average of 12 miles per hour. At that rate, how many miles could she ride in 4 hours? Make a table to solve this problem.

12. (43, 51) $\$375.48 + \$536.70$

13. (51) $367{,}419 + 90{,}852$

14. (50)
$$\begin{array}{r} 42.3 \\ 57.1 \\ 28.9 \\ 96.4 \\ +\ 38.0 \\ \hline \end{array}$$

15. (52) $\$20.00 - \$19.39$

16. (52) $310{,}419 - 250{,}527$

17. (58) $\$6.08 \times 7$

18. (67) 86×40

19. (48) $59¢ \times 8$

*20. (71) $3\overline{)180}$

*21. (71) $8\overline{)241}$

*22. (68) $5\overline{)323}$

*23. (71) $184 \div 6$

*24. (71) $423 \div 7$

*25. (Inv. 3, 62) $\sqrt{36} + 4^2 + 10^2$

26. $9 + m = 27 + 72$ (61)

27. $6n = 90$ (41, 64)

28. **Model** Use an inch ruler to find the lengths of segments *AB, BC,* and *AC.* (39)

***29.** If the diameter of a coin is 2 centimeters, then its radius is how many millimeters? (21, 69)

***30.** **Estimate** From 7 a.m. until noon, the employees in a customer service department received 147 phone calls. What is a reasonable estimate of the number of calls that were received each hour? Explain how you found your answer. (71)

Early Finishers

Real-World Connection

Maddox has a roll of film with 32 photos and another roll with 12 photos. He developed both rolls of film. He decided to put all of his photos into two scrapbooks. Each scrapbook will hold 20 pictures.

a. How many pictures does Maddox have altogether?

b. Will Maddox be able to place all of his photos into the two scrapbooks? Explain your answer.

LESSON 72

• Finding Information to Solve Problems

Power Up

facts

Power Up H

count aloud

When we count by fives from 3, we say the numbers 3, 8, 13, 18, and so on. Count by fives from 3 to 53.

mental math

a. **Number Sense:** 12×20

b. **Number Sense:** 12×30

c. **Number Sense:** 12×40

d. **Number Sense:** $36 + 29 + 230$

e. **Money:** Lucas bought a roll of film for $4.87 and batteries for $3.98. What was the total cost?

f. **Time:** The baseball game started at 7:05 p.m. and lasted 1 hour 56 minutes. What time did the game end?

g. **Estimation:** One mile is about 1609 meters. Round this length to the nearest hundred meters.

h. **Calculation:** $\frac{1}{2}$ of 6, $\times 2$, $\times 5$, $- 16$

problem solving

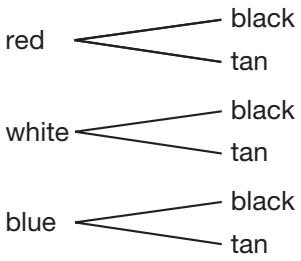
Levon has three colors of shirts—red, white, and blue. He has two colors of pants—black and tan. What combinations of one shirt and one pair of pants can Levon make?

Focus Strategy: Make a Diagram

Understand We are told that Levon has three colors of shirts and two colors of pants. We are asked to find the possible combinations of shirts and pants that Levon can wear.

Plan We can *make a diagram* to find all the combinations of shirt and pants colors.

Solve For each shirt, there are two colors of pants Levon can wear. We can list each shirt color and then draw two branches from each color. At the ends of the branches, we can write the color of the pants, like this:



Now we can list the combinations formed by the diagram. We have a total of six branches, so we find that Levon can make six different combinations of shirt and pants colors:

red, black; red, tan; white, black; white, tan; blue, black; blue, tan

Check We found six combinations that Levon can make with three different shirt colors and two different pants colors. We know our answer is reasonable because there are two combinations possible for each shirt color. There are $2 + 2 + 2$, or 6 combinations for three different shirt colors.

We call the diagram we made in this problem a *tree diagram,* because each line we drew to connect a shirt color with a pants color is like a branch of a tree.

New Concept

Part of the problem-solving process is finding the information needed to solve a problem. Sometimes we need to find information in graphs, tables, pictures, or other places. In some cases, we might be given more information than we need to solve a problem. In this lesson we will be finding the information we need to solve a problem.

Example 1

Read this information. Then answer the questions that follow.

The school elections were held on Friday, February 2. Tejana, Lily, and Taariq ran for president. Lily received 146 votes, and Tejana received 117 votes. Taariq received 35 more votes than Tejana.

Reading Math

Sometimes problems contain too much information. We need to look for the information that is necessary to solve a problem.

a. How many votes did Taariq receive?

b. Who received the most votes?

c. Speeches were given on the Tuesday before the elections. What was the date on which the speeches were given?

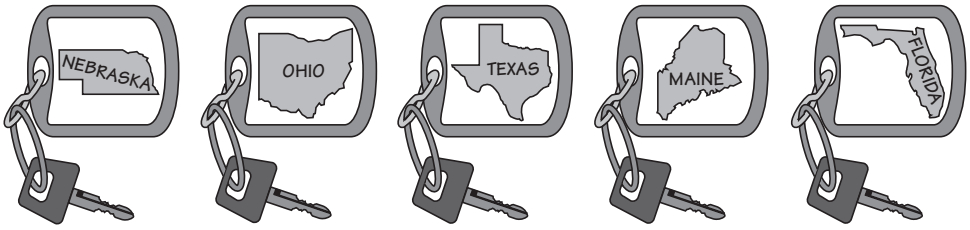
a. Taariq received 35 more votes than Tejana, and Tejana received 117 votes. So we add 35 to 117 and find that Taariq received **152 votes.**

b. Taariq received the most votes.

c. The elections were on Friday, February 2. The Tuesday when the speeches were presented was 3 days before that. We count back 3 days: February 1, January 31, January 30. The speeches were given on Tuesday, **January 30.**

Example 2

Alyssa collects key chains from the different states she has visited and displays them on a pegboard.



Since Alyssa lives in Nebraska and her grandmother lives in Ohio, she always keeps the Nebraska and Ohio key chains on the first two pegs. How many different ways can Alyssa arrange the key chains in one row?

If the Nebraska key chain is first and the Ohio key chain is second, then the other three chains can be arranged six ways:

Florida, Texas, Maine

Florida, Maine, Texas

Texas, Florida, Maine

Texas, Maine, Florida

Maine, Florida, Texas

Maine, Texas, Florida

If the Ohio key chain is first and the Nebraska key chain is second, then the other three chains can be arranged in the same six ways. Altogether, there are **12 different ways** to arrange the key chains.

Lesson Practice

Read this information. Then solve the problems that follow.

Terell did yard work on Saturday. He worked for 3 hours in the morning and 4 hours in the afternoon. He was paid $6 for every hour he worked.

a. How many hours did Terell work in all?

b. How much money did Terell earn in the morning?

c. How much money did Terell earn in all?

d. How many different amounts of money could you make using any two of the three coins shown below? Name the amounts.

Written Practice

Distributed and Integrated

1. (57) Christie's car travels 18 miles on each gallon of gas. How many miles can it travel on 10 gallons of gas?

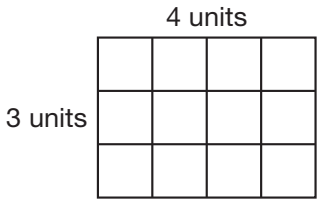
***2.** (Inv. 2, 52) **Analyze** Alejandro's front yard was 50 feet wide. Each time he pushed the mower along the length of the yard, he mowed a path 24 inches wide. To mow the entire yard, how many times did Alejandro need to push the mower along the length of the yard?

***3.** (64, 71) A gift of $160 is to be divided equally among 8 children. What amount of money will each child receive?

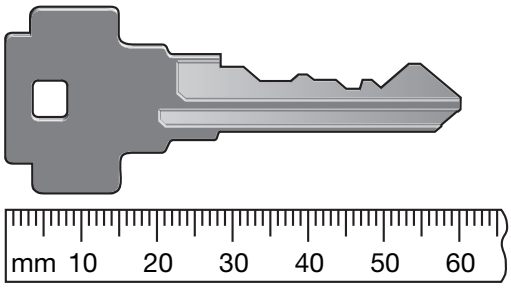
4. (27) Soccer practice lasts for an hour and a half. If practice starts at 3:15 p.m., at what time does it end?

***5.** (70) **Represent** One third of the team's 36 points were scored by Chinara. How many points did Chinara score? Draw a picture to help you solve the problem.

6. (Inv. 2, Inv. 3) Find the perimeter and area of the rectangle at right.



***7.** (69) **Estimate** This key is 60 mm long. The key is how many centimeters long?



***8.** (54) According to this calendar, the year 1902 began on what day of the week?

DECEMBER 1901

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

***9.** (72) Jocelyn is the first person in line at the school cafeteria. Antonio, Bryan, and Caroline are standing in line behind Jocelyn. In how many different orders could Antonio, Bryan, and Caroline be arranged behind Jocelyn? Name the ways.

10. (Inv. 2) A meter equals 100 centimeters. If each side of a square is 1 meter long, then what is the perimeter of the square in centimeters?

***11.** (55) List the first four multiples of 90.

12. (43) $\$1.68 + 32¢ + \$6.37 + \$5$

13. (43) $4.3 + 2.4 + 0.8 + 6.7$

14. (43, 45) **Explain** Find $\$10 - (\$6.46 + \$2.17)$. Describe the steps you used.

15. (62) $5 \times 4 \times 5$

16. (67) 359×70

17. (67) 50×74

*18. $2\overline{)161}$ (71)

*19. $5\overline{)400}$ (71)

*20. $9\overline{)462}$ (68)

21. $\frac{216}{3}$ (65)

*22. $159 \div 4$ (68)

*23. $\frac{490}{7}$ (71)

24. $\frac{126}{3}$ (65)

*25. $360 \div \sqrt{36}$ (Inv. 3, 71)

26. $5n = 120$ (41, 65)

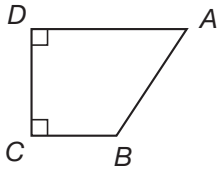
*27. **Analyze** Use the information below to answer parts **a** and **b**. (72)

Kamili scored two goals when her soccer team won 5 to 4 on November 3. To make the playoffs, her team needs to win two of the next three games.

a. How many goals were scored by Kamili's teammates?

b. Kamili's team has won four games and lost three games. Altogether, how many games does Kamili's team need to win to make the playoffs?

28. **a.** **Classify** Angles *C* and *D* of this polygon are right angles. Which angle appears to be an obtuse angle? (23)



b. **Classify** Which segments are perpendicular?

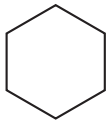
c. **Classify** Which segments are parallel?

*29. **Multiple Choice** Which two of these figures appear to be congruent? (66)

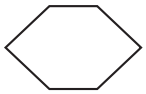
A

B

C



D



*30. **Represent** The average weights of some animals are shown in the table. Make a bar graph to display the data. (Inv. 6)

Average Weights of Animals

Animal	Weight (in pounds)
Domestic Rabbit	8
Otter	13
Ringtail Monkey	6
Chicken	7

LESSON 73

• Geometric Transformations

Power Up

facts Power Up H

count aloud Count down by fives from 53 to 3.

mental math

a. **Number Sense:** 21 × 20

b. **Number Sense:** 25 × 30

c. **Number Sense:** 25 × 20

d. **Number Sense:** 48 + 19 + 310

e. **Money:** Julia has a gift card that is worth $50. She has used the card for $24.97 in purchases. How much value is left on the card?

f. **Time:** The track meet started at 9:00 a.m. and lasted 4 hours 30 minutes. What time did the track meet end?

g. **Estimation:** At sea level, sound travels about 1116 feet in one second. Round this distance to the nearest hundred feet.

