

## • Angle Measures

### Power Up

#### facts

Power Up I

#### count aloud

Count by fours from 80 to 120.

#### mental math

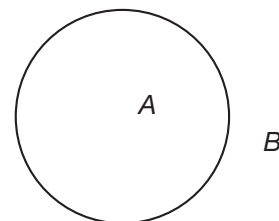
Find each difference by first increasing both numbers so that the second number ends in zero in **a–c**.

- Number Sense:**  $63 - 28$
- Number Sense:**  $45 - 17$
- Number Sense:**  $80 - 46$
- Money:** Noah had \$10.00. Then he spent \$5.85 on lunch. How much money did he have left over?
- Measurement:** How many inches is  $\frac{1}{2}$  of a foot?
- Measurement:** How many inches is  $\frac{1}{4}$  of a foot?
- Estimation:** The total cost for 4 movie rentals was \$15.92. Round this amount to the nearest dollar and then divide by 4 to estimate the cost per rental.
- Calculation:**  $5^2, \times 2, \times 2, \times 2, \times 2$

#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. In the diagram at right, the circle represents students who have one or more pets at home. A letter inside the circle represents a particular student who has a pet. A letter outside the circle represents a student who does not have any pets. The letter *A* represents Adrian, who has a dog. The letter *B* represents Beth, who does not have any pets. Copy the graph on your paper. On the graph, place the letter *C* for Clarissa, who keeps a goldfish, and *D* for David, who does not have pets.

#### Students with Pets



## New Concept

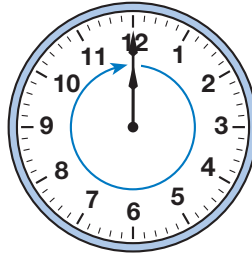
### Thinking Skill

#### Discuss

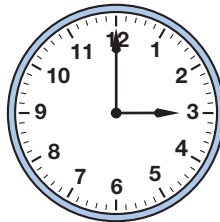
Name a time on a clock when the hour hand and the minute hand form

- an acute angle.
- an obtuse angle.

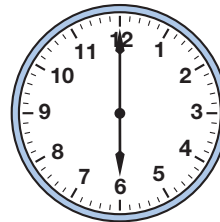
In one hour the minute hand of a clock turns all the way around once. Recall from Lesson 75 that one full turn measures  $360^\circ$ .



As the minute hand moves, it forms changing angles with the hour hand. At 3 o'clock the angle formed is a right angle, which measures  $90^\circ$ . At 6 o'clock the angle formed is a **straight angle** because the two sides of the angle form a straight line. A straight angle measures  $180^\circ$ .

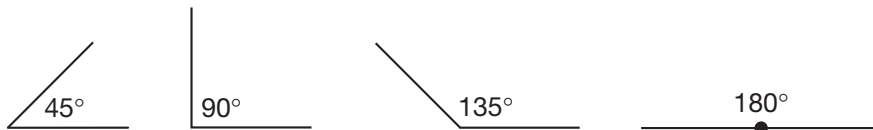


right angle,  $90^\circ$



straight angle,  $180^\circ$

Here we show some angles and their measures in degrees:



Notice that a  $45^\circ$  angle is half the size of a  $90^\circ$  angle. Also notice that a  $135^\circ$  angle is the size of a  $90^\circ$  angle plus a  $45^\circ$  angle. A  $180^\circ$  angle is twice the size of a  $90^\circ$  angle.

### Activity

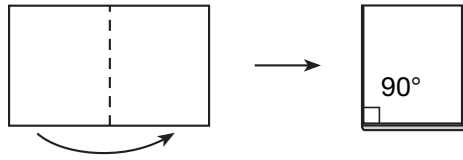
#### Angle Measurement Tool

Material needed:

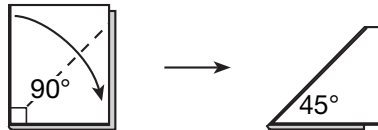
- 3-by-5-inch rectangle of unlined paper

Create your own angle measurement tool.

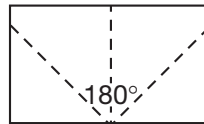
**Step 1:** Fold the paper in half, making sure the sides are aligned before creasing. Draw a square corner at the fold and write “90°” as shown. Use the edge of your pencil point to shade the sides of the 90° angle.



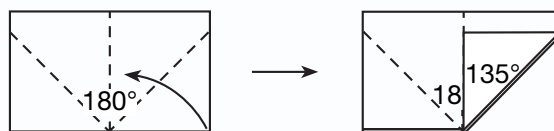
**Step 2:** Fold the paper again so that the left side aligns with the bottom side before creasing. Write “45°” as shown. Shade the sides of the 45° angle.



**Step 3:** Unfold the paper. Turn the paper over so that the 90° and 45° labels are on the back and the folds appear as shown. Write “180°” where the folds meet. Shade the 180° angle across the bottom of the card.



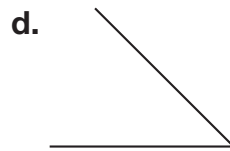
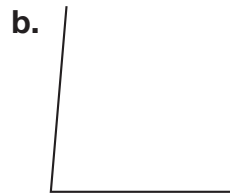
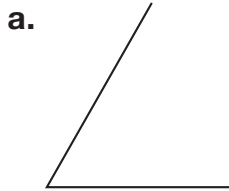
**Step 4:** Fold up the right-hand corner of the paper, and write “135°” as shown. Shade the remaining side of the 135° angle.



**Model** Find three angles to measure in the classroom using your tool. If the angle does not match one of the angles on your tool, then estimate its measure. Sketch the three angles on your paper and write your estimate of the measure of each angle.

## Lesson Practice

Using the paper you folded in this lesson, estimate the measure of each angle in problems **a–d**. First find an angle on the paper that is a close match to the angle you are measuring. Then match the corner and one side of the paper with the corner and one side of the angle. If the angle is larger or smaller than the paper angle, estimate how much larger or smaller. Add or subtract from your paper measurement to get a final estimate.



- e. At 9 o'clock the hands of a clock form an angle of how many degrees?

## Written Practice

*Distributed and Integrated*

1. Cecilia skated 27 times around the rink forward and 33 times around the rink backward. How many times did she skate around the rink altogether?

(1)
2. Nectarines cost 68¢ per pound. What is the price for 3 pounds of nectarines?

(49)
- \*3. **Analyze** In bowling, the sum of Amber's score and Bianca's score was equal to Consuela's score. If Consuela's score was 113 and Bianca's score was 55, what was Amber's score?

(72)
- \*4. One third of the 84 students were assigned to each room. How many students were assigned to each room? Draw a picture to explain how you found your answer.

(70)
5. Round 2250 to the nearest thousand.

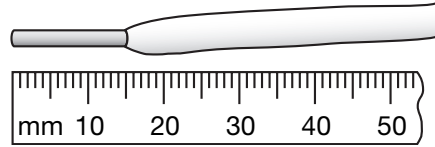
(54)
- \*6. In the word ARIZONA, what fraction of the letters are *not* As?

(74)
- \*7. **Multiple Choice** The African elephant weighed 7 tons. How many pounds is that?

(77)

A 7000      B 140      C 14,000      D 2000

- \* 8.** **Estimate** The tip of this shoelace is how many millimeters long?  
(69)



- \* 9.** **Conclude** Choose the more reasonable measure for parts **a** and **b**.  
(40, 77)

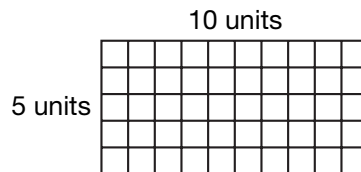
- a.** a new box of cereal: 2 lb or 2 oz  
**b.** a full pail of water: 1 pt or 1 gal

- \* 10.** According to this calendar, what is the date of the last Tuesday in February 2019?  
(54)

FEBRUARY 2019						
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		

- 11.** **Represent** Forty-two thousand, seven hundred is how much greater than thirty-four thousand, nine hundred?  
(31, 52)

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



- \* 13.** **Analyze** Sh'Reese was riding north. Then she turned  $90^\circ$  to the left. After turning, in what direction was Sh'Reese riding? Explain how you know.  
(75)

**14.**  $6743 - (507 \times 6)$   
(52, 58)

**15.**  $\$70.00 - \$63.17$   
(43)

**16.**  $3 \times 7 \times 0$   
(62)

**17.**  $\$8.15 \times 6$   
(58)

**18.**  $67\text{¢} \times 10$   
(67)

**19.**  $4.5 + 0.52 + 1.39$   
(50)

**\* 20.**  $2 \overline{) \$12.16}$   
(76, 80)

**\* 21.**  $6 \overline{) 4321}$   
(80)

**\* 22.**  $8 \overline{) 4800}$   
(80)

**\*23.**  $963 \div \sqrt{9}$   
*(Inv. 3, 76)*

**\*24.**  $5^3 \div 5$   
*(62, 65)*

**\*25.**  $\$6.57 \div 9$   
*(76)*

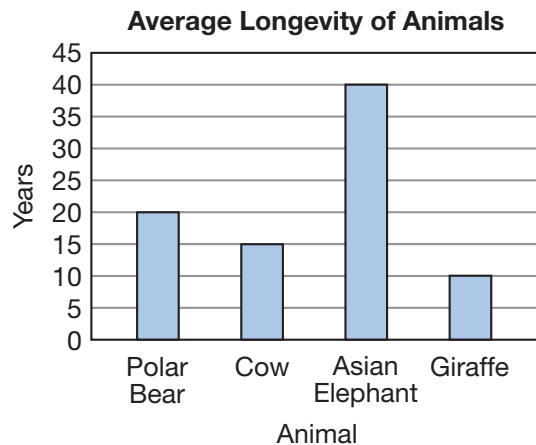
**26.**  $4n = 200$   
*(41, 71)*

**27.**  $7d = 105$   
*(41, 65)*

**28.**  $\begin{array}{r} 473 \\ 286 \\ + \quad n \\ \hline 943 \end{array}$   
*(17, 24)*

**29.**  $1 + 12 + 3 + 14 + 5 + 26$   
*(1)*

- \*30.** The bar graph shows the average life span in years of several animals. Use the graph to solve parts **a–c**.  
*(Inv. 6)*



- Write the names of the animals in order from longest to shortest average life span.
- What fraction of the average life span of an Asian elephant is the average life span of a polar bear?
- When compared to the average life span of a giraffe, how many times greater is the average life span of an Asian elephant?

**Early Finishers**  
*Real-World Connection*

- Use the angle measurement tool you created in the activity to draw a polygon. Use all the angles on your tool at least once.
- For each angle of the polygon, label the type of angle as obtuse, right, or acute.
- Then label each angle with the number of degrees.

## • Tessellations

### Power Up

**facts**

Power Up I

**count aloud**

Count by fives from 3 to 63.

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

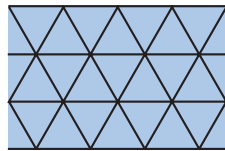
- a. **Number Sense:**  $38 + 46$
- b. **Number Sense:**  $67 + 24$
- c. **Number Sense:**  $44 + 28$
- d. **Number Sense:**  $3 \times 50 \times 10$
- e. **Number Sense:** Counting by 5s from 5, every number Julio says ends in 0 or 5. If he counts by 5s from 9, then every number he says ends in which digit?
- f. **Geometry:** The radius of the truck tire was 15 inches. The diameter of the tire was how many inches?
- g. **Estimation:** The total cost for 6 boxes of snack bars was \$17.70. Round this amount to the nearest dollar and then divide by 6 to estimate the cost per box.
- h. **Calculation:**  $25\%$  of 40,  $\times 2$ ,  $\div 10$ ,  $\times 8$ ,  $+ 59$

**problem solving**

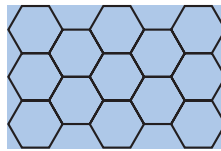
Choose an appropriate problem-solving strategy to solve this problem. Landon is packing a lunch for the park. He will take one bottle of water, a sandwich, and a fruit. He will choose either a ham sandwich or a peanut butter and jelly sandwich. For the fruit, Landon will choose an apple, an orange, or a banana. Make a tree diagram to find the possible combinations of lunches that Landon can pack. Then list each possible combination.