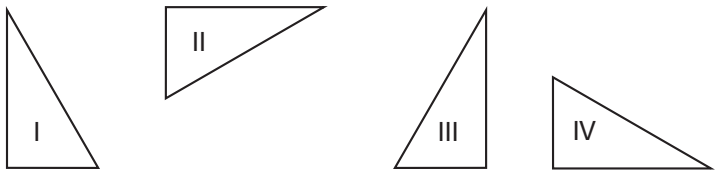
h. **Calculation:** $\sqrt{25}$, × 7, + 5, + 10, ÷ 10

problem solving Choose an appropriate problem-solving strategy to solve this problem. The charge for the taxi ride was $2.50 for the first mile and $1.50 for each additional mile. What was the charge for an 8-mile taxi ride? Explain how you solved the problem.

New Concept

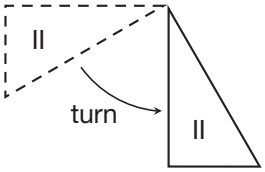
Geometry is a branch of mathematics that deals with such figures as lines, angles, polygons, circles, and solid objects. One concept from geometry that we have practiced is congruent figures. Recall that figures are congruent if they have the same shape and size. However, congruent figures may be in different

orientations (positions). For example, all four of these triangles are congruent:

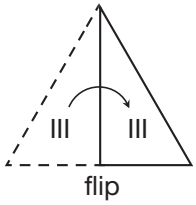


The right angle of △I ("triangle one") is at the lower left of the triangle. The other triangles may be reoriented to match △I.

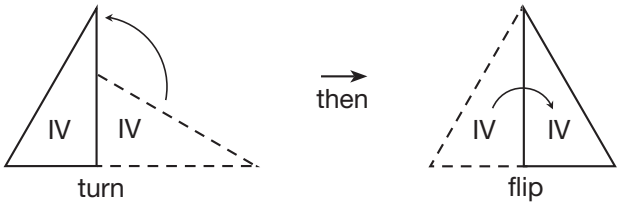
To reorient △II, we may *turn* the triangle so that its right angle is at the lower left.



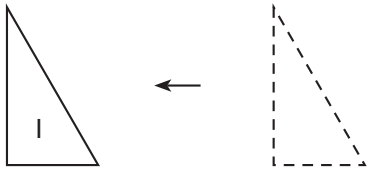
To reorient △III, we may *flip* the triangle as we might flip a pancake or flip a page in a book. (Imagine flipping △III so that its right angle is at the lower left.)



To reorient △IV, we may both turn and flip the triangle. (Imagine turning △IV so that it is oriented like △III. After turning the triangle, flip the triangle to match △I.)



To put each of triangles II, III, and IV in the same location as △I requires an additional step. Each reoriented triangle needs to *slide* to the location of △I.



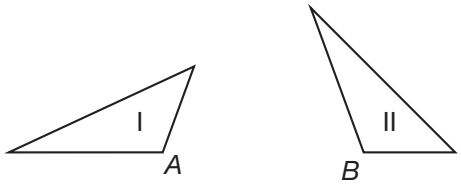
Turns, flips, and slides are three ways of moving figures. In geometry we call these movements **transformations,** and we give them special names: a turn is a **rotation,** a flip is a **reflection,** and a slide is a **translation.**

Transformations

Movement	Name
Slide	Translation
Turn	Rotation
Flip	Reflection

Example 1

Which transformations would move △II to the same orientation and location as △I?



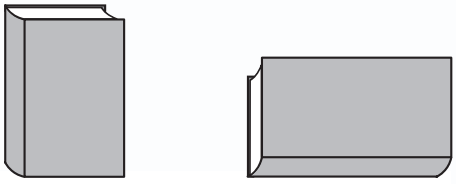
We may move △II to the location of △I with two transformations: **a turn and a slide.** The order of the transformations does not matter. We may slide △II so that point *B* is on point *A*. Then we may turn △II around point *B* so that the sides and angles align with △I. We call a slide a **translation,** and we call a turn a **rotation.**

Activity

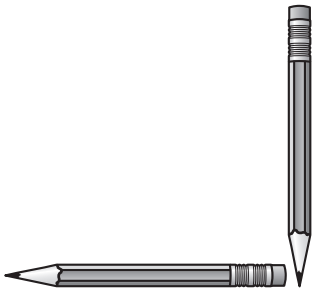
Using Transformations

Model Use classroom objects to act out the activities below.

a. Place two books in the positions shown below. Describe the transformations you would use to move one book into the same position as the other. Are the books congruent? Explain.



b. Place two pencils in the positions shown below. Describe the transformations you would use to move one pencil to the same position as the other. Are the pencils the same size and shape? Explain.



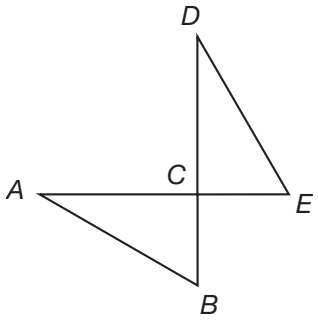
c. Place two rulers on a desk and describe the transformations that are needed to move one ruler to the same position as the other. Arrange the rulers so that a translation, a reflection, and a rotation are needed to move one ruler to the same position as the other.

Lesson Practice

a. Congruent figures may be repositioned through transformations so that all corresponding sides and angles are aligned. Name the three transformations described in this lesson. Give the common name and the geometric name for each transformation.

b. **Conclude** Which transformations would position $\triangle ABC$ on $\triangle DEC$?

c. **Model** Use a color tile to model a turn, a flip, and a slide.



Written Practice

Distributed and Integrated

*1. (Inv. 5, 70) **Represent** Half of the 48 pencils were sharpened. How many were *not* sharpened? What percent of the pencils were not sharpened? Draw a picture to solve the problem.

*2. (70) **Represent** What number is $\frac{1}{4}$ of 60? Draw a picture to solve the problem.

*3. (52, 72) Use this information to answer parts **a–c:**

Thirty students are going on a field trip. Each car can hold five students. The field trip will cost each student $5.

a. How many cars are needed for the field trip?

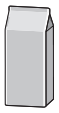
b. Altogether, how much money will be needed?

c. Diego has saved $3.25. How much more does he need to go on the field trip?

4. (27) **Analyze** During the summer, the swim team practiced $3\frac{1}{2}$ hours a day. If practice started at 6:30 a.m., at what time did it end if there were no breaks?

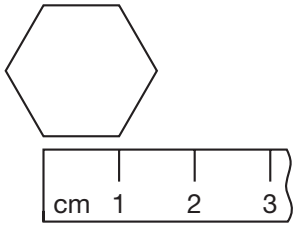
5. (40) One gallon of water will be poured into 1-quart bottles. How many 1-quart bottles will be filled?

1 gal



1 qt

*6. (69) Each side of a regular polygon has the same length. A regular hexagon is shown below. How many millimeters is the perimeter of this hexagon?



7. (31, 52) A mile is five thousand, two hundred eighty feet. The Golden Gate Bridge is four thousand, two hundred feet long. The Golden Gate Bridge is how many feet less than 1 mile long?

*8. (55) **Multiple Choice** Which of these numbers is *not* a multiple of 90?

A 45 **B** 180 **C** 270 **D** 360

9. (Inv. 1) What number is halfway between 300 and 400?

10. (50) $37.56 - 4.2$

11. (50) $4.2 + 3.5 + 0.25 + 4.0$

12. (52)
$$\begin{array}{r} \$100.00 \\ -\ \$\ 31.53 \\ \hline \end{array}$$

13. (52)
$$\begin{array}{r} 251{,}546 \\ -\ 37{,}156 \\ \hline \end{array}$$

14. (24)
$$\begin{array}{r} n \\ +\ 423 \\ \hline 618 \end{array}$$

15. (58)
$$\begin{array}{r} \$3.46 \\ \times\ \ 7 \\ \hline \end{array}$$

16. (67)
$$\begin{array}{r} 96 \\ \times\ 30 \\ \hline \end{array}$$

17. (58)
$$\begin{array}{r} \$0.59 \\ \times\ \ 8 \\ \hline \end{array}$$

***18.** (71) $7\overline{)633}$

***19.** (68) $5\overline{)98}$

***20.** (71) $3\overline{)150}$

***21.** (68) $329 \div 6$

***22.** (68) $274 \div 4$

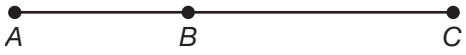
***23.** (71) $247 \div 8$

24. (41, 65) $\sqrt{25} \times m = 135$

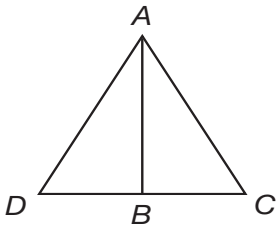
25. (24) $z - 476 = 325$

26. (61) $6a = 12 + 6$

***27.** (45, 69) **Connect** Segment AB is 2.3 cm long. Segment BC is 3.5 cm long. How long is segment AC? Write a decimal addition problem and find the answer.



***28.** (73) **Conclude** Which transformation would position $\triangle ABC$ on $\triangle ABD$?



29. (59) **Estimate** Using rounding or compatible numbers, which numbers would you choose to estimate the exact product of 25×25? Explain your reasoning.

***30.** *(Inv. 6)* **Interpret** This pictograph shows the maximum speeds that animals can run for a short distance. Use the pictograph to answer the questions that follow.

Animal	Maximum Speed (in miles per hour)
Warthog	
Wild turkey	
Lion	
Elephant	
Zebra	

Key:  = 10 miles per hour

a. Which animals can run at a speed of at least 30 miles per hour?

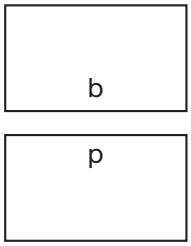
b. A squirrel can run at a maximum speed of 12 miles per hour. About how many times greater is the maximum speed of a lion? Explain your reasoning.

c. Some athletes can run at a maximum speed of about 28 miles per hour for short distances. Could some athletes run faster than an elephant? Explain your answer.

Early Finishers

Real-World Connection

Mr. Mikel drew the figure shown below. His students said the answer was "flip." What questions did Mr. Mikel ask the students?



LESSON 74

• Fraction of a Set

Power Up

facts

Power Up H

count aloud

When we count by fives from 4, we say the numbers 4, 9, 14, 19, and so on. Count by fives from 4 to 54.

mental math

a. **Number Sense:** 25×100

b. **Number Sense:** 100×40

c. **Number Sense:** $12 \times 3 \times 100$

d. **Number Sense:** Counting by 5s from 5, every number Raven says ends in 0 or 5. If she counts by 5s from 7, then every number she says ends in which digit?

e. **Powers/Roots:** $\sqrt{4} + 3^2 + 1^2$

f. **Measurement:** Abdul needs 6 quarts of water to make enough lemonade for the team. How many cups is 6 quarts?

g. **Estimation:** Rahoul has $28. Does he have enough money to buy three T-shirts that cost $8.95 each?

h. **Calculation:** 50% of 44, + 6, ÷ 7, − 4

problem solving

Choose an appropriate problem-solving strategy to solve this problem. M'Keisha solved a subtraction problem and then erased two of the digits from the problem. She gave the problem to Mae as a problem-solving exercise. Copy M'Keisha's problem on your paper, and fill in the missing digits for Mae.

$$\begin{array}{r} 123 \\ -\ \ 4\_ \\ \hline \_4 \end{array}$$

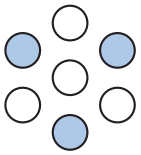
New Concept

Thinking Skill

Discuss

How can we check the answer?