## New Concept

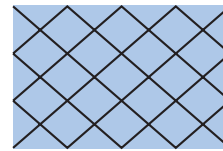
Archeologists have found that people used tiles to make mosaics and to decorate homes and other buildings as long ago as 4000 B.C. The Romans called these tiles *tesselae*, from which we get the word **tessellation**. A tessellation, also called a *tiling*, is the repeated use of shapes to fill a flat surface without gaps or overlaps. Below are examples of tessellations and the name of the shape that produced each one.



triangle



hexagon

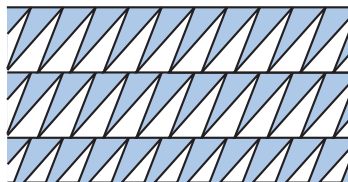


quadrilateral

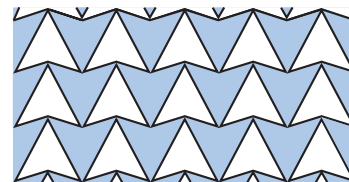
**Connect** Starting with any tile, how might you move that tile to continue each tessellation above? That is, what transformations can be used to go from one tile to another?

- For the triangle tessellation, rotate a tile  $180^\circ$  and then translate it up, down, right, or left.
- For the hexagon tessellation, translate a tile until one of its sides aligns with the side of another hexagon.
- For the quadrilateral tessellation, translate a tile to continue the pattern. The translation can be up, down, left, right, or diagonal.

Not all polygons tessellate, or fill a flat surface. However, every triangle and every quadrilateral can fill a flat surface. Here we show two examples:



triangle



quadrilateral



## Activity 1

### Tessellations

Materials needed:

- Lesson Activity 35
- scissors
- mirror

1. **Model** Cut out the triangles and quadrilaterals on **Lesson Activity 35**. Then use the figures to form two tessellations: one with the triangles and one with the quadrilaterals. You may want to color the figures before cutting them out and then put them together in a way that creates a colorful design.
2. **Analyze** Use a mirror to decide if your design has a line of symmetry. If it does, draw the line of symmetry.

## Activity 2

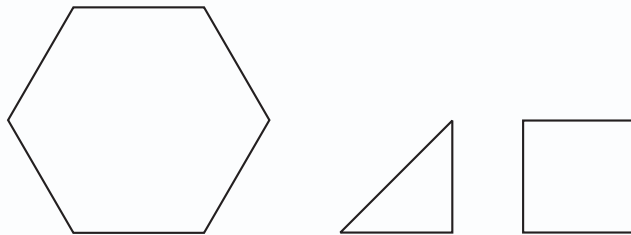
### Tessellations With Multiple Shapes

Materials needed:

- Lesson Activity 36
- scissors

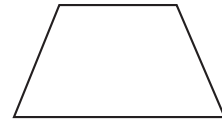
Use **Lesson Activity 36** to cut out the same shapes as those shown below.

**Model** Look for pairs of shapes that will tessellate. Make a list to show the combinations of each pair of shapes.

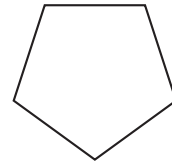


## Lesson Practice

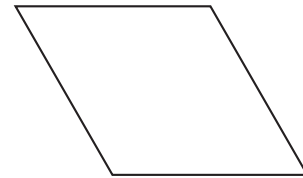
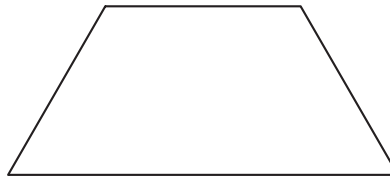
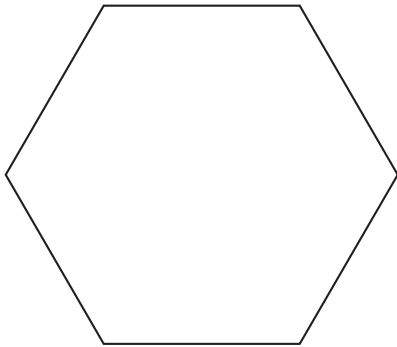
a. Trace this figure on your paper a few times, turning your paper as you trace, to show that the figure will fill a flat surface.



b. Does this figure tessellate?



c. Look at the three shapes below. Find pairs of shapes that will tessellate. Make a list to show the combinations of each pair of shapes.



## Written Practice

*Distributed and Integrated*

**Formulate** Write and solve equations for problems 1–4.

1. There were 35 students in the class but only 28 math books. How many more math books are needed so that every student in the class has a math book?  
(31)


2. Each of the 7 children slid down the water slide 11 times. How many times did they slide in all?  
(49)

\*3. A bowling lane is 60 feet long. How many yards is 60 feet?  
(Inv. 2, 52)

\*4. Wei carried the baton four hundred forty yards. Eric carried it eight hundred eighty yards. Jesse carried it one thousand, three hundred twenty yards, and Bernardo, carried it one thousand, seven hundred sixty yards. Altogether, how many yards was the baton carried?  
(1, 51)

5. One third of the members voted “no.” What fraction of the members did not vote “no”?

(61)

\*6.  **Explain** Marissa would like to estimate the sum of  $6821 + 4963$ . Explain how Marissa could use rounding to make an estimate.

(59)

7. What fraction of the days of the week start with the letter S?

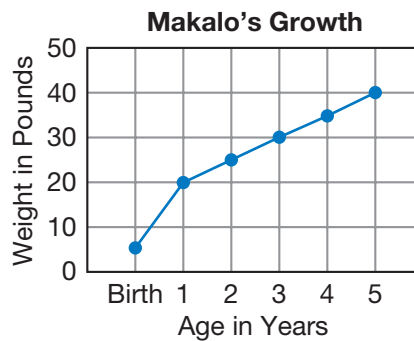
(74)

\*8. Together, Bob’s shoes weigh about 1 kilogram. Each shoe weighs about how many grams?

(77)

\*9. **Interpret** Use the line graph below to answer parts a–c.

(Inv. 6)



a. About how many pounds did Makalo weigh on his second birthday?

b. About how many pounds did Makalo gain between his third and fifth birthdays?

c. Copy and complete this table using information from the line graph:

**Makalo's Growth**

Age	Weight
At birth	6 pounds
1 year	
2 years	

10. If 65% of the lights are on, then what percent of the lights are off?

(Inv. 5)

- \* **11.** **Analyze** Kerry is thinking about names for a baby girl. She likes Abby or Bekki for the first name and Grace or Marie for the middle name. What combinations of first and middle names are possible with these choices?

- \* **12.** The table shows the number of vacation days Carson earns at work:

Days Worked	Vacation Days Earned
30	1
60	2
90	3
120	4
150	5
180	6

- a. **Generalize** Write a word sentence that describes the relationship of the data.
- b. **Predict** Use the word sentence you wrote to predict the number of vacation days Carson will earn by working 300 days.

**13.**  $\begin{array}{r} \$60.75 \\ + \$95.75 \\ \hline \end{array}$

**14.**  $\begin{array}{r} \$16.00 \\ - \$15.43 \\ \hline \end{array}$

**15.**  $\begin{array}{r} 3.15 \\ - 3.12 \\ \hline \end{array}$

**16.**  $\begin{array}{r} 320 \\ \times 30 \\ \hline \end{array}$

**17.**  $\begin{array}{r} 465 \\ \times 7 \\ \hline \end{array}$

**18.**  $\begin{array}{r} \$0.98 \\ \times 6 \\ \hline \end{array}$

**19.**  $425 \div 6$

\* **20.**  $\$6.00 \div 8$

\* **21.**  $625 \div 5$

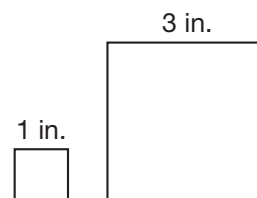
**22.**  $3r = 150$

**23.**  $10^2 + t = 150$

**24.**  $1 + 7 + 2 + 6 + 9 + 4 + n = 37$

- 25. a.** If the 3-inch square is covered with 1-inch squares, how many of the 1-inch squares are needed?

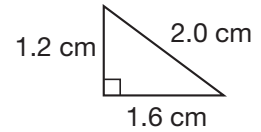
- b. What is the area of the larger square?



26. a. What is the perimeter of this triangle?

(Inv. 2,  
78)

b. Is the triangle a right triangle, an acute triangle, or an obtuse triangle?



\*27. a. **Conclude** Which of these letters has a line of symmetry?

(79)

Q R H T

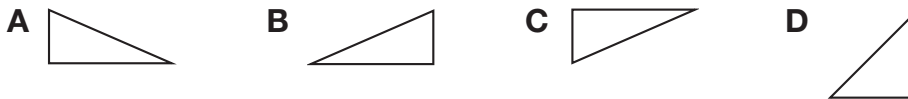
b. Which of these letters has rotational symmetry?

\*28. Write the capital letter P rotated  $90^\circ$  counterclockwise.

(75)

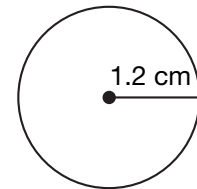
\*29. **Multiple Choice** Three of these triangles are congruent. Which triangle is *not* one of the three congruent triangles?

(66)



\*30. The radius of this circle is 1.2 cm. What is the diameter of the circle?

(21, 43)

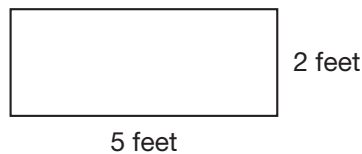


## Early Finishers

Real-World Connection

In science Nam learned that a bee's honeycomb is a tessellation of hexagons. Nam is putting tile in his bathroom, and he wants to use a tessellation design on the floor. He decides to use 6-inch square tiles to cover part of the floor.

- Using the measurements of the rectangle below, how many 6-inch tiles does he need?
- Choose a different shape, and then draw a different tessellation that Nam could use on his bathroom floor.



## • Sales Tax

### Power Up

#### facts

Power Up I

#### count aloud

Count down by halves from 10 to  $\frac{1}{2}$ .

#### mental math

Before subtracting, make both numbers larger in **a–c**.

- Number Sense:**  $56 - 29$
- Number Sense:**  $43 - 18$
- Number Sense:**  $63 - 37$
- Money:** Jabulani bought a vegetable tray for \$7.52 and a bottle of fruit punch for \$1.98. What was the total cost?
- Time:** Compare: 72 hours  2 days
- Time:** How many days are in 10 common years?
- Estimation:** The total cost for 3 boxes of cereal is \$11.97. Round this amount to the nearest dollar and then divide by 3 to estimate the cost per box.
- Calculation:**  $\frac{1}{2}$  of 70,  $\div 7$ ,  $\times 2$ ,  $+ 8$ ,  $\div 9$ ,  $\div 2$

#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. Twenty-one students went on a train tour of the zoo. Five students rode in the first train car with the engineer. The other students rode in the last four train cars. How many students were in each of the last four train cars? Explain how you found your answer.

### New Concept

**Sales tax** is an extra amount of money that sometimes must be paid when items are purchased. The amount of tax depends upon the amount purchased and the local sales-tax rate. In the United States, sales-tax rates vary by city, by county, and by state.

### Example 1

Yin bought six bolts priced at 89¢ each. The total sales tax was 32¢. How much did Yin spend in all?

First we find the cost of the six bolts by multiplying.

$$\begin{array}{r} 5 \\ 89\text{¢} \\ \times 6 \\ \hline 534\text{¢} = \$5.34 \end{array}$$

The six bolts cost \$5.34. Now we add the sales tax.

$$\begin{array}{r} \$5.34 \text{ price of bolts} \\ + \$0.32 \text{ sales tax} \\ \hline \$5.66 \text{ total cost} \end{array}$$

The total cost, including tax, was **\$5.66**.

#### Thinking Skill

##### Verify

Why are there two decimal places in the answer?

### Example 2

Taeko bought a blouse priced at \$25. The sales-tax rate was 8¢ per dollar. How much tax did Taeko pay?

Finding the amount of tax on a purchase is similar to solving an “equal groups” problem.