There are seven circles in the set below. Three of the circles are shaded. The fraction of the set that is shaded is $\frac{3}{7}$.



$\frac{3}{7}$ Three circles are shaded.
There are seven circles in all.

The total number of members in the set is the denominator (bottom number) of the fraction. The number of members named is the numerator (top number) of the fraction.

Example 1

What fraction of the triangles is not shaded?

The denominator of the fraction is 9, because there are 9 triangles in all.
The numerator is 5, because 5 of the 9 triangles are not shaded.
So the fraction of triangles that are not shaded is $\frac{5}{9}$.

Thinking Skill

Verify

How can we check the answer?

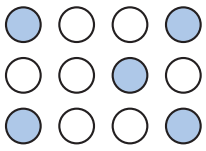
Example 2

In a class of 25 students, there are 12 girls and 13 boys. What fraction of the class is girls?

Twelve of the 25 students in the class are girls. So the fraction of the class that is girls is $\frac{12}{25}$.

Lesson Practice

a. What fraction of the set is shaded?



b. What fraction of the set is not shaded?

c. In a class of 27 students, there are 14 girls and 13 boys. What fraction of the class is boys?

d. In the word ALABAMA, what fraction of the letters are As?

Written Practice

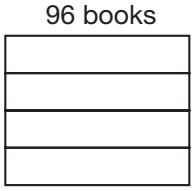
Distributed and Integrated

1. (1, 17) Milagro volunteered for sixty-two hours last semester. Michael volunteered for seven hours. Mitsu and Michelle each volunteered for twelve hours. Altogether, how many hours did they volunteer?

***2.** (31, 52) The Matterhorn is fourteen thousand, six hundred ninety-one feet high. Mont Blanc is fifteen thousand, seven hundred seventy-one feet high. How much taller is Mont Blanc than the Matterhorn?

3. (49) There are 25 squares on a bingo card. How many squares are on 4 bingo cards?

***4.** (70) **Analyze** Ninety-six books were placed on 4 shelves so that the same number of books were on each shelf. How many books were on each shelf?

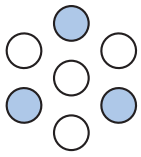


***5.** (Inv. 5, 70) One half of the 780 fans stood and cheered. How many fans stood and cheered? What percent of the fans stood and cheered?

6. (54) How many years is ten centuries?

***7.** (59) **Estimate** A package of José's favorite trading cards costs $1.75. What is a reasonable estimate of the number of packages José could purchase with $10.00? Explain your answer.

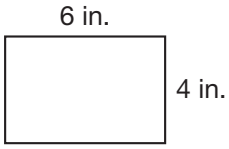
***8.** (74) What fraction of this set is not shaded?



9. (40) This 2-liter bottle contains how many milliliters of juice?

10. (Inv. 2, Inv. 3) **a.** What is the perimeter of the rectangle shown at right?

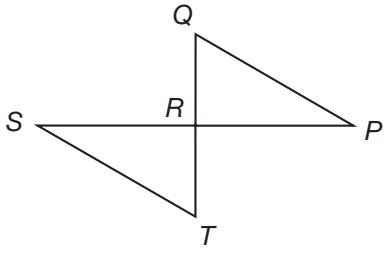
b. How many 1-inch squares would be needed to cover this rectangle?



***11.** (32) **Predict** How many millimeters are equal to 10 centimeters? Use the table to decide.

Millimeters	10	20	30	40	50
Centimeters	1	2	3	4	5

12. (73) Which transformation(s) would position $\triangle STR$ on $\triangle PQR$?



13. (43, 45) $\$6.15 - (\$0.57 + \$1.20)$

14. (52) $43{,}160 - 8459$

***15.** (62) $8 \times 8 \times 8$

16. (58) $\$3.54 \times 6$

17. (67) 80×57

***18.** (58) 704×9

***19.** (68) $9\overline{)354}$

***20.** (71) $7\overline{)285}$

***21.** (68) $5\overline{)439}$

***22.** (68) $515 \div 6$

***23.** (71) $\frac{360}{4}$

24. (65) $784 \div 8$

***25.** (Inv. 3, 62) $\sqrt{36} + n = 6^2$

26. (24) $462 - y = 205$

27. (41) $50 = 5r$

***28.** (3) **Conclude** Find the next number in this counting sequence:

…, 90, 180, 270, ____, …

***29.** (21) **Explain** Sierra's arm is 20 inches long. If Sierra swings her arm in a circle, what will be the diameter of the circle? Explain your answer.

***30.** (55) **Multiple Choice** Which of these numbers is a prime number?

A 1 **B** 2 **C** 4 **D** 9

LESSON 75

• Measuring Turns

Power Up

facts

Power Up H

count aloud

Count down by fives from 54 to 4.

mental math

The sum of 38 and 17 is 55. If we make 38 larger by 2 and 17 smaller by 2, then the addition is 40 + 15. The sum is still 55, but the mental addition is easier. Before finding the following sums, make one number larger and the other smaller so that one of the numbers ends in zero.

a. **Number Sense:** 38 + 27

b. **Number Sense:** 48 + 24

c. **Number Sense:** 59 + 32

d. **Number Sense:** 57 + 26

e. **Money:** $6.49 + $2.99

f. **Measurement:** How many cups is one pint?

g. **Estimation:** Choose the more reasonable estimate for the temperature inside a refrigerator: 3°C or 30°C.

h. **Calculation:** 2 × 9, + 29, + 53, ÷ 10

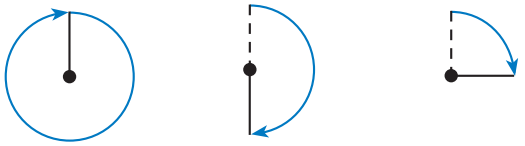
problem solving

Choose an appropriate problem-solving strategy to solve this problem. Sid wants to know the circumference of (distance around) the trunk of the big oak tree at the park. He knows the circumference of the trunk is more than one yard. Sid has some string and a yardstick. How can he measure the circumference of the trunk of the tree in inches?

New Concept

As Micah rides a skateboard, we can measure his movements. We might use feet or meters to measure the distance Micah travels. To measure Micah's turns, we may use **degrees.** Just as for temperature measurements, we use the degree symbol (°) to stand for degrees.

If Micah makes a **full turn,** then he has turned 360°. If Micah makes a **half turn,** he has turned 180°. A **quarter turn** is 90°.

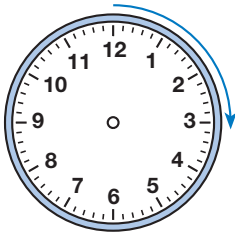


Full turn
360°

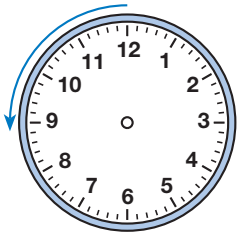
Half turn
180°

Quarter turn
90°

Besides measuring the amount of turn, we may also describe the direction of a turn as **clockwise** or **counterclockwise.**



Clockwise turn



Counterclockwise turn

For instance, we tighten a screw by turning it clockwise, and we loosen a screw by turning it counterclockwise.

Activity 1

Rotations and Degrees

Stand and perform these activities as a class.

Model Face the front of the room and make a quarter turn to the right.

Discuss How many degrees did you turn? Did you turn clockwise or counterclockwise?

Return to your original position by turning a quarter turn to the left.

How many degrees did you turn? Did you turn clockwise or counterclockwise?

Face the front of the room, and make a half turn either to the right or to the left.

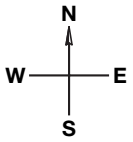
How many degrees did you turn? Is everyone facing the same direction?

Start by facing the front. Then make a three-quarter turn clockwise.

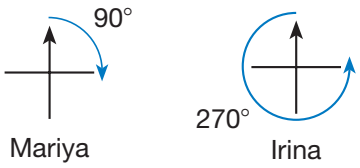
How many degrees did you turn? How many more degrees do you need to turn clockwise in order to face the front?

Example 1

Mariya and Irina were both facing north. Mariya turned 90° clockwise and Irina turned 270° counterclockwise. After turning, in which directions were the girls facing?



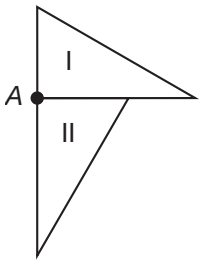
Below we show the turns Mariya and Irina made.

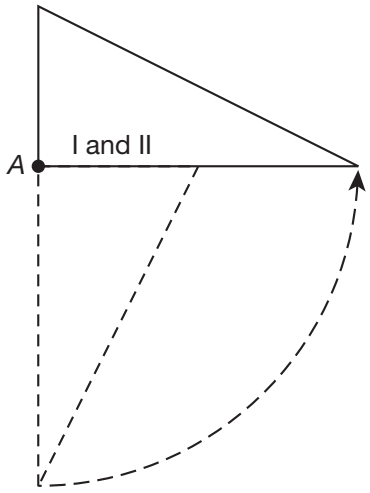


After turning 90° clockwise, Mariya was facing east. After turning 270° counterclockwise, Irina was also facing east. (Each quarter turn is 90°, so 270° is three quarters of a full turn.) Both girls were facing **east** after their turns.

Example 2

Describe the amount and the direction of a turn around point *A* that would position △II on △I.





Point *A* does not move, but the rest of △II is turned to align with △I. One solution is to rotate △II **90° counterclockwise.** The fact that the triangles perfectly match after the rotation shows that they are congruent.

Conclude Describe an alternate way to rotate △II to the position of △I.

Activity 2

Rotations and Congruence

One way to show that two figures are congruent is to move one figure to the position of the other figure to see if the two figures perfectly match.

a. **Model** Fold a sheet of paper in half and cut a shape from the doubled sheet of paper so that two congruent shapes are cut out at the same time. Then position the two figures on your desk so that a rotation is the only movement necessary to move one shape onto the other shape. Perform the rotation to show that the shapes are congruent.

b. **Represent** On another sheet of paper, draw or trace the two shapes you cut out. Draw the shapes in such a position that a 90° rotation of one shape would move it to the position of the other shape

Lesson Practice

a. **Predict** Wakeisha skated east, turned 180° clockwise, and then continued skating. In what direction was Wakeisha skating after the turn?

Describe each rotation in degrees clockwise or counterclockwise:

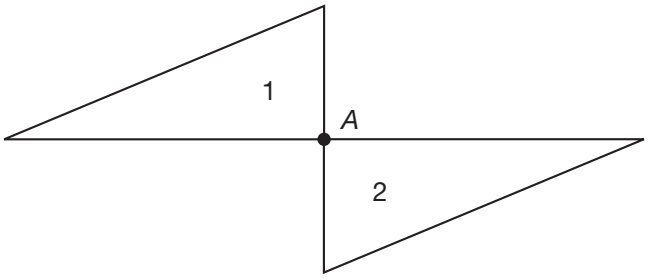
b. a quarter turn to the left

c. a full turn to the right

d. a three-quarter turn to the left

e. a half turn to the right

f. Describe the rotation that would position triangle 1 on triangle 2.

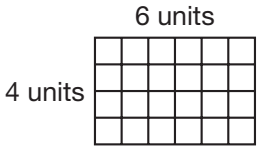


Written Practice

Distributed and Integrated

1. (49) Pears cost 59¢ per pound. How much would 4 pounds of pears cost?

2. (Inv. 2, Inv. 3) Find the perimeter and area of this rectangle:



***3.** (70) **Connect** There were three hundred sixty books on the floor. Da-Xia put one fourth of the books on a table.

a. How many books did Da-Xia put on the table?

b. How many books were still on the floor?

4. (Inv. 5) What percent of the books in problem **3** were left on the floor?

***5.** (37) **Represent** To what decimal number is the arrow pointing? What mixed number is this?

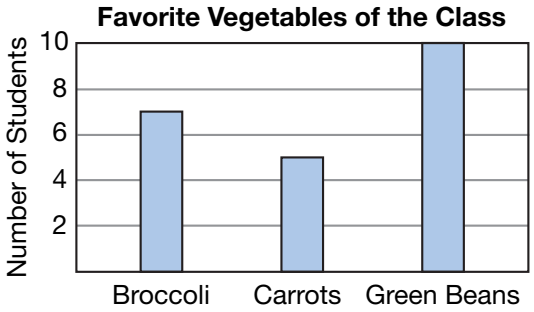
*6. (59) **Estimate** Two hundred seventy-two students attend one elementary school in a city. Three hundred nineteen students attend another elementary school. Estimate the total number of students attending those schools by rounding the number of students attending each school to the nearest hundred before adding.

*7. (74) What fraction of this set is shaded?

*8. (40) One quart of milk is how many ounces?

9. (40, Inv. 5) One quart is a quarter of a gallon. So one quart is what percent of a gallon?

*10. (Inv. 6) **Interpret** Use the information in the bar graph below to answer parts **a** and **b**.



a. Carrots are the favorite vegetable of how many students?

b. Altogether, how many students said broccoli or carrots are their favorite vegetable?

*11. (18) **Represent** The 8 a.m. temperature was −5 degrees Fahrenheit. By 3 p.m., the temperature had increased 10 degrees. What was the 3 p.m. temperature?

*12. (75) **Conclude** Describe the number of degrees and the direction of a turn that would move this letter B to an upright position.

13. (43, 51) $\begin{array}{r} \$86.47 \\ +\ \$47.98 \\ \hline \end{array}$

14. (50) $\begin{array}{r} 36.7 \\ -\ 18.5 \\ \hline \end{array}$

15. (51) $\begin{array}{r} 2358 \\ 4715 \\ 317 \\ 2103 \\ +\ \ 62 \\ \hline \end{array}$

***16.** (68) $8\overline{)716}$

***17.** (71) $2\overline{)161}$

18. (65) $7\overline{)434}$

***19.** (68) $513 \div 6$

***20.** (71) $\frac{270}{9}$

21. (65) $\frac{267}{3}$

22. (24, 50) $n - 7.5 = 21.4$

23. (58) $\begin{array}{r} \$6.95 \\ \times\ \ 8 \\ \hline \end{array}$

24. (67) $\begin{array}{r} 46 \\ \times\ 70 \\ \hline \end{array}$

25. (58) $\begin{array}{r} 460 \\ \times\ \ 9 \\ \hline \end{array}$

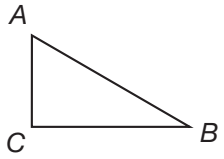
26. (61) $3a = 30 + 30$

27. (62) $3^2 - 2^3$

***28.** (75) A quarter turn is 90°. How many degrees is a three-quarter turn?

29. (23, 66) **Conclude** **a.** Which segment appears to be perpendicular to segment *BC*?

b. Draw a triangle similar to, but not congruent to, $\triangle ABC$.



30. (52) **Explain** During their professional baseball careers, pitcher Nolan Ryan struck out 5714 batters. Pitcher Steve Carlton struck out 4136 batters. How many more batters did Nolan Ryan strike out? Explain why your answer is reasonable.

Early Finishers

Real-World Connection

Alba glanced at the clock and saw that it was 3:00 p.m. When Alba glanced at the clock again, it was 3:45 p.m.

a. During this time, how many degrees did the minute hand turn?

b. Draw a picture to solve the problem.

LESSON 76

• Division with Three-Digit Answers

Power Up

facts Power Up G

count aloud Count by fives from 1 to 51.

mental math Before adding, make one number larger and the other number smaller.

a. **Number Sense:** 49 + 35

b. **Number Sense:** 57 + 35

c. **Number Sense:** 28 + 44

d. **Number Sense:** 400 × 30

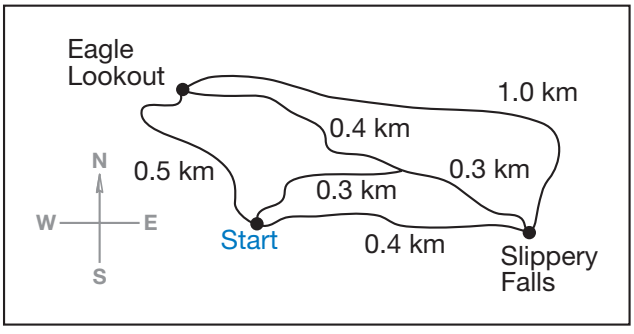
e. **Money:** KaNiyah owes her brother $10.00. She only has $4.98. How much more money does she need to repay her brother?

f. **Measurement:** Seven feet is 84 inches. A dolphin that is 7 feet 7 inches long is how many inches long?

g. **Estimation:** Each half-gallon of milk costs $2.47. Round this price to the nearest 25 cents. Then estimate the cost of 3 half-gallon containers of milk.

h. **Calculation:** $\sqrt{25}$, × 2, ÷ 5, × 15, + 48

problem solving Choose an appropriate problem-solving strategy to solve this problem. The map of a park's trails is shown at right. LaDonna will start at the point labeled "Start." She wants to visit both Eagle Lookout and Slippery



Falls. What is the shortest distance she can hike in order to visit both points and then return to where she started?

New Concept

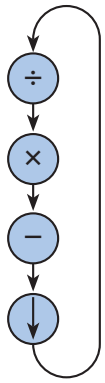
We have practiced division problems that have two-digit answers. In this lesson we will practice division problems that have three-digit answers. Remember that the pencil-and-paper method we have used for dividing has four steps.

Step 1: Divide.

Step 2: Multiply.

Step 3: Subtract.

Step 4: Bring down.



For each step we write a number. When we finish Step 4, we go back to Step 1 and repeat the steps until no digits remain to bring down.

Example 1

Thinking Skill

Discuss

Why do we write the digit 2 in the hundreds place of the quotient?

Divide: $3\overline{)794}$

Step 1: Divide $3\overline{)7}$ and write "2."

Step 2: Multiply 2 by 3 and write "6."

Step 3: Subtract 6 from 7 and write "1."

Step 4: Bring down the 9 to make 19.

Repeat:

Step 1: Divide 19 by 3 and write "6."

Step 2: Multiply 6 by 3 and write "18."

Step 3: Subtract 18 from 19 and write "1."

Step 4: Bring down the 4 to make 14.

Repeat:

Step 1: Divide 14 by 3 and write "4."

Step 2: Multiply 4 by 3 and write "12."

$$\begin{array}{r} 264\text{ R }2 \\ 3\overline{)794} \\ \underline{6} \\ 19 \\ \underline{18} \\ 14 \\ \underline{12} \\ 2 \end{array}$$

Check:

$$\begin{array}{r} 264 \\ \times\quad 3 \\ \hline 792 \end{array}$$

Step 3: Subtract 12 from 14 and write "2."

Step 4: There are no digits to bring down. We are finished dividing. We write "2" as the remainder for a final answer of **264 R 2.**

$$\begin{array}{r} 792 \\ +\quad 2 \\ \hline 794 \end{array}$$

To divide dollars and cents by a whole number, we divide the digits just like we divide whole numbers. **The decimal point in the answer is placed directly above the decimal point inside the division box.** We write a dollar sign in front of the answer.

Example 2

Thinking Skill

Justify

How can we check the answer?

The total cost of three identical items is $8.40. What is the cost of each item?

The decimal point in the quotient is directly above the decimal point in the dividend. We write a dollar sign in front of the quotient.

The cost of each item is **$2.80.**

$$\begin{array}{r} \$2.80 \\ 3\overline{)\$8.40} \\ 6 \\ \hline 24 \\ 24 \\ \hline 00 \\ 00 \\ \hline 0 \end{array}$$

Example 3

At 4 p.m. there were about 500 cars waiting in lines at 7 highway tollbooths. About the same number of cars were in each line. What is a reasonable estimate of the number of cars in each line?

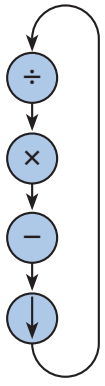
We separate 500 cars into 7 equal groups by dividing 500 by 7. To estimate, we choose a compatible number close to 500 that is divisible by 7. We choose 490.

$$490 \div 7 = 70$$

About 70 cars were in each line.

Lesson Practice

a. Copy the diagram at right. Then name the four steps of pencil-and-paper division.



Divide:

b. $4\overline{)974}$

c. $\$7.95 \div 5$

d. $6\overline{)1512}$

e. $8\overline{)\$50.00}$

f. Altogether, 878 people attended three showings of a movie on Thursday. About the same number of people attended each showing. What is a reasonable estimate of the attendance at each showing? Explain your answer.

Written Practice

Distributed and Integrated

***1.** (57) **Analyze** Brett can type at a rate of 25 words per minute. At that rate, how many words can he type in 5 minutes? Make a table to solve this problem.

***2.** (52, 71) Shakia has five days to read a 200-page book. If she wants to read the same number of pages each day, how many pages should she read each day?

***3.** (43, 59) **Estimate** Jira ordered a book for $6.99, a dictionary for $8.99, and a set of maps for $5.99. Estimate the price for all three items. Then find the actual price.

4. (49) Patrick practiced the harmonica for 7 weeks before his recital. How many days are equal to 7 weeks?

5. (61) One third of the books were placed on the first shelf. What fraction of the books were not placed on the first shelf ?

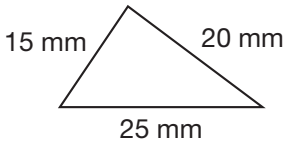
***6.** (Inv. 1) **Represent** To what decimal number is the arrow pointing? What mixed number is this?

***7.** (74) In the word HIPPOPOTAMI, what fraction of the letters are Ps?

***8.** (Inv. 2) **Multiple Choice** Deunoro ran a 5-kilometer race. Five kilometers is how many meters?

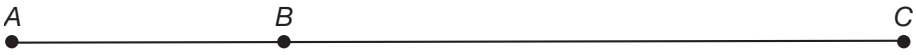
A 5 m **B** 50 m **C** 500 m **D** 5000 m

9. What is the perimeter of this triangle?
(Inv. 2)



***10.** **Estimate** Altogether, 117 students attend 6 different grades of a small elementary school. About the same number of students attend each grade. What is a reasonable estimate of the number of students in each grade? Explain your answer.
(76)

***11.** **Connect** The length of segment *AB* is 3.6 cm. The length of segment *AC* is 11.8 cm. What is the length of segment *BC?* Write and solve a decimal addition equation and a decimal subtraction equation.
(45, 69)



12. $25 − ($19.71 + 98¢)
(43, 45)

13. 12 + 13 + 5 + n = 9 × 8
(2, 24)

14. $5.00 − $2.92
(43)

15. 36.21 − 5.7
(50)

16. 5 × 6 × 9
(62)

17. 50 × 63
(67)

18. 478 × 6
(58)

***19.** $3\overline{)435}$
(76)

***20.** $7\overline{)867}$
(76)

***21.** $5\overline{)\$13.65}$
(76)

22. 453 ÷ 6
(68)

***23.** 543 ÷ 4
(76)

***24.** $4.72 ÷ 8
(76)

25. n + 6 = 120
(24)

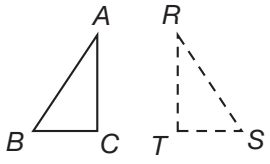
26. 4w = 132
(41, 65)

***27.** 4 + 8 + 7 + 6 + 4 + n + 3 + 6 + 5 = 55
(2)

***28.** **Predict** Mieko was facing east. If Mieko turned 90° clockwise, in which direction would she be facing?
(75)

29. If the diameter of a playground ball is one foot, then its radius is how many inches?
(21)

***30.** **Conclude** Which transformations would move △*ABC* to position *RST?*
(73)



LESSON 77

• Mass and Weight

Power Up

facts Power Up G

count aloud Count by fives from 2 to 52.

mental math Before adding, make one number larger and the other number smaller.

a. **Number Sense:** 55 + 47

b. **Number Sense:** 24 + 48

c. **Number Sense:** 458 + 33

d. **Number Sense:** 15 × 30

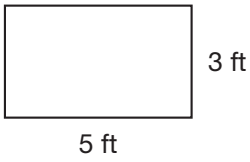
e. **Money:** Renee bought a pair of gloves for $14.50 and a hat for $8.99. What was the total cost of the items?

f. **Measurement:** Compare: 2 miles ◯ 10,000 feet

g. **Estimation:** An *acre* is a measurement of land. A square plot of land that is 209 feet on each side is about 1 acre. Round 209 feet to the nearest hundred feet.

h. **Calculation:** 7^2, − 1, ÷ 8, + 4, − 4, ÷ 6

problem solving Choose an appropriate problem-solving strategy to solve this problem. Colby wants to cover his bulletin board with square sheets of paper that are 1 foot on each side. His bulletin board is 5 feet wide and 3 feet tall. If Colby has already cut 12 squares of paper, how many more squares does he need to cut? Explain how you found your answer.