**Formula:** Price  $\times$  Tax rate = Tax

**Problem:**  $25 \times 8\text{¢} = 200$  cents

Since 200¢ is two dollars, Taeko paid a tax of **\$2.00**.

If we do not have the exact amount of money needed to buy something at a store, we pay more than the total cost and then we get change back. To find how much change we should get back, we subtract the total cost from the amount we paid.

### Example 3

Morgan bought a pair of pants priced at \$23.99. The sales tax was \$1.56. Morgan paid the clerk \$40.00. How much money should she get back in change?

First we figure out the total cost.

$$\begin{array}{r} \$23.99 \text{ price of pants} \\ + \$ 1.56 \text{ sales tax} \\ \hline \$25.55 \text{ total cost} \end{array}$$

Now we subtract the total cost from the amount she paid.

$$\begin{array}{r} \$40.00 \text{ amount paid} \\ - \$25.55 \text{ total cost} \\ \hline \$14.45 \text{ change back} \end{array}$$

#### Thinking Skill

##### Discuss

Suppose Morgan gave the clerk \$40.55 instead of \$40 to pay for her purchase. Why would she do that?

Morgan should get **\$14.45** back from the clerk.

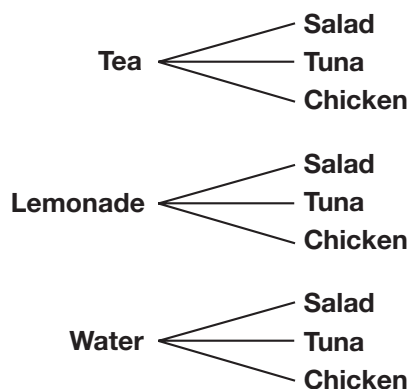
**Justify** How can we count to check the answer?

### Example 4

Mrs. Benson has coupons that can be used at her favorite restaurant. Some coupons are for a beverage and other coupons are for a main course. How many different ways can she combine one beverage coupon and one main-course coupon?



Each beverage coupon can be linked with one main-course coupon. We will use a tree diagram to show the combinations.



**Analyze** Which combination will give Mrs. Benson the greatest discount?



## Lesson Practice

- a. Serena bought three pairs of socks. Each pair was priced at \$2.24. The sales tax was 34¢. Altogether, how much did Serena spend on socks?
- b. Hakim paid \$10.00 for a tape that cost \$6.95. The sales tax was 49¢. How much money should Hakim get back in change?
- c. At a “no sales tax” sale at the hardware store, Beatriz is deciding which of two paint brushes to buy. One costs \$3.99 and a better one costs \$4.49. Beatriz has a \$5 bill, a \$10 bill, and a \$20 bill. If she buys one of the brushes and pays with one of the bills, what combinations are possible and how much will she get back in change? Use a tree diagram to find the combinations.

## Written Practice


*Distributed and Integrated*

- \* 1. Multiple Choice** To prepare for a move to a new building, the employees of a library spent an entire week packing books in boxes. On Monday the employees packed 30 books in each of 320 boxes. How many books did those boxes contain?

**A** 9600 books    **B** 960 books    **C** 320 books    **D** 350 books
- 2.** The movie was 3 hours long. If it started at 11:10 a.m., at what time did it end?
- 3. Explain** Jonathan is reading a 212-page book. If he has finished 135 pages, how many pages does he still have to read? Explain why your answer is reasonable.
- 4.** Khalil, Julian, and Elijah each scored one third of the team’s 42 points. Copy and complete the diagram at right to show how many points each person scored.

42 points

- 5. Estimate** A family has \$4182 in a savings account. Round the number of dollars in the account to the nearest thousand.

- \*6.**  **Explain** The shirt was priced at \$16.98. The tax was \$1.02. Sam paid the clerk \$20. How much money should Sam get back? Explain your thinking.  
(83)

- \*7.** What fraction of the letters in the following word are Is?  
(74)

S U P E R C A L I F R A G I L I S T I C E X P I A L I D O C I O U S

- 8.** Compare:  $3 \times 4 \times 5$   $\bigcirc$   $5 \times 4 \times 3$   
(Inv. 1, 62)

**9.**  $m - 137 = 257$   
(24)

**10.**  $n + 137 = 257$   
(24)

**11.**  $1.45 + 2.4 + 0.56 + 7.6$   
(50)

**12.**  $5.75 - (3.12 + 0.5)$   
(45, 50)

- \*13.** **Analyze** Use the information below to answer parts **a-c**.  
(72)

*In the first 8 games of this season, the Rio Hondo football team won 6 games and lost 2 games. They won their next game by a score of 24 to 20. The team will play 12 games in all.*

- a.** In the first nine games of the season, how many games did Rio Hondo win?
- b.** Rio Hondo won its ninth game by how many points?
- c.** What is the greatest number of games Rio Hondo could win this season?

**14.** 
$$\begin{array}{r} 638 \\ \times 50 \\ \hline \end{array}$$
  
(67)

**15.** 
$$\begin{array}{r} 472 \\ \times 9 \\ \hline \end{array}$$
  
(58)

**16.** 
$$\begin{array}{r} \$6.09 \\ \times 6 \\ \hline \end{array}$$
  
(58)

**\*17.** 
$$3 \overline{)921}$$
  
(80)

**\*18.** 
$$5 \overline{)678}$$
  
(76)

**\*19.** 
$$4 \overline{)2400}$$
  
(80)

**20.**  $\$12.60 \div 5$   
(76)

**21.**  $\$14.34 \div 6$   
(76)

**\*22.**  $\$46.00 \div 8$   
(76)

**23.**  $9^2 = 9n$   
(61, 62)

**24.**  $5w = 5 \times 10^2$   
(61, 62)

- 25.** The names of one fourth of the months begin with the letter J. What percent of the months begin with the letter J?  
(Inv. 5)

- \*26. a. **Model** Use a ruler to find the perimeter of the rectangle at right in millimeters.



- b. **Analyze** Draw a rectangle that is similar to the rectangle in part a and whose sides are twice as long. What is the perimeter in centimeters of the rectangle you drew?

27. Barton turned around three times. How many degrees did Barton turn?  
(75)

28. Rachel wants to determine if two right triangles are congruent, so she moves  $\triangle 1$  to the position of  $\triangle 2$  to see if they match. Name two transformations Rachel uses to move  $\triangle 1$ .



29. Below we show an equilateral triangle, an isosceles triangle, and a scalene triangle. Name the triangle that does not have reflective symmetry.  
(78, 79)



- \*30. Four students wrote their names on slips of paper. The names were then placed in a paper bag and picked one at a time.  
(36)



List the different ways the second, third, and fourth names could have been chosen if Cole's name was chosen first.

### Early Finishers

Real-World Connection

Before taxes were calculated, Crystal spent \$34.00 on school supplies. After adding tax, she paid the clerk \$37.40.

- What was the tax on Crystal's purchase?
- How many cents per dollar of tax did Crystal pay?

## • Decimal Numbers to Thousandths

### Power Up

#### facts

Power Up I

#### count aloud

Count down by quarters from 4 to  $\frac{1}{4}$ .

#### mental math

Counting by fives from 1, 2, 3, 4, or 5, we find five different final-digit patterns: 1 and 6; 2 and 7; 3 and 8; 4 and 9; and 5 and 0. When a number ending in 5 is added to or subtracted from another number, the final digit of that number and of the answer will fit one of the five patterns. Look for the final-digit patterns as you solve **a–f**.

a. **Number Sense:**  $22 + 5$

b. **Number Sense:**  $22 - 5$

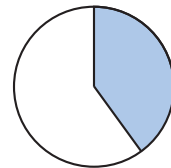
c. **Number Sense:**  $38 + 5$

d. **Number Sense:**  $38 - 5$

e. **Number Sense:**  $44 + 5$

f. **Number Sense:**  $44 - 5$

g. **Estimation:** Estimate the percent of this circle that is shaded:



h. **Calculation:**  $\sqrt{36}, \times 3, + 10, \div 4, - 1, \div 3$

#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. Tanner has three homework assignments to complete. One assignment is in math, one is in science, and one is in vocabulary. Tanner plans to finish one assignment before starting the next. What are the possible sequences in which he could complete the assignments?

## New Concept

In Investigation 4, we practiced writing fractions with a denominator of 10 as decimal numbers with one decimal place.

$$\frac{7}{10} = 0.7 \quad \text{Both numbers are *seven tenths*.$$

### Thinking Skill

#### Discuss

Name the order of the fractions from least to greatest.

We also wrote fractions with a denominator of 100 as decimal numbers with two decimal places.

$$\frac{12}{100} = 0.12 \quad \text{Both numbers are *twelve hundredths*.$$

In this lesson, we will write fractions with a denominator of 1000 as decimal numbers with three decimal places.

$$\frac{125}{1000} = 0.125 \quad \text{Both numbers are *one hundred twenty-five thousandths*.$$

$$\frac{25}{1000} = 0.025 \quad \text{Both numbers are *twenty-five thousandths*.$$

### Example 1



Visit [www.SaxonMath.com/Int4Activities](http://www.SaxonMath.com/Int4Activities) for a calculator activity.

Write  $\frac{375}{1000}$  as a decimal number. Then use words to name both numbers.

The denominator of the fraction is 1000, so we use three decimal places to write the fraction as a decimal number.

$$\frac{375}{1000} = \mathbf{0.375} \quad \text{three hundred seventy-five thousandths}$$

Working in the reverse, we see that a decimal number with three decimal places may be written as a fraction with a denominator of 1000.

### Example 2

Write each decimal number as a fraction or mixed number. Then use words to name the numbers.

a. **0.625**

b. **3.125**

a. Since there are three places that follow the decimal point, we will use the denominator 1000 for our fraction. We write the digits that follow the decimal point as the numerator of the fraction.

$$0.625 = \frac{\mathbf{625}}{\mathbf{1000}} \quad \text{six hundred twenty-five thousandths}$$

b. Since there is a whole number, 3, we may write the decimal number as a mixed number. Only the digits that follow the decimal point become part of the fraction.

$$3.125 = \frac{125}{1000} \quad \text{three and one hundred twenty-five thousandths}$$

**Verify** Explain why  $\frac{625}{1000}$  is greater than  $\frac{325}{1000}$ .

## Lesson Practice

Write each fraction or mixed number as a decimal number:

a.  $\frac{425}{1000}$

b.  $3\frac{875}{1000}$

c.  $\frac{35}{1000}$

d.  $2\frac{7}{1000}$

Write each decimal number as a fraction or mixed number. Then use words to name the numbers.

e. 0.214

f. 4.321

g. 0.025


h. 5.012

i. 0.003

j. 9.999

## Written Practice

*Distributed and Integrated*

- \*1. <sup>(54)</sup> If it is not a leap year, what is the total number of days in January, February, and March?
2. <sup>(49)</sup> A tailor made each of 12 children a pair of pants and 2 shirts. How many pieces of clothing did the tailor make?
- \*3. <sup>(31)</sup> Ariel did seven more chin-ups than Burke did. If Ariel did eighteen chin-ups, how many chin-ups did Burke do?
4. <sup>(60)</sup> Kadeeja drove 200 miles on 8 gallons of gas. Her car averaged how many miles on each gallon of gas?
- \*5. <sup>(83)</sup> Melinda paid the clerk \$20.00 for a book that was priced at \$8.95. The tax was 54¢. How much money should she get back?
- \*6. <sup>(55)</sup> a. Which two prime numbers are factors of 15?  
b.  **Explain** Is 15 a prime number? Why or why not?
7. <sup>(69)</sup> If each side of an octagon is 1 centimeter long, what is the octagon's perimeter in millimeters?

8. **Represent** (70) One third of the 18 marbles were blue. How many of the marbles were blue? Draw a picture to solve the problem.

9. a. **Analyze** (57) The Mendez family hiked 15 miles in 1 day. At that rate, how many miles would they hike in 5 days? Make a table to solve the problem.

b. **Formulate** Write an equation to represent the data in the table.

\* 10. **Explain** (60, 80) Mylah picked 3640 peaches in 7 days. She picked an average of how many peaches each day? Explain why your answer is reasonable.