New Concept

There is a difference between *weight* and *mass*. The **mass** of an object is how much matter an object has. **Weight** is the measure of the force of gravity on that object. Though an object's weight depends on the force of gravity, its mass does not. For example, the force of gravity on the moon is less than it is on Earth, so the weight of an object on the moon is less, but its mass remains the same.

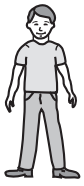
The units of *weight* in the U.S. Customary System are **ounces, pounds,** and **tons.** Remember that in Lesson 40, we used the word *ounce* to describe an amount of fluid. However, *ounce* can also describe an amount of weight. A fluid ounce of water weighs about one ounce.

As we see in the table below, one *pound* is 16 ounces, and one *ton* is 2000 pounds. Ounce is abbreviated **oz.** Pound is abbreviated **lb.**

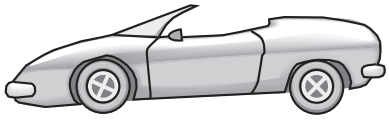
16 oz = 1 lb
2000 lb = 1 ton

A box of cereal might weigh 24 ounces. Some students weigh 98 pounds. Many cars weigh 1 ton or more.

24 ounces



98 pounds



1 ton

Example 1

Mallory's book weighs about 2 pounds. Two pounds is how many ounces?

Each pound is 16 ounces. This means that 2 pounds is 2 × 16 ounces, which is **32 ounces.**

Example 2

The rhinoceros weighed 3 tons. Three tons is how many pounds?

Each ton is 2000 pounds. This means 3 tons is 3 × 2000 pounds, which is **6000 pounds.**

Activity 1

Customary Weight

Materials needed:

- **Lesson Activity 30**
- balance scale
- #2 pencils (unsharpened, taped in bundles of 5)

Use a balance scale and pencils to perform these activities. Use the U.S. Customary Weights table on **Lesson Activity 30** to record your answers.

a. Each bundle of 5 pencils is equal to 1 ounce. Using this information, how many pencils would weigh a pound?

b. Find a small object in the classroom to weigh, such as a ruler or tape. Use the bundle of pencils to estimate the weight of this object in ounces, and then place the object on a balance scale. Record the name of the object, your estimate, and the measured weight in ounces. Was your estimate reasonable? Why or why not?

c. Find two different objects that you estimate to be the same weight. Place the two objects on the balance scale to see if the scale is balanced. Record the names of the two objects, and state which object is heavier or if the weights are equal.

Grams and *kilograms* are metric units of mass. Recall that the prefix *kilo-* means "thousand." This means a kilogram is 1000 grams. Gram is abbreviated **g.** Kilogram is abbreviated **kg.**

$$1000 \text{ g} = 1 \text{ kg}$$

A dollar bill has a mass of about 1 gram. This book has a mass of about 1 kilogram. Since this book has fewer than 1000 pages, each page is more than 1 gram.

Example 3

Choose the more reasonable measure for parts a–c.

a. pair of shoes: 1 g or 1 kg

b. cat: 4 g or 4 kg

c. quarter: 5 g or 5 kg

a. A pair of shoes is about **1 kg.**

b. A cat is about **4 kg.**

c. A quarter is about **5 g.**

Example 4

Delores's rabbit has a mass of 4 kilograms. Four kilograms is how many grams?

Each kilogram is 1000 grams. So 4 kilograms is 4 × 1000 grams, which is **4000 grams.**

Activity 2

Metric Mass

Materials needed:

- **Lesson Activity 30**
- balance scale
- gram masses

Use a balance scale and gram masses to perform these activities. Use the "Metric Mass" table on **Lesson Activity 30** to record your answer.

a. Select an object such as a pencil or ruler and estimate its mass in grams. Then balance the object on a balance scale with gram masses to find its mass. Record the name of the object, your estimate, and the measured mass.

b. Estimate how many pencils would equal a kilogram. Then weigh a number of pencils to improve your estimate. Describe how you can make a close estimate of the number of pencils that would equal a kilogram.

c. Find a small book and estimate its weight in grams. Use a balance scale to find the actual weight of the book. How close was your estimate to the actual weight?

Lesson Practice

a. Dave's pickup truck can haul a half ton of cargo. How many pounds is a half ton?

b. The newborn baby weighed 7 lb 12 oz. The baby's weight was how much less than 8 pounds?

Estimate Choose the more reasonable measure in problems **c–h:**

c. tennis ball: 57 g or 57 kg

d. tennis ball: 5 oz or 5 lb

e. dog: 6 g or 6 kg

f. dog: 11 oz or 11 lb

g. bowling ball: 7 g or 7 kg

h. bowling ball: 13 oz or 13 lb

i. Seven pounds is how many ounces?

j. Which depends on the force of gravity: mass or weight?

k. Nancy had 4 pounds of peaches. To make a peach cobbler, she needs 24 ounces of peaches. After making the cobbler, how many ounces of peaches will Nancy have left?

Written Practice

Distributed and Integrated

***1.** *(40, Inv. 6)* Use the information in the pictograph below to answer parts **a–c.**

Consumed by Matt in One Day	
Water	
Tea	
Milk	
Juice	

Key:  = 1 cup = 8 ounces

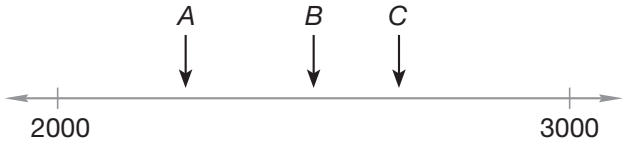
a. How many pints of liquid did Matt drink in 1 day?

b. Matt drank twice as much water as he did what other beverage?

c. He drank exactly 1 quart of which beverage?

***2.** *(Inv. 5, 70)* **Analyze** There were 4 rooms. One fourth of the 56 guests gathered in each room. How many guests were in each room? What percent of the guests were in each room?

3. (Inv. 1) **Estimate** Which of these arrows could be pointing to 2500?



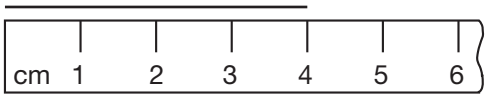
***4.** (59) **Estimate** Zoe estimated the sum of 682 + 437 + 396 by first rounding each addend to the nearest hundred. What was Zoe's estimate of the actual sum?

***5.** (74) What fraction of this set is shaded?

***6.** (77) **Connect** Jevonte weighed 9 pounds when he was born. How many ounces is that?

***7.** (69) **a.** **Estimate** The segment below is how many centimeters long?

b. The segment is how many millimeters long?



***8.** (33) **Represent** A company was sold for $7,450,000. Use words to write that amount of money.

9. (Inv. 2, 63) If each side of a hexagon is 1 foot long, then how many inches is its perimeter?

10. (51)
$$\begin{array}{r} 93{,}417 \\ +\ 8{,}915 \\ \hline \end{array}$$

11. (24, 52)
$$\begin{array}{r} 42{,}718 \\ -\quad k \\ \hline 26{,}054 \end{array}$$

12. (51)
$$\begin{array}{r} 1307 \\ 638 \\ 5219 \\ 138 \\ +\ 16 \\ \hline \end{array}$$

13. (41, 52)
$$\begin{array}{r} \$100.00 \\ -\ \$\ 86.32 \\ \hline \end{array}$$

14. (52)
$$\begin{array}{r} 405{,}158 \\ -\ 396{,}370 \\ \hline \end{array}$$

15. (58) 567×8

16. (67) $30 \times 84¢$

17. (58) $\$2.08 \times 4$

***18.** (76) $4\overline{)\$15.00}$

***19.** (76) $\frac{936}{6}$

***20.** (76) $8\overline{)4537}$

*21. 452 ÷ 5 (71)

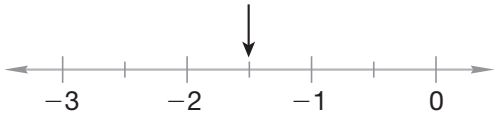
22. 378 ÷ 9 (65)

*23. 960 ÷ 7 (76)

24. $\sqrt{16} \times n = 100$ (Inv. 3, 41)

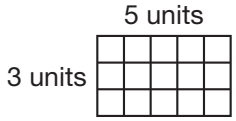
25. $5b = 10^2$ (61, 62)

*26. **Represent** To what decimal number is the arrow pointing? What mixed number is this? (Inv. 1)



*27. **Conclude** Mona turned a quarter turn clockwise, and then she turned two more quarter turns clockwise. Altogether, Mona turned how many degrees? (75)

28. Find the perimeter and area of the rectangle shown at right. (Inv. 2, Inv. 3)



29. The relationship between feet and inches is shown in the table below: (3, 32)

Inches	12	24	36	48	60
Feet	1	2	3	4	5

a. **Generalize** Write a rule that describes the relationship.

b. **Predict** How many inches are equal to 12 feet?

*30. **Verify** The weight of an object on the moon is about $\frac{1}{6}$ of its weight on Earth. Obi's golden retriever weighs 84 pounds. What would the golden retriever weigh on the moon? (77)

Early Finishers

Real-World Connection

The great white shark is found in oceans all over the world. It is the world's largest predatory fish. The average weight of the great white is 2500 pounds.

a. Does the average great white shark weigh more or less than a ton? Explain your answer.

b. Does the average great white shark weigh more or less than two tons? Explain your answer.

LESSON 78

• Classifying Triangles

Power Up

facts Power Up G

count aloud Count by fives from 3 to 53.

mental math

a. **Number Sense:** 35 × 100

b. **Number Sense:** Counting by 5s from 5, every number Ramon says ends in 0 or 5. If he counts by 5s from 8, then every number he says ends in which digit?

c. **Percent:** 50% of $31.00

d. **Measurement:** Jenna jogged 3 kilometers. How many meters is that?

e. **Money:** The box of cereal cost $4.36. Tiana paid with a $5 bill. How much change should she receive?

f. **Time:** Rodrigo's school day lasts 7 hours. If Rodrigo attends school Monday through Friday, how many hours is he at school each week?

g. **Estimation:** Each CD costs $11.97. Estimate the cost of 4 CDs.

h. **Calculation:** 50% of 88, + 11, ÷ 11

problem solving Choose an appropriate problem-solving strategy to solve this problem. V'Nessa is mailing an envelope that weighs 6 ounces. The postage rates are 39¢ for the first ounce and 24¢ for each additional ounce. If V'Nessa pays the postal clerk $2.00 for postage, how much money should she get back?