\* 11. a. **Analyze** (74, 84) Zachary did 1000 push-ups last week. He did 129 of those push-ups last Wednesday. What fraction of the 1000 push-ups did Zachary do last Wednesday?

b. **Represent** Write the answer to part a as a decimal number. Then use words to name the number.

\* 12. **Explain** (77) Suppose that an object on Earth has a known mass of 80 kilograms. Will the mass of that object be less than, more than, or the same as on the other planets in our solar system? Explain your answer.

13.  $4.56 - (2.3 + 1.75)$   
(45, 50)

14.  $\sqrt{36} + n = 7 \times 8$   
(Inv. 3, 61)

15.  $3 \times 6 \times 3^2$   
(62)

16.  $462 \times \sqrt{9}$   
(Inv. 3, 58)

17.  $7^2 - \sqrt{49}$   
(Inv. 3, 62)

18.  $\begin{array}{r} 36 \\ \times 50 \\ \hline \end{array}$   
(67)

19.  $\begin{array}{r} \$4.76 \\ \times \quad 7 \\ \hline \end{array}$   
(58)

20.  $\begin{array}{r} 4 \\ 3 \\ 2 \\ 7 \\ 6 \\ 8 \\ + n \\ \hline 47 \end{array}$   
(2)

21.  $\frac{524}{4}$   
(76)

\* 22.  $6 \overline{)4200}$   
(80)

23.  $5 \overline{) \$26.30}$   
(76)

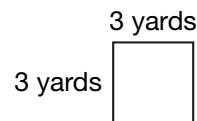
24.  $2n = \$3.70$   
(41, 76)

25.  $786 \div 3$   
(76)

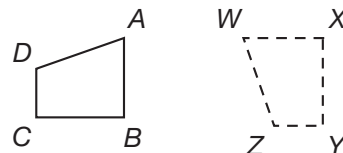
\* 26.  $4902 \div 7$   
(80)

- \*27. Write 0.321 as a fraction.  
(84)

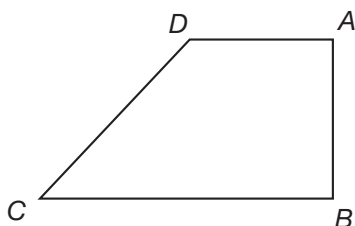
28. Find the perimeter and area of this square:  
(Inv. 2,  
Inv. 3)



29. Which transformations would move figure  $ABCD$  to position  $WXYZ$ ?  
(73)



30. **Estimate** Which angle in this figure looks like it measures about  $45^\circ$ ?  
(23, 81)



## Early Finishers

Real-World Connection

The Republic of Malta is a group of small islands in the Mediterranean Sea. It is directly south of Sicily and north of Libya. From 1972 to 1994, the currency used in the Republic of Malta included a 2-mil coin, a 3-mil coin, and a 5-mil coin. A mil was  $\frac{1}{1000}$  (or 0.001) of a lira, another Maltese money amount.

- Write the value of each mil coin in both decimal and fraction form as it relates to the lira.
- Use words to name each fraction in part **a**.
- If you were to add a 2-mil coin, a 3-mil coin, and a 5-mil coin together, how many mils would you have?
- How many lira would equal the total in part **c**? Write the total as a decimal and then as a fraction in lowest terms.



- Multiplying by 10, by 100, and by 1000

## Power Up

### facts

Power Up G

### mental math

Use the 5s pattern as you add in **a–c**.

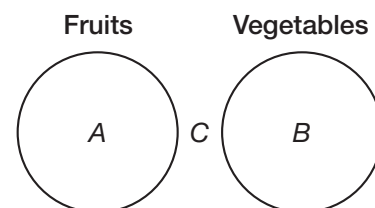
- Number Sense:**  $36 + 15$
- Number Sense:**  $47 + 25$
- Number Sense:**  $28 + 35$
- Number Sense:**  $40 \times 40 \times 10$
- Money:**  $\$10.00 - \$2.75$
- Time:** How many days is 8 weeks?
- Estimation:** Each bracelet costs \$2.99. Tatiana has \$11. Does she have enough money to buy 4 bracelets?
- Calculation:**  $50\% \text{ of } 42, \div 3, + 10, - 3, \div 2, \times 7$

### problem solving

Choose an appropriate problem-solving strategy to solve his problem.

The diagram at right is called a *Venn diagram*. The circle on the left stands for fruit, and the circle on the right stands for vegetables. The *A*

represents apples, which are fruit, and the *B* represents broccoli, which is a vegetable. The *C* stands for cheese, which is not a fruit or a vegetable. Copy the diagram on your paper and place abbreviations for eggs, oranges, and green beans.



## New Concept

To multiply a whole number by 10, we simply attach a zero to the end of the number.

### Thinking Skill

#### Generalize

If we were to multiply 15 by 1 million, how many zeros would we attach to the right of the product of 15 and 1?

$$\begin{array}{r} 123 \\ \times 10 \\ \hline 1230 \end{array}$$

When we multiply a whole number by 100, we add two zeros to the end of the number.

$$\begin{array}{r} 123 \\ \times 100 \\ \hline 12,300 \end{array}$$

When we multiply a whole number by 1000, we add three zeros to the end of the number.

$$\begin{array}{r} 123 \\ \times 1000 \\ \hline 123,000 \end{array}$$

When we multiply dollars and cents by a whole number, we remember to insert the decimal point two places from the right side of the product.

$$\begin{array}{r} \$1.23 \\ \times 100 \\ \hline \$123.00 \end{array}$$

### Example

**Multiply mentally:**

**a.  $37 \times 10$**

**b.  $\$6.12 \times 100$**

**c.  $45\text{¢} \times 1000$**

**a.** The answer is "37" with one zero at the end:

$$\mathbf{370}$$

**b.** The answer is "612" with two zeros at the end. We remember to place the decimal point and dollar sign:

$$\mathbf{\$612.00}$$

**c.** The answer is "45" with three zeros at the end. This makes 45,000¢, which in dollar form is

$$\mathbf{\$450.00}$$

### Thinking Skill

#### Discuss

Why is the product of 100 and \$6.12 not written as \$6.1200?

## Lesson Practice

Multiply mentally:

a.  $365 \times 10$

b.  $52 \times 100$

c.  $7 \times 1000$

d.  $\$3.60 \times 10$

e.  $420 \times 100$

f.  $\$2.50 \times 1000$

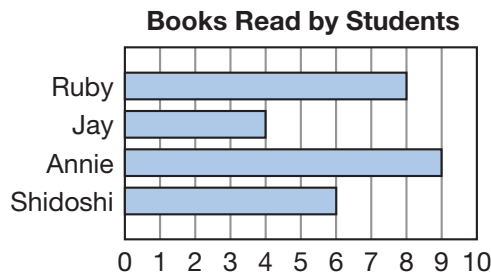
g. The table below shows the relationship between dimes and dollars. Write a formula to represent the relationship.

Number of Dollars	1	2	3	4	5
Number of Dimes	10	20	30	40	50

## Written Practice

*Distributed and Integrated*

- \*1. **Interpret** Use the information in the graph below to answer parts a–c.  
(49, Inv. 6)



- a. Which student has read exactly twice as many books as Jay?
- b. Shidoshi's goal is to read 10 books. How many more books does he need to read to reach his goal?
- c. If the books Annie has read have an average of 160 pages each, how many pages has she read?
- \*2. **Dala** saw some pentagons. The pentagons had a total of 100 sides.  
(52, 63) How many pentagons did Dala see?
- \*3. **Mariah** bought a rectangular piece of land that was 3 miles long and 2 miles wide. Fifty percent of the land could be farmed. How many square miles could be farmed?  
(Inv. 3, Inv. 5)
- \*4. **Max** bought 10 pencils for 24¢ each. The tax was 14¢. What was the total cost of the pencils?  
(83)

**\*5. Multiple Choice** A full pitcher of orange juice contains about how much juice?

(40)

- A 2 ounces      B 2 liters      C 2 gallons      D 2 cups

**6. Represent** Draw a triangle that has two perpendicular sides. What type of triangle did you draw?

(23, 78)

**7. a. Represent** One fourth of the 48 gems were rubies. How many of the gems were rubies? Draw a picture to solve the problem.

(Inv. 5, 70)

b. What percent of the gems were not rubies?

**\*8. a. Represent** One thousand fans attended the game, but only 81 fans cheered for the visiting team. What fraction of the fans who attended the game cheered for the visiting team?

(74, 84)

b. Write the answer in part a as a decimal number. Then use words to name the number.

**9.**  $46.01 - (3.68 + 10.2)$

(45, 50)

**10.**  $728 + c = 1205$

(24)

**11.**  $36 \times 10$

(85)

**12.**  $100 \times 42$

(85)

**13.**  $\$2.75 \times 1000$

(85)

**14.**  $\$3.17$   
 $\times \quad 4$   
-----

(58)

**15.**  $206$   
 $\times \quad 5$   
-----

(58)

**16.**  $37$   
 $\times \quad 40$   
-----

(67)

**17.**  $3 \overline{)492}$

(76)

**18.**  $5 \overline{)860}$

(76)

**19.**  $6m = \$9.30$

(41, 76)

**20.**  $168 \div 2^3$

(62, 65)

**\*21.**  $\$20.00 \div 8$

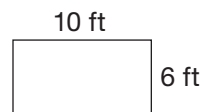
(76, 80)

**\*22.**  $1600 \div \sqrt{16}$

(Inv. 3, 80)

**23.** Find the perimeter and area of this rectangle:

(Inv. 2, Inv. 3)



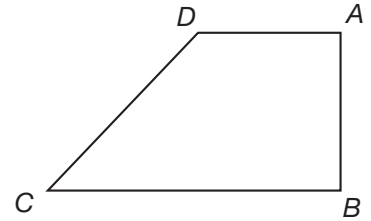
**\*24. a. Verify** Which of these letters has two lines of symmetry?

(79)

# H A P P Y

b. Which of these letters has rotational symmetry?

- \*25. **Estimate** Which angle in this figure looks like it measures about  $135^\circ$ ?  
(23, 81)



- \*26. **Multiple Choice** Luz wants to cover a floor with tiles.  
(82) Which of these tile shapes will *not* tessellate, or will not completely cover the floor?



- \*27. The table shows the relationship between meters and centimeters:  
(Inv. 8)

Number of Meters	1	2	3	4	5
Number of Centimeters	100	200	300	400	500

- a. **Formulate** Write a formula to represent the relationship.
- b. **Predict** Use your formula to find the number of centimeters in 10 meters.
28. In Dodge City, Kansas, the average maximum temperature in January is  $41^\circ\text{F}$ . The average minimum temperature is  $19^\circ\text{F}$ . How many degrees cooler is  $19^\circ\text{F}$  than  $41^\circ\text{F}$ ?  
(18)
29. The Peace River is 1210 miles long, and its source is in British Columbia. The Red River is 1290 miles long, and its source is in New Mexico. Which river is longer?  
(52)
- \*30. **Model** Draw a number line from 6 to 7 divided into tenths. On it show the locations of 6.1,  $6\frac{3}{10}$ , 6.6, and  $6\frac{9}{10}$ .  
(Inv. 1)

## • Multiplying Multiples of 10 and 100

### Power Up

#### facts

Power Up G

#### mental math

Use the 5s pattern as you subtract in **a–c**.

- Number Sense:**  $41 - 15$
- Number Sense:**  $72 - 25$
- Number Sense:**  $84 - 45$
- Number Sense:**  $25 \times 30$
- Money:** Bridget spent \$6.54. Then she spent \$2.99 more. Altogether, how much did Bridget spend?
- Time:** Mirabel’s speech lasted 2 minutes 20 seconds. How many seconds is that?
- Estimation:** Kione purchased two DVDs for \$18.88 each. Estimate the total cost of the DVDs.
- Calculation:**  $\frac{1}{10}$  of 60,  $\times 4$ ,  $\div 2$ ,  $\times 5$

#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. Josh will flip a coin three times in a row. On each flip, the coin will either land on “heads” or “tails.” If the coin were to land heads up each time, the combination of flips would be heads, heads, heads, which can be abbreviated as HHH. Find all the possible combinations of heads and tails Josh can get with three coin flips.