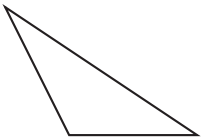
New Concept

One way to classify (describe) a triangle is by referring to its largest angle as either obtuse, right, or acute. An obtuse angle is larger than a right angle. An acute angle is smaller than a right angle.

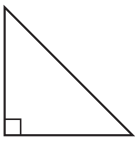
Thinking Skill

Conclude

Describe two different characteristics of the angles of an equilateral triangle.



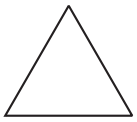
Obtuse triangle
(One angle is obtuse.)



Right triangle
(One angle is right.)

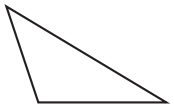
Acute triangle
(All angles are acute.)

Another way to classify a triangle is by comparing the lengths of its sides. If all three sides are equal in length, the triangle is *equilateral.* If at least two sides are equal in length, the triangle is **isosceles.** If all three sides have different lengths, the triangle is **scalene.**



Equilateral triangle

Isosceles triangle



Scalene triangle

Represent Can an isosceles triangle have an obtuse angle? Draw a triangle to support your conclusion.

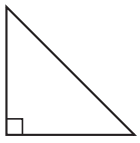
Notice that the three angles of the equilateral triangle are the same size. This means an equilateral triangle is also **equiangular.** Now notice that two angles of the isosceles triangle are the same size. In a triangle, the number of angles with the same measure equals the number of sides with the same measure.

Example

Draw a triangle that is both a right triangle and an isosceles triangle.

A right triangle contains one right angle. An isosceles triangle has two sides of equal length. We begin by drawing a right angle with equal-length sides.

Then we draw the third side of the triangle.



Discuss Describe different triangles that have acute, right, and obtuse angles.

Activity

Transformations and Congruent Triangles

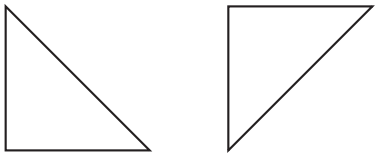
Material needed:

- **Lesson Activity 31**

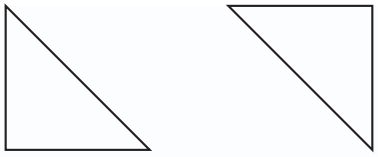
Formulate For this activity, you will develop a plan to predict the movement of a triangle to determine **congruence.**

a. Cut out the two right triangles from **Lesson Activity 31,** or use triangle manipulatives.

b. **Predict** Place the two triangles in the positions shown below. Plan a way to move one triangle using a translation and a rotation to show that the triangles are congruent. Remember that one triangle must be on top of the other in the final position. Write your conclusion. Include direction and degrees in your answer.



c. **Predict** Place the two triangles in the positions shown below. Plan a way to move one triangle to show that the triangles are congruent. Remember that one triangle must be on top of the other in the final position. Write your conclusion. Include direction and degrees in your answer.



Lesson Practice

a. **Conclude** Can a right triangle have two right angles? Why or why not?

b. What is the name for a triangle that has at least two sides equal in length?

c. **Model** Use a color tile to model a translation, reflection, and rotation.

Written Practice

Distributed and Integrated

1. (52, 64) Jarell bought pencils on sale for 5 cents each. He spent 95 cents. How many pencils did Jarell buy?

2. (25, 30) **Estimate** Clanatia went to the store with $9.12. She spent $3.92. About how much money did Clanatia have left?

3. (70) Pamela listened to half of a 90-minute tape. How many minutes of the tape did she hear?

***4.** (Inv. 5, 61) One fourth of the guests gathered in the living room. What fraction of the guests did not gather in the living room? What percent of the guests did not gather in the living room?

***5.** (69, 78) If one side of an equilateral triangle is 3 centimeters long, then what is its perimeter in

a. centimeters?

b. millimeters?

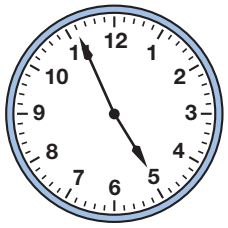
***6.** (Inv. 1) **Represent** To what decimal number is the arrow pointing? What mixed number is this?

***7.** (40, 74) **Analyze** Half of a gallon is a half gallon. Half of a half gallon is a quart. Half of a quart is a pint. Half of a pint is a cup. A cup is what fraction of a quart?

***8.** (77) A baby deer is called a fawn. Most fawns weigh about 3 kilograms when they are born. How many grams is that?

***9.** (59) **Explain** Isabella estimated the product of 389 × 7 to be 2800. Explain how Isabella used rounding to make her estimate.

***10.** (27, 75) **Multiple Choice** It is late afternoon. When the minute hand turns 360°, what time will it be?



A 11:25 a.m. **B** 5:56 a.m.

C 4:56 p.m. **D** 5:56 p.m.

***11.** (56) **Represent** Compare: $\frac{3}{4}$ ◯ $\frac{4}{5}$. Draw and shade two congruent rectangles to show the comparison.

12. (50) $4.32 - 2.5$

13. (50) $3.65 + 5.2 + 0.18$

14. (50) $\$50.00 - \$42.60$

15. (43) $\$17.54 + 49¢ + \$15$

***16.** (76) $2\overline{)567}$

***17.** (76) $6\overline{)\$34.56}$

***18.** (76) $4\overline{)978}$

19. (58) 398×6

20. (67) 47×60

21. (58) $8 \times \$6.25$

***22.** (Inv. 3, 76) $970 \div \sqrt{25}$

***23.** (76) $\frac{372}{3}$

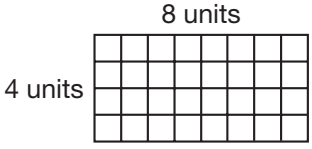
24. (71) $491 \div 7$

25. (41, 65) $8n = 120$

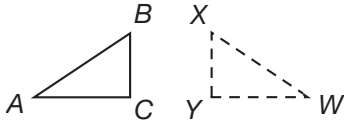
26. (62, 65) $f \times 3^2 = 108$

27. (2) $7 + 8 + 5 + 4 + n + 2 + 7 + 3 = 54$

***28.** (Inv. 2, Inv. 3) Find the perimeter and area of this rectangle:



***29.** (73) Name the transformation(s) that would move △*ABC* to position *WXY.*



***30.** (55) The first four multiples of 18 are 18, 36, 54, and 72. What are the first four multiples of 180?

LESSON 79

• Symmetry

Power Up

facts Power Up G

count aloud Count by fives from 4 to 54.

mental math Before adding, make one number larger and the other number smaller in **a–c.**

a. **Number Sense:** 48 + 37

b. **Number Sense:** 62 + 29

c. **Number Sense:** 135 + 47

d. **Percent:** 50% of $20

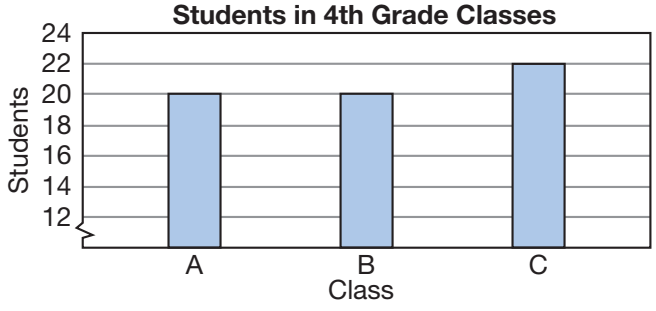
e. **Percent:** 25% of $20

f. **Percent:** 10% of $20

g. **Estimation:** Masoud earns $8.95 for each hour he works. About how much does Masoud earn for working 6 hours?

h. **Calculation:** $\sqrt{64}$, × 3, + 1, × 2, + 98

problem solving Choose an appropriate problem-solving strategy to solve this problem. The bar graph at right shows the number of students in each of the three fourth grade classes at Mayfair School. If seven new fourth graders were to start attending the school, how could they be assigned to the classes to make each class equal in size?



New Concept

Thinking Skill

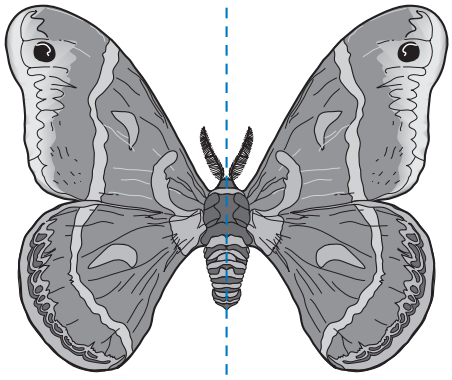
Discuss

Name several real-world examples of line symmetry.

In nature, we often find balance in the appearance and structure of objects and living things. For example, we see a balance in the wing patterns of moths and butterflies. We call this kind of balance **reflective symmetry,** or just **symmetry.**

The dashes across this drawing of a moth indicate a **line of symmetry.** The portion of the figure on each side of the dashes is the *mirror image* of the other side. If we stood a mirror along the dashes, the reflection in the mirror would appear to complete the figure.

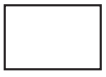
Visit www.SaxonMath.com/Int4Activities for an online activity.



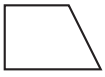
Some polygons and other figures have one or more lines of symmetry.

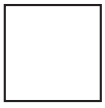
Example 1

Which of these polygons does *not* have a line of symmetry?

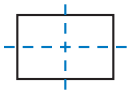
A 

B 

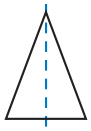
C 

D 

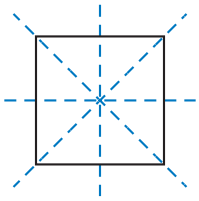
The rectangle has two lines of symmetry.



The isosceles triangle has one line of symmetry.



The square has four lines of symmetry.



The third polygon has no line of symmetry. The answer is **C.**

Conclude Will every regular polygon always have at least one line of symmetry? Explain why or why not.

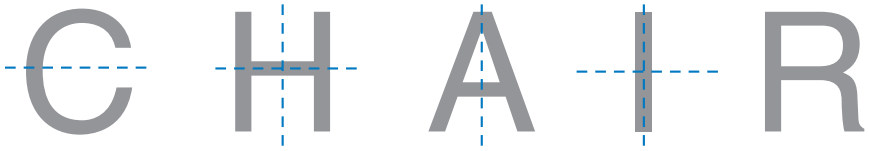
About half of the uppercase letters in the alphabet have lines of symmetry.

Example 2

Copy these letters and draw each line of symmetry, if any.

C H A I R

The letters **H** and **I** each have two lines of symmetry. The letters **C** and **A** each have one line of symmetry. The letter **R** has no lines of symmetry.



Represent Print the letters of your first name and describe any lines of symmetry those letters have.