### New Concept

Once we have memorized the multiplication facts, we can multiply rounded numbers “in our head.” To do this, we multiply the first digits of the factors and count zeros. Study the multiplication on the next page.

### Thinking Skill

#### Analyze

Is the product of 40 and 50 written as 200, 2000, or 20,000? Explain your reasoning.

$$\begin{array}{r} 40 \\ \times 30 \\ \hline \end{array}$$

two zeros

$$4 \times 3 \longrightarrow \longrightarrow \text{two zeros}$$

To find the product of 40 and 30, we multiply 4 by 3 and then attach two zeros.

### Example 1

**In the weight-lifting room, a group of football players lifted 80 pounds of weights 60 different times. How many pounds of weight did the players lift altogether?**

We think, "Six times eight is 48." Since there is one zero in 60 and one zero in 80, we attach two zeros to 48. The product is 4800, so the total weight lifted was **4800 pounds**.

6 × 8 is 48.

### Example 2

#### Thinking Skill

#### Verify

Why do we attach three zeros when we multiply 30 by \$7.00?

**A store has 30 ping-pong paddles for sale at \$7.00 each. How much money will the store receive if all of the paddles are sold?**

We think, "Three times seven is 21." There are three zeros in the problem, so we attach three zeros to 21 to get 21,000. Since we multiplied dollars and cents, we insert the decimal point two places from the right and add a dollar sign. The product is \$210.00, so the income will be **\$210**.

3 × 7 is 21.

### Example 3

**Multiply mentally:  $400 \times 700$**

We think, "Four times seven is 28." We attach four zeros and get **280,000**.

4 × 7 is 28.

### Lesson Practice

Multiply mentally:

a.  $70 \times 80$

b.  $40 \times 50$

c.  $40 \times \$6.00$

d.  $30 \times 800$


1. It takes Tempest 20 minutes to walk to school. At what time should she start for school if she wants to arrive at 8:10 a.m.?  
(27)

\*2. A container and its contents weigh 125 pounds. The contents of the container weigh 118 pounds. What is the weight of the container?  
(25, 30)

\*3. Anjelita is shopping for art supplies and plans to purchase a sketchpad for \$4.29, a charcoal pencil for \$1.59, and an eraser for 69¢. If the amount of sales tax is 43¢ and Anjelita pays for her purchase with a \$10 bill, how much change should she receive?  
(83)

4. According to this calendar, October 30, 1904, was what day of the week?  
(54)

OCTOBER 1904						
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					

\*5.  **Explain** From 3:00 p.m. to 3:45 p.m., the minute hand of a clock turns how many degrees? Explain your thinking.  
(75)

6. Round three thousand, seven hundred eighty-two to the nearest thousand.  
(34, 54)

7. The limousine weighed 2 tons. How many pounds is 2 tons?  
(77)

\*8. **Represent** One fifth of the 45 horses were pintos. How many of the horses were pintos? Draw a picture to illustrate the problem.  
(70)

9. What percent of the horses in problem 8 were pintos?  
(Inv. 5, 70) (Hint: Find  $\frac{1}{5}$  of 100%.)

100%




10. **Represent** Which point on the number line below could represent 23,650?  
(Inv. 1)



- \* 11. **Connect** Write each decimal number as a fraction:  
(Inv. 4, 84)

a. 0.1

b. 0.01

c. 0.001

12.  $\begin{array}{r} \$36.47 \\ + \$9.68 \\ \hline \end{array}$   
(43, 51)

13.  $\begin{array}{r} \$30.00 \\ - \$13.45 \\ \hline \end{array}$   
(52)

14.  $\begin{array}{r} 6 \\ 8 \\ 17 \\ 23 \\ 110 \\ 25 \\ + 104 \\ \hline \end{array}$   
(17)

15.  $\begin{array}{r} 476 \\ \times 7 \\ \hline \end{array}$   
(58)

16.  $\begin{array}{r} 804 \\ \times 5 \\ \hline \end{array}$   
(58)

17.  $12.65 - (7.43 - 2.1)$   
(45, 50)

18.  $5^2 + 5^2 + n = 10^2$   
(61, 62)

19. **Represent** Write each of these numbers with words:  
(35, Inv. 4)

a.  $2\frac{1}{10}$

b. 2.1

\* 20.  $100 \times 23\text{¢}$   
(85)

\* 21.  $60 \times 30$   
(86)

\* 22.  $70 \times \$2.00$   
(86)

\* 23.  $3 \overline{) \$6.27}$   
(76, 80)

24.  $7 \overline{) 820}$   
(76)

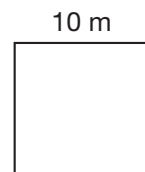
25.  $6 \overline{) 333}$   
(68)

26.  $625 \div \sqrt{25}$   
(Inv. 3, 76)

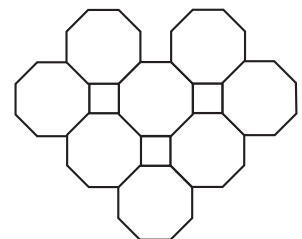
\* 27.  $4000 \div 2^3$   
(62, 80)

28.  $2w = 1370$   
(41, 76)

29. Find the perimeter and area of this square.  
(Inv. 2, Inv. 3)



- \* 30. a. **Analyze** Some combinations of shapes will fit together to cover a flat surface. What two types of polygons are used in the pattern at right?  
(63, 82)



- b. Does this tessellation have line symmetry?

## • Multiplying Two Two-Digit Numbers, Part 1

### Power Up

#### facts

Power Up G

#### mental math

Use the 5s pattern as you add or subtract in **a–c**.

- a. **Number Sense:**  $83 - 15$
- b. **Number Sense:**  $29 + 35$
- c. **Number Sense:**  $76 + 15$
- d. **Percent:** Cory figures that about 50% of the calories he consumes are from carbohydrates. Cory consumes about 2000 calories each day. About how many of those calories are from carbohydrates?
- e. **Measurement:** How many inches is one yard?
- f. **Time:** Which day of the week is 71 days after Monday?
- g. **Estimation:** Jayla has run  $\frac{1}{2}$  mile in 4 minutes 57 seconds. If she can continue running at the same pace, about how long will it take Jayla to run one full mile?
- h. **Calculation:**  $5^2 + 5^2, + 6, \div 8$

#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. Sandra bought a CD priced at \$12.95. Sales tax was \$1.10. She paid for her purchase with a \$10 bill and a \$5 bill. Sandra got back five coins (not including a half-dollar). What were the coins Sandra should have received in change?

## New Concept

We use three steps to multiply by a two-digit number. First we multiply by the ones digit. Next we multiply by the tens digit. Then we add the products. To multiply 34 by 12, for example, we multiply 34 by 2 and then multiply 34 by 10. Then we add the products.

$$\begin{array}{r} 34 \times 2 = 68 \text{ partial product} \\ 34 \times 10 = 340 \text{ partial product} \\ \hline 34 \times 12 = 408 \text{ total product} \end{array}$$

### Thinking Skill

#### Evaluate

Can the expression  $(2 \times 34) + (10 \times 34)$  be used to represent the vertical form of  $34 \times 12$ ? Explain why or why not.

**Multiple Methods:** It is easier to write the numbers one above the other when we multiply, like this:

$$\begin{array}{r} 34 \\ \times 12 \\ \hline \end{array}$$

**Method 1:** First we multiply 34 by 2 and write the answer.

$$\begin{array}{r} 34 \\ \times 12 \\ \hline 68 \end{array}$$

Next we multiply 34 by 1. This 1 is actually 10, so the product is 340. We write the answer, and then we add the results of the two multiplication problems and get 408.

$$\begin{array}{r} 34 \\ \times 12 \\ \hline 68 \\ + 340 \\ \hline 408 \end{array}$$

**Method 2:** An alternate method would be to omit the zero from the second multiplication. Using this method, we position the last digit of the second multiplication in the second column from the right. The empty place is treated like a zero when adding.

$$\begin{array}{r} 34 \\ \times 12 \\ \hline 68 \\ + 34 \\ \hline 408 \end{array}$$



Visit [www.SaxonMath.com/Int4Activities](http://www.SaxonMath.com/Int4Activities) for a calculator activity.

**Example**

$$\begin{array}{r} \text{Multiply: } 31 \\ \times 23 \\ \hline \end{array}$$

First we multiply 31 by 3.

$$\begin{array}{r} 31 \\ \times 23 \\ \hline 93 \end{array}$$

Now we multiply 31 by 2. Since this 2 is actually 20, we write the last digit of the product in the tens column. Then we add to get **713**.

$$\begin{array}{r} 31 \\ \times 23 \\ \hline 93 \\ + 62 \\ \hline 713 \end{array} \quad \text{or} \quad \begin{array}{r} 31 \\ \times 23 \\ \hline 93 \\ + 620 \\ \hline 713 \end{array}$$

**Lesson Practice**

Multiply:

a.  $\begin{array}{r} 32 \\ \times 23 \\ \hline \end{array}$

b.  $\begin{array}{r} 23 \\ \times 32 \\ \hline \end{array}$

c.  $\begin{array}{r} 43 \\ \times 12 \\ \hline \end{array}$

d.  $\begin{array}{r} 34 \\ \times 21 \\ \hline \end{array}$

e.  $\begin{array}{r} 32 \\ \times 32 \\ \hline \end{array}$

f.  $\begin{array}{r} 22 \\ \times 14 \\ \hline \end{array}$

g.  $\begin{array}{r} 13 \\ \times 32 \\ \hline \end{array}$

h.  $\begin{array}{r} 33 \\ \times 33 \\ \hline \end{array}$

**Written Practice**

*Distributed and Integrated*

- \*1. **Analyze** Use the following information to answer parts **a–c**.  
(27, 72)

*Freeman rode his bike 2 miles from his house to Didi's house. Together they rode 4 miles to the lake. Didi caught 8 fish. At 3:30 p.m. they rode back to Didi's house. Then Freeman rode home.*

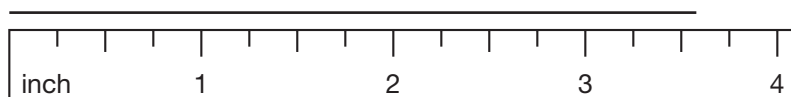
- Altogether, how far did Freeman ride his bike?
- It took Freeman an hour and a half to get home from the lake. At what time did he get home?
- Didi caught twice as many fish as Freeman. How many fish did Freeman catch?

\*2. <sup>(83)</sup> Saraj bought some feed priced at \$12.97. Tax was 91¢. He paid with a \$20 bill. How much change should he receive?

3. <sup>(59)</sup> **Estimate** Find a reasonable sum of 4876 and 3149 by rounding each number to the nearest thousand and then adding.

4. <sup>(Inv. 2, 63)</sup> **Estimate** What is the perimeter of a pentagon if each side is 20 centimeters long? Explain your reasoning.

\*5. <sup>(39)</sup> **Estimate** Find the length of this segment to the nearest quarter inch:



6. <sup>(70)</sup> **Represent** One half of the 18 players were on the field. How many players were on the field? Draw a picture to illustrate the problem.

7. <sup>(36)</sup> A dime is  $\frac{1}{10}$  of a dollar. What fraction of a dollar is a penny?

8. <sup>(Inv. 5)</sup> A dime is what percent of a dollar?

9. <sup>(87)</sup> Find  $13^2$  by multiplying  $13 \times 13$ .

10. <sup>(84)</sup> **Represent** One millimeter is  $\frac{1}{1000}$  of a meter. Write that number as a decimal number. Then use words to write the number.