Reflections and Lines of Symmetry

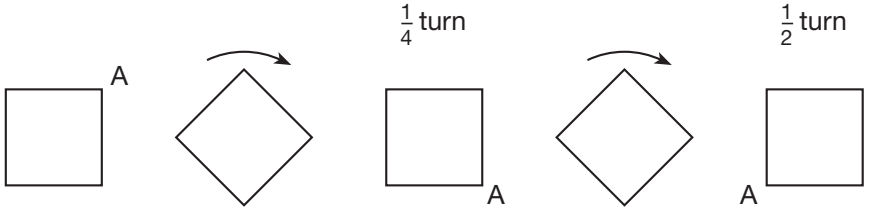
Materials needed:

- **Lesson Activity 32**
- mirror

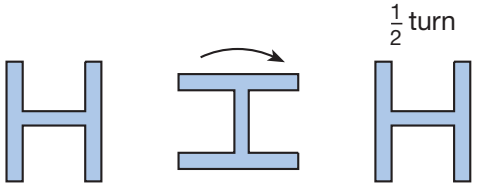
Use a mirror to find lines of symmetry in the figures on **Lesson Activity 32.**

The symmetry illustrated in Examples 1 and 2 is reflective symmetry. Another type of symmetry is *rotational symmetry.* A figure has rotational symmetry if it matches its original position as it is rotated.

For example, a square has rotational symmetry because it matches itself every quarter turn (90°).



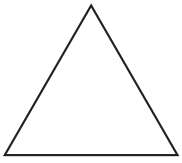
Likewise, the uppercase letter H has rotational symmetry because it matches its original position every half turn (180°).



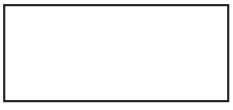
Example 3

Which figures do *not* have rotational symmetry?

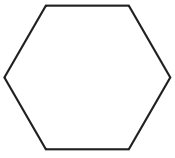
A



B



C



D

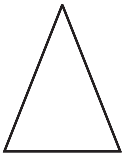


Figure A has rotational symmetry because it matches its original position every $\frac{1}{3}$ of a turn (120°).

Figure B has rotational symmetry because it matches its original position in one half of a turn (180°).

Figure C has rotational symmetry because it matches its original position every $\frac{1}{6}$ of a turn (60°).

Figure D does not have rotational symmetry because it requires a full turn (360°) to match its original position.

Lesson Practice

Copy each figure and draw the lines of symmetry, if any.

a. 

b. 

c. 

d. W

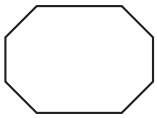
e. X

f. Z

g. Which figures **a–f** do *not* have rotational symmetry?

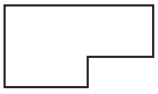
h. Which figures in **a–f** have reflective symmetry?

i. Which of these polygons have reflective symmetry?

A 

B 

C 

D 

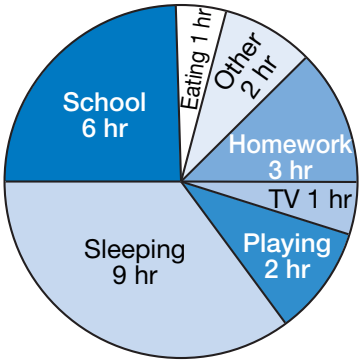
Written Practice

Distributed and Integrated

***1.** **Interpret** Use this circle graph to answer parts **a–d.**

(Inv. 6, 74)

How Franz Spent His Day



a. What is the total number of hours shown in the graph?

b. What fraction of Franz's day was spent watching TV?

c. If Franz's school day starts at 8:30 a.m., at what time does it end?

d. **Multiple Choice** Which two activities together take more than half of Franz's day?

A sleeping and playing

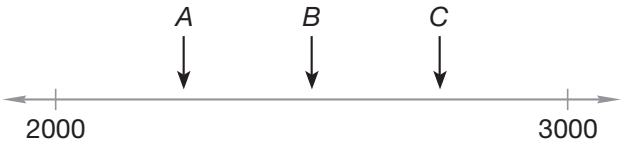
B school and homework

C school and sleeping

D school and playing

2. (70) One fifth of the 60 eggs were placed in each box. How many eggs were placed in each box?

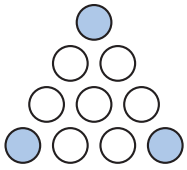
3. (Inv. 1) **Estimate** Which of these arrows could be pointing to 2250?



***4.** (59) **Estimate** Find a reasonable estimate of $4.27, $5.33, and $7.64 by rounding each amount to the nearest dollar before adding.

***5.** (74) **a.** What fraction of this set is *not* shaded?

b. What decimal of this set is shaded?

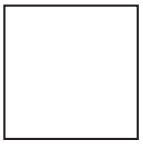


***6.** (57) Kurt drove across the state at 90 kilometers per hour. At that rate, how far will Kurt drive in 4 hours? Make a table to solve the problem.

7. (55) **Verify** Is the product of 3 and 7 a prime number? How do you know?

***8.** (Inv. 2, Inv. 3) **a.** What is the perimeter of this square?

b. If the square were to be covered with 1-inch squares, how many squares would be needed?



***9.** (73) **Represent** Draw the capital letter E rotated 90° clockwise.

E

10. (43, 51)
$$\begin{array}{r} \$20.10 \\ -\ \$16.45 \\ \hline \end{array}$$

11. (43, 51)
$$\begin{array}{r} \$98.54 \\ +\ \$\ \ 9.85 \\ \hline \end{array}$$

12. (58) 380×4

13. (67) 97×80

*14. $5\overline{)3840}$ (76)

15. $\$8.63 \times 7$ (58)

16. $4.25 - 2.4$ (50)

*17. $8\overline{)\$70.00}$ (76)

*18. $6\overline{)3795}$ (76)

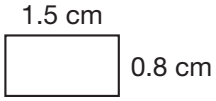
19. $4p = 160$ (41, 71)

20. $\frac{\sqrt{64}}{\sqrt{16}}$ (Inv. 3)

21. $\frac{287}{7}$ (65)

*22. $10 \times (6^2 + 2^3)$ (45, 62)

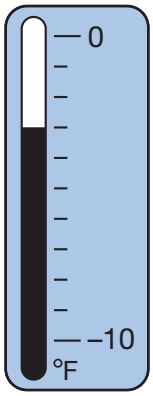
23. **Analyze** Find the perimeter of this rectangle (Inv. 2, 69)



a. in centimeters.

b. in millimeters.

24. The thermometer shows the outside temperature on a cold, winter day in Cedar Rapids, Iowa. What temperature does the thermometer show? (18)



*25. Mulan spun completely around twice on a skateboard. How many degrees did Mulan spin? (75)

*26. **a.** **Conclude** Which of these letters does *not* have a line of symmetry? (79)

T N V W

b. Which of these letters has rotational symmetry?

*27. **a.** **Multiple Choice** Sketch each of the triangles below. Which of these triangles does *not* exist? (78)

A a scalene right triangle

B an isosceles right triangle

C an equilateral right triangle

D an equilateral acute triangle

b. **Justify** Explain why the triangle you chose does not exist.

*28. (22) **Analyze** How many different amounts of money could you make using any two of the four coins shown below? Name the amounts.

*29. (65) **Estimate** Cora estimated the quotient of 261 ÷ 5 to be 50. Explain how Cora used a compatible number to make her estimate.

*30. (25) **Formulate** Write and solve a subtraction word problem for the equation $175 - t = 84$.

Early Finishers

Real-World Connection

a. Draw a capital letter that has rotational symmetry and line symmetry.

b. Draw a capital letter that has line symmetry but does *not* have rotational symmetry.

c. What is the difference between the two figures you have drawn?

LESSON 80

• Division with Zeros in Three-Digit Answers

Power Up

facts Power Up G

count aloud Count by fourths from $2\frac{1}{2}$ to $7\frac{1}{2}$.

mental math Subtracting two-digit numbers mentally is easier if the second number ends in zero. By increasing both numbers in a subtraction by the same amount, we can sometimes make the subtraction easier while keeping the difference the same. For example, instead of $45 - 28$, we can think $47 - 30$. We added two to 28 to make it end in zero and then added two to 45 to keep the difference the same. Use this strategy in **a–d.**

a. **Number Sense:** $45 - 39$

b. **Number Sense:** $56 - 27$

c. **Number Sense:** $63 - 48$

d. **Number Sense:** $82 - 35$

e. **Powers/Roots:** Compare: $\sqrt{16} - \sqrt{9} \bigcirc 1^2$

f. **Measurement:** The high temperature was 84°F. The low temperature was 68°F. The difference between the high and low temperatures was how many degrees?

g. **Estimation:** Each candle costs $3.05. If Miranda has $12, does she have enough to buy 4 candles?

h. **Calculation:** $\frac{1}{4}$ of 24, $\times$ 9, $-$ 15, $+$ 51

problem solving Choose an appropriate problem-solving strategy to solve this problem. Tahlia's soccer team, the Falcons, won their match against the Eagles. There were 11 goals scored altogether by both teams. The Falcons scored 3 more goals than the Eagles. How many goals did each team score?

New Concept

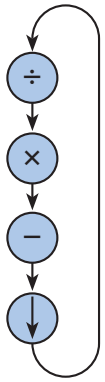
Recall that the pencil-and-paper method we have used for dividing numbers has four steps:

Step 1: Divide.

Step 2: Multiply.

Step 3: Subtract.

Step 4: Bring down.



Every time we bring a number down, we return to Step 1. Sometimes the answer to Step 1 is zero, and we will have a zero in the answer.

Example 1

Each weekday afternoon in a small town, 618 newspapers are delivered to customers. The task of delivering the newspapers is divided equally among 3 drivers. How many newspapers does each driver deliver?

Step 1: Divide $3\overline{)6}$ and write "2."

Step 2: Multiply 2 by 3 and write "6."

Step 3: Subtract 6 from 6 and write "0."

Step 4: Bring down the 1 to make 01 (which is 1).

$$\begin{array}{r} 2 \\ 3\overline{)618} \\ \underline{6} \\ 01 \end{array}$$

Repeat:

Step 1: Divide 3 into 01 and write "0."

Step 2: Multiply 0 by 3 and write "0."

Step 3: Subtract 0 from 1 and write "1."

Step 4: Bring down the 8 to make 18.

Repeat:

Step 1: Divide 3 into 18 and write "6."

Step 2: Multiply 6 by 3 and write "18."

Step 3: Subtract 18 from 18 and write "0."

Step 4: There are no more digits to bring down, so the division is complete. The remainder is zero.

$$\begin{array}{r} 206 \\ 3\overline{)618} \\ \underline{6} \\ 01 \\ \underline{0} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

Each driver delivers **206 papers.**

Thinking Skill

Verify

Why do we write the digit 2 in the hundreds place of the quotient?

Thinking Skill

Discuss

Why do we write the digit 0 in the tens place of the quotient?

Example 2

Divide: $4\overline{)1483}$

Step 1: Divide $4\overline{)14}$ and write "3."

Step 2: Multiply 3 by 4 and write "12."

Step 3: Subtract 12 from 14 and write "2."

Step 4: Bring down the 8 to make 28.

Repeat:

Step 1: Divide 4 into 28 and write "7."

Step 2: Multiply 7 by 4 and write "28."

Step 3: Subtract 28 from 28 and write "0."

Step 4: Bring down the 3 to make 03 (which is 3).

Repeat:

Step 1: Divide 4 into 03 and write "0."

Step 2: Multiply 0 by 4 and write "0."

Step 3: Subtract 0 from 3 and write "3."

Step 4: There are no digits to bring down, so the division is complete. We write "3" as the remainder.

$$\begin{array}{r} \textbf{370 R 3} \\ 4\overline{)1483} \\ \underline{12} \\ 28 \\ \underline{28} \\ 03 \\ \underline{0} \\ 3 \end{array}$$

Use a calculator to divide the example.

Discuss How is the answer displayed on the calculator different from the answer displayed in the solution?

Example 3

The same number of landscaping bricks are stacked on each of 4 pallets. The total weight of the pallets is 3 tons. What is the weight in pounds of each pallet?

First we find the number of pounds in 3 tons. Each ton is 2 thousand pounds, so 3 tons is 6 thousand pounds. Now we find the weight of each pallet of bricks by dividing 6000 by 4.