\*11. <sup>(87)</sup> 
$$\begin{array}{r} 31 \\ \times 21 \\ \hline \end{array}$$

\*12. <sup>(87)</sup> 
$$\begin{array}{r} 32 \\ \times 31 \\ \hline \end{array}$$

\*13. <sup>(87)</sup> 
$$\begin{array}{r} 13 \\ \times 32 \\ \hline \end{array}$$

\*14. <sup>(87)</sup> 
$$\begin{array}{r} 11 \\ \times 11 \\ \hline \end{array}$$

\*15. <sup>(87)</sup> 
$$\begin{array}{r} 12 \\ \times 14 \\ \hline \end{array}$$

\*16. <sup>(86)</sup>  $30 \times 800$

17. <sup>(76)</sup>  $7 \overline{)1000}$

18. <sup>(76)</sup>  $3 \overline{)477}$

19. <sup>(80)</sup>  $5 \overline{)2535}$

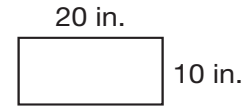
20. <sup>(76, 80)</sup>  $\$64.80 \div 9$

21. <sup>(76)</sup>  $716 \div 4$

22. <sup>(41, 65)</sup>  $8x = 352$

- \*23. How many different three-digit numbers can you write using the digits 1, 5, and 0? Each digit may be used only once, and the digit 0 may not be used in the hundreds place.

- \*24. Find the perimeter and area of this rectangle:

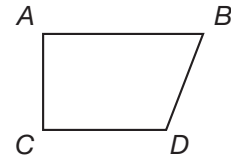


- \*25. **Represent** Draw an equilateral triangle with sides 2 cm long.

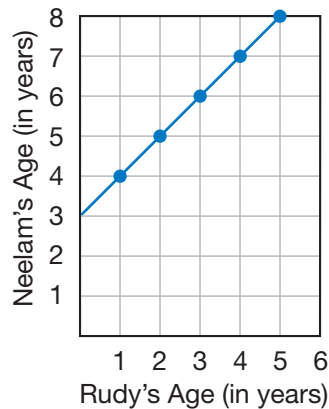
26. What is the perimeter in millimeters of the triangle you drew in problem 25?

- \*27. a. **Conclude** In this polygon, which side appears to be parallel to side  $AB$ ?

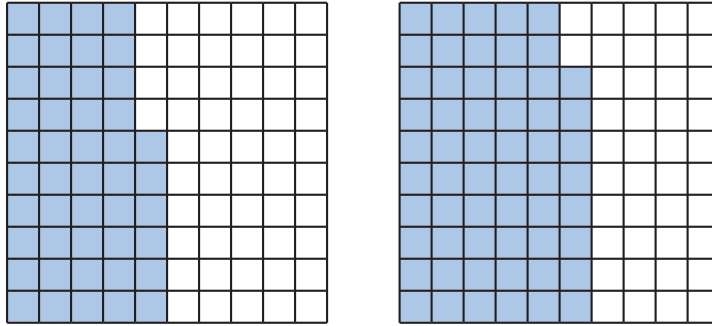
- b. **Estimate** Which angle looks as if it might measure  $110^\circ$ ?




28. This graph shows the relationship between Rudy's age and Neelam's age. How old was Neelam when Rudy was 4 years old?



29. **Represent** Each grid represents a decimal number.  
(Inv. 4)



Write each decimal number. Then write the sum and the difference of those numbers.

30.  **Estimate** A mail carrier worked from 8 a.m. to noon and from 1 p.m. to 4 p.m. During those times, the carrier delivered mail to 691 homes. About how many deliveries did the carrier make each hour? Explain your answer.  
(76)

### Early Finishers

Real-World Connection

Murals are pictures painted on walls. In 2005, archaeologists revealed the last wall of a room-sized mural that was painted more than 2000 years ago in the ancient Mayan city of San Bartolo, Guatemala.

- Estimate the area of a mural that measures 23 feet by 84 feet.
- Find the actual area of a mural with the measurements given.
- How close was your estimate to the actual area?

## • Remainders in Word Problems About Equal Groups

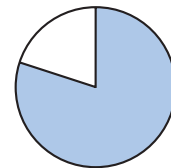
### Power Up

#### facts

Power Up G

#### mental math

- Number Sense:**  $85 - 38$
- Number Sense:**  $4 \times 20 \times 10$
- Percent:** 10% of \$20
- Measurement:** How many pints is a gallon?
- Powers/Roots:**  $9^2 - \sqrt{9}$
- Time:** Which day of the week is 699 days after Monday?
- Estimation:** Estimate what percent of the circle is shaded.



- Calculation:**  $\sqrt{81}, \div 3, \times 25, + 75, \times 2$

#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. Tandy wants to know the circumference of (the distance around) her bicycle tire. She has some string and a meterstick. How can Tandy measure the circumference of the tire in centimeters?

### New Concept

We have practiced solving “equal groups” problems using division. In these problems, there were no remainders from the division. In this lesson we will begin practicing division word problems that involve remainders. When solving these problems, we must be careful to identify exactly what the question is asking.



### Example

Lilly needs to place 100 bottles into boxes that hold 6 bottles each.

- How many boxes can be filled?
- How many bottles will be left over?
- How many boxes are needed to hold all the bottles?

Each of these questions asks for different information. To answer the questions, we begin by dividing 100 by 6.

$$\begin{array}{r} 16 \text{ R } 4 \\ 6 \overline{)100} \\ \underline{6} \phantom{0} \\ 40 \\ \underline{36} \\ 4 \end{array}$$

The result “16 R 4” means that the 100 bottles can be separated into 16 groups of 6 bottles.

There will be 4 extra bottles.

- The bottles can be separated into 16 groups of 6 bottles, so **16 boxes** can be filled.
- The 4 remaining bottles do not completely fill a box. So after filling 16 boxes, there will still be **4 bottles** left over.
- Although the 4 remaining bottles do not completely fill a box, another box is needed to hold them. Thus, **17 boxes** are needed to hold all the bottles.

### Lesson Practice

**Interpret** Use the statement below to answer problems **a–b**.

*Tomorrow 32 students are attending an awards ceremony. Each table will seat 5 students.*

- How many tables can be filled?
- How many tables will be needed?

**Interpret** Use the statement below to answer problems **c–e**.

*Tendai found 31 quarters in his bank. He made stacks of 4 quarters each.*

- How many stacks of 4 quarters did he make?
- How many extra quarters did he have?
- If Tendai made a short stack with the extra quarters, how many stacks would he have in all?

\*1. **Interpret** Taryn packed 6 table-tennis balls in each package. There were 100 table-tennis balls to pack.

(88)

- How many packages did he fill?
- How many table-tennis balls were left over?

\*2. Write the formula for the area of a square. Then find the area of a square with sides 12 inches long.

(62, 87)

\*3. **Estimate** Paola bought four pretzels priced at 59¢ each. The sales tax was 16¢. Estimate the total cost of the pretzels. Explain your thinking.

(83)

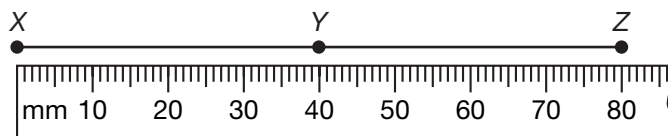
4. Twenty-four inches is how many feet?

(Inv. 2)

\*5. a. Segment YZ is how many millimeters long?

(45, 69)

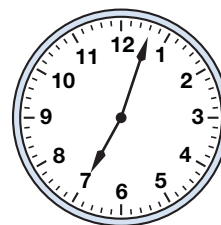
b. Segment YZ is how many centimeters long?



6. Jorge finished eating breakfast at the time shown on the clock. He finished eating lunch 5 hours 20 minutes later.

(27)

What time did Jorge finish eating lunch?



7. **Represent** Write the number 7528 in expanded form. Then use words to write the number.

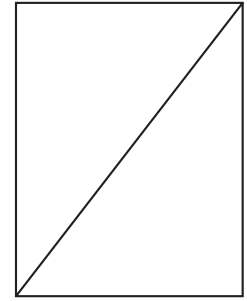
(16, 33)

\*8. a. **Represent** One fifth of the 25 band members missed the note. How many band members missed the note? Draw a picture to illustrate the problem.

(Inv. 5, 70)

b. What percent of the band members missed the note?

- \*9. <sup>(73)</sup> Nikki cut a rectangular piece of paper along a diagonal to make two triangles. What transformation can Nikki use to find out if the triangles are congruent?



10. <sup>(43, 51)</sup>  $\$6.35 + \$14.25 + \$0.97 + \$5$

\*11. <sup>(43, 50)</sup>  $4.60 - (1.4 + 2.75)$

12. <sup>(43, 45)</sup>  $\$10.00 - (46\text{¢} + \$1.30)$

\*13. <sup>(85)</sup>  $28 \times 1000$

\*14. <sup>(87)</sup>  $\begin{array}{r} 13 \\ \times 13 \\ \hline \end{array}$

\*15. <sup>(87)</sup>  $\begin{array}{r} 12 \\ \times 11 \\ \hline \end{array}$

16. <sup>(58)</sup>  $\begin{array}{r} \$8.67 \\ \times 9 \\ \hline \end{array}$

\*17. <sup>(87)</sup>  $\begin{array}{r} 31 \\ \times 31 \\ \hline \end{array}$

\*18. <sup>(87)</sup>  $\begin{array}{r} 12 \\ \times 31 \\ \hline \end{array}$

19. <sup>(80)</sup>  $7 \overline{)3542}$

20. <sup>(76, 80)</sup>  $6 \overline{)\$33.00}$

21. <sup>(80)</sup>  $8 \overline{)4965}$

22. <sup>(68)</sup>  $482 \div 5$


23. <sup>(80)</sup>  $2700 \div 9$

24. <sup>(Inv. 3, 80)</sup>  $2700 \div \sqrt{9}$

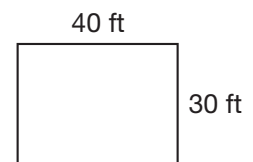
25. <sup>(61, 62)</sup>  $7 + 7 + n = 7^2$

26. <sup>(61, 62)</sup>  $3n = 6^2$

- \*27. a. **Represent** Draw an obtuse triangle.

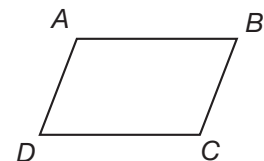
- b.  **Explain** Describe the segments of the obtuse angle. Explain your thinking.

28. <sup>(Inv. 3, 86)</sup> The classroom was 40 feet long and 30 feet wide. How many 1-foot square floor tiles were needed to cover the floor?



- \*29. a. <sup>(23)</sup> In polygon  $ABCD$ , which side appears to be parallel to side  $AD$ ?

- b. **Classify** Describe the angles.



- \* 30.** **Interpret** This table shows the heights of several tall buildings.  
(Inv. 6) Make a bar graph to display the data.

**Tall Buildings in the United States**

Building	Location	Height (stories)
The Pinnacle	Chicago, IL	48
Interstate Tower	Charlotte, NC	32
Two Union Square	Seattle, WA	56
28 State Street	Boston, MA	40

**Early Finishers**

*Real-World Connection*

George's Peach Pit Stop sells peaches in paper packages. Each package holds 25 peaches. George has an order for 346 peaches.

- How many packages can be filled?
- How many packages will he actually need?
- How many peaches will be in the partially filled package?

## • Mixed Numbers and Improper Fractions

### Power Up

#### facts

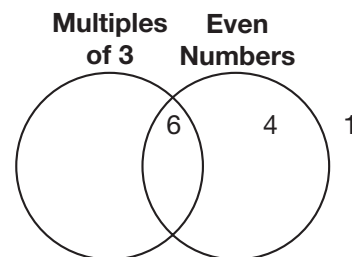
Power Up G

#### mental math

- Number Sense:**  $25 \times 1000$
- Number Sense:**  $58 + 35$
- Percent:** Alonso needs to collect 25% of \$40. What is 25% of \$40?
- Time:** What day is 71 days after Wednesday?
- Measurement:** How many feet is 6 yards?
- Money:** The book cost \$6.75. If Daina paid for the book with a \$10 bill, then how much change should she receive?
- Estimation:** The total cost for 6 picture frames was \$41.94. Round this amount to the nearest dollar and then divide by 6 to estimate the cost of each frame.
- Calculation:**  $\sqrt{1}$ ,  $\times 1$ ,  $\div 1$ ,  $- 1 + 1$

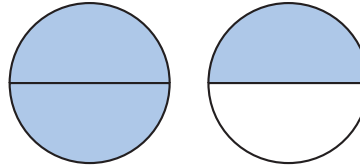
#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. In this Venn diagram, the circle on the left stands for multiples of 3. The circle on the right stands for even numbers. The number 6 is both a multiple of 3 and an even number, so it is placed within the space created by the overlap of the two circles. The number 4 is placed within the circle for even numbers but outside the overlap, since 4 is not a multiple of 3. The number 1 is placed outside both circles because it is not a multiple of 3 and it is not even. Copy the Venn diagram on your paper, and place the numbers 9, 10, 11, and 12.