We find that each pallet of bricks weighs **1500 pounds.**

$$\begin{array}{r} 1500 \\ 4\overline{)6000} \\ \underline{4} \\ 20 \\ \underline{20} \\ 000 \end{array}$$

Lesson Practice

a. List the four steps of division and draw the division diagram.

Divide:

b. $4\overline{)815}$

c. $5\overline{)4152}$

Divide using a calculator. Show your answer as a decimal number.

d. $6\overline{)5432}$ **e.** $7\overline{)845}$

Divide mentally:

f. $5\overline{)1500}$ **g.** $4\overline{)2000}$

h. Find the missing factor in the equation $3m = 1200$.

Written Practice

Distributed and Integrated

1. (Inv. 5) If the chance of rain is 30%, then is it more likely that it will rain or that it will not rain?

***2.** (31) **Analyze** Monty ran the race 12 seconds faster than Ivan. Monty ran the race in 58 seconds. Ivan ran the race in how many seconds?

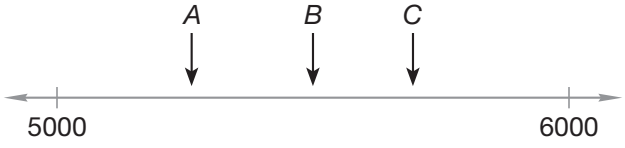
3. (70) The whole rectangle is divided into 5 equal parts. Each part is what percent of the rectangle? (*Hint:* Divide 100 by 5.)

4. (52) **Analyze** How many 6-inch-long sticks can be cut from a 72-inch-long stick?

***5.** (61) **Multiple Choice** One fifth of the leaves had fallen. What fraction of the leaves had *not* fallen?

A $\frac{2}{5}$ **B** $\frac{3}{5}$ **C** $\frac{4}{5}$ **D** $\frac{5}{5}$

6. (Inv. 1) **Estimate** Which of these arrows could be pointing to 5263?



***7.** (54, 74) What fraction of the months of the year have 31 days?

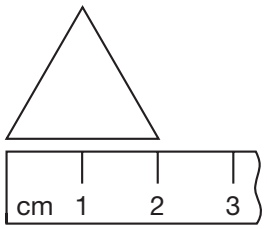
***8.** (77) The prefix *kilo-* means what number?

9. (52) **Explain** Cleon would like to estimate the difference between $579 and $385. Explain how Cleon could use compatible numbers to make an estimate.

***10.** (Inv. 2, 78) The triangle at right is equilateral.

a. How many millimeters is the perimeter of the triangle?

b. **Classify** Describe the angles.



11. (40) Three liters equals how many milliliters?

***12.** (60) Wilma runs 5 miles every day. At that rate, how many days would it take her to run 40 miles? Make a table to solve the problem.

13. (41, 65) $2n = 150$

14. (45, 50) $24.25 - (6.2 + 4.8)$

15. (51)
$$\begin{array}{r} 103{,}279 \\ +\ 97{,}814 \\ \hline \end{array}$$

16. (43, 51)
$$\begin{array}{r} \$36.14 \\ +\ \$27.95 \\ \hline \end{array}$$

17. (52)
$$\begin{array}{r} 39{,}420 \\ -\ 29{,}516 \\ \hline \end{array}$$

18. (24, 52)
$$\begin{array}{r} \$60.50 \\ -\quad n \\ \hline \$43.20 \end{array}$$

19. (58)
$$\begin{array}{r} 604 \\ \times\ \ 9 \\ \hline \end{array}$$

20. (67)
$$\begin{array}{r} 87 \\ \times\ 60 \\ \hline \end{array}$$

21. (58)
$$\begin{array}{r} \$6.75 \\ \times\ \ 4 \\ \hline \end{array}$$

***22.** (80) $3\overline{)618}$

***23.** (76, 80) $5\overline{)\$21.50}$

***24.** (24, 52)
$$\begin{array}{r} n \\ +\ 1467 \\ \hline 2459 \end{array}$$

***25.** (80) $\frac{600}{4}$

26. (71) $543 \div 6$

27. (65) $472 \div 8$

***28.** (61, 62) $9w = 9^2 + (9 \times 2)$

***29.** (80) Divide mentally: $5\overline{)3000}$

***30.** (66, 79) **a.** **Represent** Draw a triangle that is congruent to this isosceles triangle. Then draw its line of symmetry.

b. Draw the triangle when it is rotated 180°.

Focus on

• Analyzing and Graphing Relationships

In Lesson 57 we learned to make a table to display a relationship between two sets of data. Now we will learn how to write an equation to represent the relationship in the table.

Mrs. Cooke writes the percent of correct answers on each 10-question quiz she grades. Look at the data in each column. On the quiz, 100 points is equal to 100%. If a student has 8 correct answers, the score is 80%. This means 80 out of 100 points are earned for correct answers.

Quiz: 10 Questions

Number of Correct Answers	Score
1	10%
2	20%
3	30%
4	40%
5	50%
6	60%
7	70%
8	80%
9	90%
10	100%

Interpret Use the table above to answer problems **1–4.**

1. Seven correct answers will earn what percent?
2. A score of 90% means how many questions were answered correctly?
3. **Analyze** Each quiz question represents what number of points?

4. **a.** **Analyze** What multiplication formula could you write to represent the relationship between the two columns of data?

   b. **Represent** Mrs. Cooke also writes the percent of correct answers on each 20-question test she grades. Copy the table for the 20-question test. Extend the table to show the scores for each number of correct answers up to 20.

Test: 20 Questions

Number of Correct Answers	Score
1	5%
2	10%
3	15%
4	20%
5	25%
6	30%
7	35%
8	40%
9	45%
10	50%
11	55%

Interpret Use your table to answer problems **5–8.**

5. Sonia answered 18 questions correctly. What was her score?
6. Litzel scored 70%. How many questions did Litzel answer correctly?
7. **Analyze** Each test question represents what number of points?
8. **Analyze** What multiplication equation could you write to represent the relationship between the two columns of data?

Graphs can also be used to display relationships between two quantities, such as pay and time worked.

Suppose Dina has a job that pays $10 per hour. This table shows the total pay Dina would receive for 1, 2, 3, or 4 hours of work.

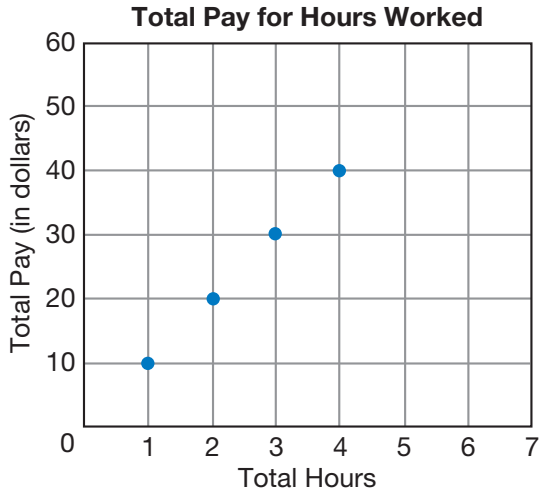
9. **Represent** Copy the table. Extend the table to show Dina's pay for each hour up to 8 hours of work.

Pay Schedule

Hours Worked	Total Pay
1	$10
2	$20
3	$30
4	$40

The graph below shows the same relationship between hours worked and total pay. Each dot on the graph represents both a number of hours and an amount of pay.

If Dina works more hours, she earns more pay. We say that her total pay is a function of the number of hours she works. Since Dina's total pay depends on the number of hours she works, we make "Total Pay" the vertical scale and "Total Hours" the horizontal scale.

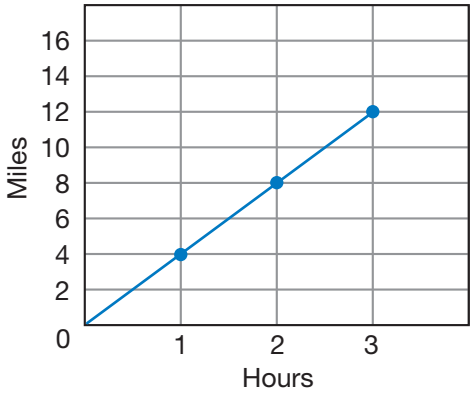


10. **Represent** Copy the graph. Extend the sides of the graph to include 8 hours and \$80. Then graph (draw) the dots for Dina's total pay for each hour up to 8 hours.

The following table and graph show how many miles Rosita hiked at 4 miles per hour.

Miles Hiked
(at 4 mi per hr)

Hours	Miles
1	4
2	8
3	12



The dots indicate how far Rosita hiked in one, two, and three hours. However, every second Rosita hiked, she was hiking a small part of a mile. We show this progress by drawing a line through the dots. Every point on a line represents a distance hiked for a given time.

For example, straight up from $1\frac{1}{2}$ hours is a point on the line at 6 miles.

11. **Interpret** Use the graph to find the distance Rosita hiked in $2\frac{1}{2}$ hours.

12. **Analyze** What multiplication formula could you write to represent the relationship between the two sets of data?

13. **Verify** Use your formula to find the number of miles Rosita would hike in 5 hours.

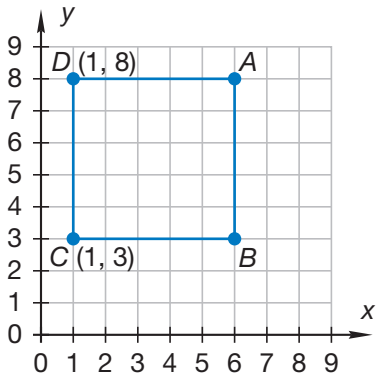
Activity 1

Graphing Pay Rates

Formulate Work with a partner and agree on an hourly rate of pay for a selected job. Then create a table to display a pay schedule showing the total pay for 1, 2, 3, 4, 5, 6, 7, and 8 hours of work at the agreed rate of pay. Use the pay schedule to create a graph that shows the relationship represented by the table. Write an equation to represent the data.

Graphing Points on a Coordinate Plane

Sometimes we want to name points on a grid. Below we show how to name points using pairs of numbers called **coordinates.** The first number in each coordinate pair is taken from the horizontal scale. The second number in each pair is taken from the vertical scale. We write the coordinates in parentheses.



14. Write the coordinates of point *A.*

15. Write the coordinates of point *B.*

To draw this rectangle, we connect points by using segments. We start at point *A,* draw a segment to point *B,* and then continue in order to points *C* and *D* before going back to point *A.*

Activity 2

Graphing on a Coordinate Grid

Material needed:

- **Lesson Activity 34**

Practice graphing points on a grid and connecting the points to complete a design.

a. Use a large container or bucket. Estimate the number of pints that would fill the container. Use water or sand to determine how close your estimate was. Make a table to show the relationship between pints and 1, 2, 3, 4, and 5 containers or buckets. Then write an equation to represent the relationship.

b. Use a large container or bucket. Estimate the number of liters that would fill the container. Use water or sand to determine how close your estimate was. Make a table to show the relationship between liters and 1, 2, 3, 4, and 5 containers or buckets. Then write an equation to represent the relationship.

c. Estimate the mass and weight of an object of your choosing. Then use a scale to find the actual mass and weight. Research the force of gravity on other planets. Make a table that shows how the weight/mass of the object would or would not change on other planets.

d. Use a stopwatch to time how many seconds it takes you to write your first and last names. Use the data to make a table to represent the relationship of the amount of time and the number of times you wrote your name (up to four times). Then graph the relationship represented by the table.

e. Copy the table of *x*- and *y*-coordinates of the set of data in Rosita's hiking table and extend the table to five hours. Then list the five ordered pairs.