## New Concept

Here we show a picture of  $1\frac{1}{2}$  shaded circles. Each whole circle has been divided into two half circles.



$$1\frac{1}{2} = \frac{2}{2} + \frac{1}{2} = \frac{3}{2}$$

### Math Language

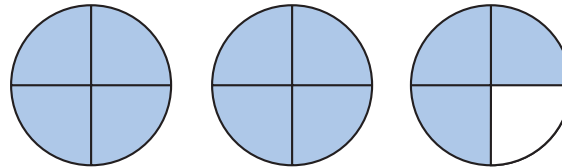
A **proper fraction** is a fraction whose numerator is less than the denominator.

We see from the picture that  $1\frac{1}{2}$  is the same as *three halves*, which is written as  $\frac{3}{2}$ . The numerator is greater than the denominator, so the fraction  $\frac{3}{2}$  is greater than 1. Fractions that are greater than or equal to 1 are called **improper fractions**. In this lesson we will draw pictures to show mixed numbers and their equivalent improper fractions.

### Example

**Draw circles to show that  $2\frac{3}{4}$  equals  $\frac{11}{4}$ .**

We begin by drawing three circles. The denominator of the fraction part of  $2\frac{3}{4}$  is four, so we divide all the circles into fourths and shade  $2\frac{3}{4}$  of them.



$$2\frac{3}{4} = \frac{4}{4} + \frac{4}{4} + \frac{3}{4} = \frac{11}{4}$$

We count 11 shaded fourths. The drawing shows that  $2\frac{3}{4}$  equals  $\frac{11}{4}$ .

### Activity

#### Modeling Mixed Numbers and Improper Fractions

Material needed:

- fraction manipulatives from **Lesson Activities 37 and 38**

Use fraction manipulatives to perform the following activities:

- a. Place five  $\frac{1}{2}$  circles on a desk. Then arrange four of the  $\frac{1}{2}$  circles to form whole circles. Draw a picture of the whole and part circles you formed, and write the improper fraction and mixed number represented by the five  $\frac{1}{2}$  circles.
- b. Place one more  $\frac{1}{2}$  circle on the desk to complete another circle. Write the improper fraction and whole number represented.
- c. Clear the desk of  $\frac{1}{2}$  circles and place seven  $\frac{1}{4}$  circles on the desk. Fit the pieces together to form a whole circle and part of a circle. Draw a picture, and write the improper fraction and mixed number represented.
- d. Place one more  $\frac{1}{4}$  circle on the desk to complete another circle. Write the improper fraction and whole number represented.

### Lesson Practice

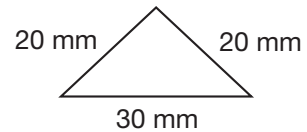
- a. Draw circles to show that  $1\frac{3}{4} = \frac{7}{4}$ .
- b. Draw circles to show that  $2\frac{1}{2} = \frac{5}{2}$ .
- c. Draw circles to show that  $1\frac{1}{3} = \frac{4}{3}$ .

### Written Practice

*Distributed and Integrated*

- \* 1. **Interpret** (88) The coach divided 33 players as equally as possible into 4 teams.
  - a. How many teams had exactly 8 players?
  - b. How many teams had 9 players?
2. **Justify** (1, 43) On the package there were two 39¢ stamps, two 20¢ stamps, and one 15¢ stamp. Altogether, how much did the stamps on the package cost? Explain why your answer is reasonable.
3. (49, 67) Daniella read 20 pages each day. How many pages did she read in 2 weeks?
4. (Inv. 2) In the first track meet of the season, Wyatt's best triple jump measured 36 feet. What was the distance of that jump in yards?

- \*5. What is the perimeter of this isosceles triangle in centimeters?  
(Inv. 2, 69)



- \*6. **Multiple Choice** Which of these tallies represents a prime number?

- (55, Inv. 7) **A** ||| |||      **B** ||| |||  
**C** ||| ||| |      **D** ||| ||| ||

- \*7. **Multiple Choice** About how much liquid is in this medicine dropper?  
(40)

- A** 2 milliliters      **B** 2 liters  
**C** 2 pints      **D** 2 cups



8. Solve for  $n$ :  $87 + 0 = 87 \times n$   
(61)

- \*9. **Represent** One third of the 24 students finished early. How many students finished early? Draw a picture to illustrate the problem.  
(70)

10. What percent of a dollar is a quarter?  
(Inv. 5)

11.  $\begin{array}{r} \$478.63 \\ + \$32.47 \\ \hline \end{array}$   
(43, 51)

12.  $\begin{array}{r} 137,140 \\ - 129,536 \\ \hline \end{array}$   
(52)

13.  $\begin{array}{r} \$60.00 \\ - \$24.38 \\ \hline \end{array}$   
(52)

\*14.  $70 \times 90$   
(86)

15.  $\begin{array}{r} 11 \\ \times 13 \\ \hline \end{array}$   
(87)

\*16.  $\begin{array}{r} 12 \\ \times 12 \\ \hline \end{array}$   
(87)

17.  $\begin{array}{r} \$4.76 \\ \times 8 \\ \hline \end{array}$   
(58)

\*18.  $\begin{array}{r} 21 \\ \times 13 \\ \hline \end{array}$   
(87)

\*19.  $\begin{array}{r} 21 \\ \times 21 \\ \hline \end{array}$   
(87)

20.  $4 \overline{)3000}$   
(80)

21.  $5n = 635$   
(41, 76)

22.  $7 \overline{)426}$   
(71)

23.  $8 \overline{)3614}$   
(76)

24.  $\frac{2736}{6}$   
(76)

25. How much is one fourth of \$10.00?  
(70)

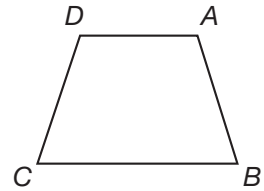
- \*26. **Represent** Draw and shade circles to show that  $1\frac{1}{2}$  equals  $\frac{3}{2}$ .  
(89)



- \*27. a. **Represent** Draw a rectangle that is 5 cm long and 4 cm wide.  
 (Inv. 2,  
 Inv. 3)
- b. What is the perimeter and area of the rectangle you drew?

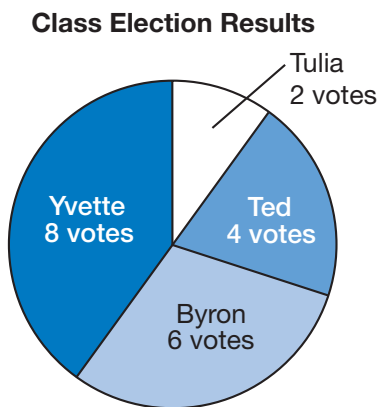
- \*28. a. **Conclude** In this polygon, which side appears to be parallel to side  $BC$ ?  
 (23, 79)

- b. Copy this figure and draw its line of symmetry.
- c. Does this figure have rotational symmetry?



- \*29. **Analyze** Which two-digit number less than 20 is a multiple of both 4 and 6?  
 (55)

- \*30. **Interpret** This circle graph shows the results of an election for class president. Use the graph to answer the questions that follow.  
 (Inv. 6)



- a. Which candidate won the election? How many votes did that candidate receive?
- b. Altogether, how many votes were cast in the election?
- c. Which number is greater: the number of votes received by the winner, or the sum of the number of votes received by all of the other candidates?

## • Multiplying Two Two-Digit Numbers, Part 2

### Power Up

#### facts

Power Up I

#### mental math

Find half of each number in **a–d**.

- Number Sense:** 40
- Number Sense:** 48
- Number Sense:** 64
- Number Sense:** 86
- Number Sense:**  $75 + 37$
- Money:** Taylor bought scissors for \$3.54 and glue for \$2.99. What was the total cost?
- Estimation:** Choose the more reasonable estimate for the mass of 500 sheets of copy paper: 2 grams or 2 kilograms.
- Calculation:**  $\sqrt{49}, \times 2, + 7, \div 3, \times 7$

#### problem solving

Choose an appropriate problem-solving strategy to solve this problem. A half-ton pickup truck can carry a load weighing half of a ton. How many 100-pound sacks of cement can a half-ton pickup truck carry?

### New Concept

Recall the three steps for multiplying two two-digit numbers:

**Step 1:** Multiply by the ones digit.

**Step 2:** Multiply by the tens digit.

**Step 3:** Add to find the total.

### Example 1

#### Thinking Skill

#### Justify

How can we check the answer?

A college auditorium has 27 rows of seats and 46 seats in each row. How many people can be seated in the auditorium?

The first step is to multiply 46 by 7. The result is 322. This is not the final product. It is called a *partial product*.

$$\text{Step 1} \left[ \begin{array}{r} 46 \\ \times 27 \\ \hline 322 \end{array} \right.$$

The second step is to multiply 46 by the 2 of 27. Since we are actually multiplying by 20, we place a zero in the ones place or shift this partial product one place to the left.

$$\begin{array}{l} \text{Step 2} \left[ \begin{array}{r} 46 \\ \times 27 \\ \hline 322 \\ 92 \end{array} \right. \text{ or } \left[ \begin{array}{r} 46 \\ \times 27 \\ \hline 322 \\ 920 \end{array} \right. \\ \text{Step 3} \left[ \begin{array}{r} 1242 \end{array} \right. \end{array}$$

The third step is to add the partial products. The final product is 1242.

We find that **1242 people** can be seated.

### Example 2

A golf course has 46 different spectator mounds. Each mound can seat an average of 72 spectators. How many spectators can be seated on the mounds altogether?

First we multiply 46 by 2.

$$\begin{array}{r} 46 \\ \times 2 \\ \hline 92 \end{array}$$

Next we multiply 46 by 7 and then add the partial products.

$$\begin{array}{l} \begin{array}{r} 46 \\ \times 72 \\ \hline 92 \\ 322 \\ \hline 3312 \end{array} \text{ or } \begin{array}{r} 46 \\ \times 72 \\ \hline 920 \\ 3220 \\ \hline 3312 \end{array} \end{array}$$

We find that **3312 spectators** can be seated.

### Example 3

Adelio estimated the product of  $86 \times 74$  to be 6300. Did Adelio make a reasonable estimate?

Before multiplying, we round 86 to 90 and round 74 to 70. Since  $90 \times 70 = 6300$ , Adelio's estimate is reasonable. (The exact product is 6364.)

### Lesson Practice

Multiply:

a. 
$$\begin{array}{r} 38 \\ \times 26 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 49 \\ \times 82 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 84 \\ \times 67 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 65 \\ \times 48 \\ \hline \end{array}$$

- e. Mya is renting 21 tables for a reception. The rental charge is \$29 per table. Explain how Mya can make a reasonable estimate of the total cost.

## Written Practice

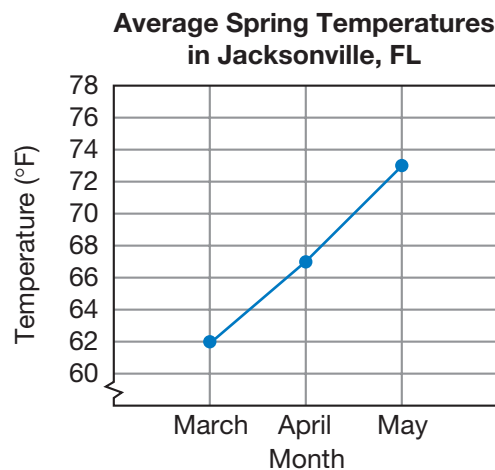
*Distributed and Integrated*

\* 1.  
(Inv. 6)





### Interpret

The line graph shows the average monthly temperatures during spring in Jacksonville, Florida. Use the graph to answer the questions that follow.



- What is the average temperature during March in Jacksonville, Florida? During April? During May?
- Write a sentence that compares the average March temperature to the freezing temperature of water.
- In Salt Lake City, Utah, the average May temperature is 14 degrees cooler than the average May temperature in Jacksonville, Florida. What is the average May temperature in Salt Lake City?

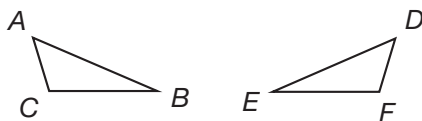
2. The 3-pound melon cost \$1.44. What was the cost per pound?  
(52)
3. Jin spun all the way around in the air and dunked the basketball. Jin turned about how many degrees?  
(75)
- \*4. Shunsuke bought a pair of shoes priced at \$47.99. The sales tax was \$2.88. Shunsuke gave the clerk \$60.00. How much change should he receive?  
(83)
5. **Analyze** If the perimeter of a square is 1 foot, how many inches long is each side?  
(Inv. 2)
- \*6. a. The mass of a dollar bill is about 1 gram. Use this information to estimate the number of dollar bills it would take to equal 1 kilogram?  
(77)
- b. Would the mass of a dollar bill still be about 1 gram on the moon? Why or why not?
7. a. **Represent** One fourth of the 64 balloons were red. How many balloons were red? Draw a picture to illustrate the problem.  
(Inv. 5, 70)
- b. What percent of the balloons was not red?
- \*8. a. T'Marra knew that her trip would take about 7 hours. If she left at half past nine in the morning, around what time should she arrive?  
(27)
- b. If T'Marra traveled 350 miles in 7 hours, then she traveled an average of how many miles each hour?
- c. Using your answer to part **b**, make a table to show how far T'Marra would travel at her average rate in 1, 2, 3, and 4 hours.
- \*9.  **Explain** On the last Wednesday in May, school buses will transport 116 students on a field trip. Each bus can seat 40 passengers. How many buses will be needed to transport the students, 8 teachers, and 13 adult volunteers? Explain your answer.  
(88)
10. Compare: 3049 ○ 3049.0  
(33)

- \* 11.**  **Estimate** Shakura purchased a birthday present for each of two friends. Including sales tax, the cost of one present was \$16.61 and the cost of the other present was \$14.37. What is a reasonable estimate of the total cost of the presents? Explain your answer.

- \* 12.** **Represent** Manuel is deciding what to wear. He must choose between blue pants and black pants, and between a red shirt, a green shirt, and a yellow shirt. Draw a tree diagram to show all of the different ways to combine two pairs of pants and three shirts.

- \* 13.** Eighty-eight horseshoes are enough to shoe how many horses?

- \* 14. a.** **Conclude** Triangles  $ABC$  and  $DEF$  are congruent. Which transformations would move  $\triangle ABC$  to the same position as  $\triangle DEF$ ?



- b. Multiple Choice** Which of these words does *not* describe triangles  $ABC$  and  $DEF$ ?

**A** similar      **B** obtuse      **C** scalene      **D** isosceles

- 15.** Find  $0.625 - (0.5 + 0.12)$ . Describe the steps in order.

- 16.** Mentally find the product of  $47 \times 100$ .

**17.** 
$$\begin{array}{r} 328 \\ \times 4 \\ \hline \end{array}$$

**\* 18.** 
$$\begin{array}{r} 43 \\ \times 32 \\ \hline \end{array}$$

**\* 19.** 
$$\begin{array}{r} 25 \\ \times 35 \\ \hline \end{array}$$

**20.** 
$$\begin{array}{r} 5 \overline{)4317} \end{array}$$

**21.** 
$$\begin{array}{r} 8 \overline{)\$40.00} \end{array}$$

**22.** 
$$\begin{array}{r} 6 \overline{)3963} \end{array}$$

**23.**  $3a = 426$

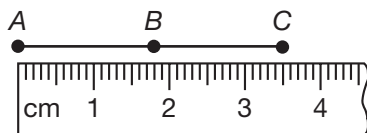
**24.**  $2524 \div 4$

**\* 25.**  $60 \times 700$

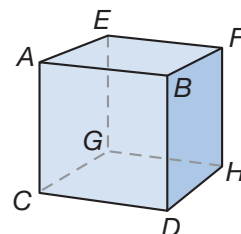
- 26.** **Represent** Draw and shade circles to show that  $2\frac{1}{2}$  equals  $\frac{5}{2}$ .

**27.**  $4 + 3 + 27 + 35 + 8 + n = 112$

- \*28. a. Segment  $BC$  is 1.7 cm long. How many centimeters long is segment  $AB$ ?  
(69)



- b. Write a decimal addition problem that is illustrated by the lengths of segments  $AB$ ,  $BC$ , and  $AC$ .
- \*29. a. Name a pair of parallel edges in the figure at right.  
(45)
- b. Name a pair of perpendicular edges.
- \*30. Before multiplying two numbers, Ashley estimated the product. After multiplying the numbers, she used the estimate to check her work. Explain how Ashley can estimate the product of  $32 \times 57$ .  
(90)



**Early Finishers**  
Real-World Connection

- a. Describe the error Julio made on his homework.

$$\begin{array}{r} 67 \\ \times 38 \\ \hline 536 \\ 201 \\ \hline 737 \end{array}$$

- b. What is the correct answer?

Focus on

• Investigating Fractions with Manipulatives

Fraction manipulatives can help us better understand fractions. In this investigation we will make and use a set of fraction manipulatives.

Activity 1

Using Fraction Manipulatives

Materials needed:

- Lesson Activities 37, 38, and 39
- scissors
- envelopes or locking plastic bags (optional)

**Model** Use your fraction manipulatives to complete the following exercises:

1. Another name for  $\frac{1}{4}$  is a *quarter*. How many quarters of a circle does it take to form a whole circle? Show your work.
2. Fit two quarter circles together to form a half circle; that is, show that  $\frac{2}{4}$  equals  $\frac{1}{2}$ .
3. How many fourths equal  $1\frac{1}{4}$ ?
4. This number sentence shows how to make a whole circle using half circles:

$$\frac{1}{2} + \frac{1}{2} = 1$$

Write a number sentence that shows how to make a whole circle using only quarter circles.

5. How many half circles equal  $1\frac{1}{2}$  circles?
6. Four half circles make how many whole circles?

**Model** Manipulatives can help us compare and order fractions. Use your fraction manipulatives to illustrate and answer these problems:

7. Arrange  $\frac{1}{2}$ ,  $\frac{1}{8}$ , and  $\frac{1}{4}$  in order from least to greatest.
8. Arrange  $\frac{3}{8}$ ,  $\frac{3}{4}$ , and  $\frac{1}{2}$  in order from greatest to least.
9.  $\frac{2}{2} \bigcirc \frac{2}{4}$
10.  $\frac{4}{8} \bigcirc \frac{3}{8}$



11. **Generalize** If the denominators of two fractions are the same, how can we determine which fraction is larger and which is smaller?
12. **Generalize** If the numerators of two fractions are the same, how can we determine which fraction is larger and which is smaller?

Manipulatives can also help us **reduce** fractions. When we reduce a fraction, we do not change the size of the fraction. We just use smaller numbers to name the fraction. (With manipulatives, we use fewer pieces to form the fraction.) For example, we may reduce  $\frac{2}{4}$  to  $\frac{1}{2}$ . Both  $\frac{2}{4}$  and  $\frac{1}{2}$  name the same portion of a whole, but  $\frac{1}{2}$  uses smaller numbers (fewer pieces) to name the fraction. If a fraction cannot be reduced, it is in **lowest terms**.

Use your fraction manipulatives to reduce the fractions in problems 13–16. Show how the two fractions match.

13.  $\frac{2}{4}$

14.  $\frac{2}{8}$

15.  $\frac{4}{8}$

16.  $\frac{6}{8}$

Manipulatives can also help us add and subtract fractions. Illustrate each addition below by combining fraction manipulatives. Record each sum.

17.  $\frac{1}{4} + \frac{2}{4}$

18.  $\frac{2}{8} + \frac{3}{8}$

To illustrate each subtraction in problems 19–21, form the first fraction using your fraction manipulatives; then separate the second fraction from the first fraction. Record what is left of the first fraction as your answer.

19.  $\frac{3}{4} - \frac{2}{4}$

20.  $\frac{4}{8} - \frac{1}{8}$

21.  $\frac{2}{2} - \frac{1}{2}$

## Activity 2

### *Understanding How Fractions, Decimals, and Percents Are Related*

Fraction manipulatives can help us understand how fractions and percents are related. Use the percent labels on your manipulatives to answer these problems:

22. One half of a circle is what percent of a circle?
23. What percent of a circle is  $\frac{1}{4}$  of a circle?
24. What percent of a circle is  $\frac{3}{4}$  of a circle?

Fraction manipulatives can help us understand how fractions and decimals are related. Use the decimal labels on your manipulatives to answer these problems:

25. What decimal number is equivalent to  $\frac{1}{2}$ ?  
26. What decimal number is equivalent to  $\frac{1}{4}$ ?  
27. What decimal number is equivalent to  $\frac{1}{8}$ ?

Complete each comparison.

28.  $0.5 \bigcirc 0.2$                       29.  $0.2 \bigcirc 0.25$

30. Compare:  $0.125 \bigcirc 0.25$

31. Arrange the decimal numbers 0.5, 0.125, and 0.25 in order from greatest to least.

32. Form a half circle using two  $\frac{1}{4}$  pieces. Here is a fraction number sentence for the model:

$$\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$

Write an equivalent number sentence using the decimal numbers on the pieces.

33. Compare:  $0.50 \bigcirc 0.5$

34. Form a half circle using four  $\frac{1}{8}$  pieces. Here is a fraction number sentence for the model:

$$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{1}{2}$$

Write an equivalent number sentence using the decimal numbers on the pieces.

35. Compare:  $0.500 \bigcirc 0.5$

36. Form  $\frac{3}{4}$  of a circle two ways. First use three  $\frac{1}{4}$  pieces. Then use a  $\frac{1}{2}$  piece and a  $\frac{1}{4}$  piece. Here are the two fraction number sentences for these models:

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} \quad \frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

Write equivalent number sentences using the decimal numbers on these pieces.

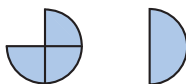
37. Form a whole circle using four  $\frac{1}{4}$  pieces. Then take away one of the  $\frac{1}{4}$  pieces. A fraction number sentence for this subtraction is shown below. Write an equivalent number sentence using the decimal numbers on the pieces.

$$1 - \frac{1}{4} = \frac{3}{4}$$

38. Form a half circle using four  $\frac{1}{8}$  pieces. Then take away one of the pieces. A fraction number sentence for this subtraction is shown below. Write an equivalent number sentence using the decimal numbers on the pieces.

$$\frac{1}{2} - \frac{1}{8} = \frac{3}{8}$$

39. Here we show  $\frac{3}{4}$  of a circle and  $\frac{1}{2}$  of a circle:



We see that  $\frac{3}{4}$  is greater than  $\frac{1}{2}$ . In fact, we see that  $\frac{3}{4}$  is greater than  $\frac{1}{2}$  by a  $\frac{1}{4}$  piece. Here we show a larger-smaller-difference number sentence for this comparison:

$$\frac{3}{4} - \frac{1}{2} = \frac{1}{4}$$

Write an equivalent number sentence using the decimal numbers on the pieces.

### Investigate Further



Instead of using fraction circles, we can use squares divided into 10 or 100 parts to represent decimal numbers. Each large square represents the whole number 1. Each row or column represents the fraction  $\frac{1}{10}$  and the decimal 0.1. Each small square represents the fraction  $\frac{1}{100}$  and the decimal 0.01. Use **Lesson Activity 40** to complete the following activities:

- In the first row of squares, shade all of the first square, one column of the second square, and one small square of the third square. Name the shaded part of each square as a fraction and as a decimal. Look at the three numbers in the decimals row and arrange the decimal numbers in order from least to greatest.
- In the second row of squares, shade three rows of the first square and 27 small squares of the second square. Name the shaded part of each square as a fraction and as a decimal. Write a comparison statement that compares the two decimal numbers.
- In the third row, shade the first five columns in the first square and the first fifty small squares in the second square. Name the shaded part of each square as a fraction and as a decimal. Write a comparison statement that compares the two decimal numbers.