

- **Triangles, Rectangles, Squares, and Circles**

Power Up**multiples**

Power Up K

The multiples of 7 are 7, 14, 21, and so on. On your hundred number chart, circle the numbers that are multiples of seven. Which of the circled numbers is an even number as well as a multiple of five?

mental math

- Number Sense:** $44 + 32$
- Number Sense:** $57 + 19$
- Number Sense:** $32 + 43 + 100$
- Number Sense:** What number should be added to 6 to get a total of 9?
- Money:** What is the total value of 2 quarters, 3 dimes, and 1 nickel?
- Money:** What is the total cost of a \$200 bicycle and a \$24 helmet?
- Estimation:** Round \$13.89 to the nearest dollar.
- Estimation:** Round 73 yards to the nearest ten yards.

problem solving

Choose an appropriate problem-solving strategy to solve this problem. The P.E. instructor divided the 21 students into four teams. If the P.E. instructor divided the class as evenly as possible, how many students were on each of the four teams?

New Concept

In this lesson we will practice drawing triangles, rectangles, squares, and circles.

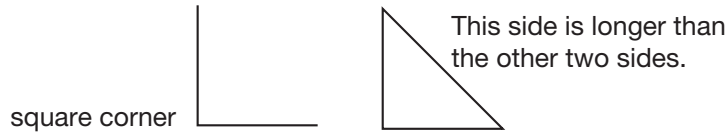
Example 1

Represent Draw a triangle whose sides all have the same length.

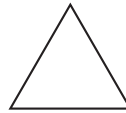
Math Language

A triangle whose sides are all equal in length is called an **equilateral triangle**.

You may need to practice on a separate sheet of paper to understand how to draw this triangle. A triangle has three sides, but those sides can be positioned many different ways. If you start with a “square corner,” the third side will be too long.



A triangle whose sides are the same length looks like this:



Example 2

Represent Draw a rectangle whose sides all have the same length.

A rectangle has four sides and square corners. It does not have to be longer than it is wide. A rectangle whose sides are the same length looks like this:



This figure looks like a square. We know that it is a square because it has 4 sides with the same length. It is also a rectangle. **A square is a special kind of rectangle.**

Example 3

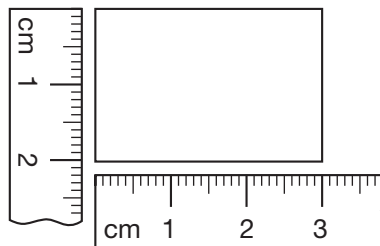
Thinking Skill

Analyze

What is the perimeter of this rectangle?

Represent Draw a rectangle that is 3 cm long and 2 cm wide.

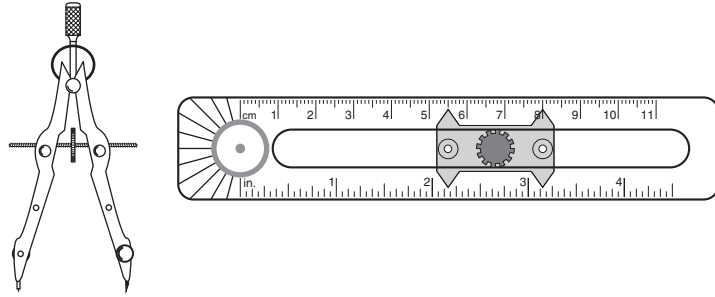
We use a centimeter ruler to help us make the drawing.



A **circle** is a closed, curved shape in which all points on the shape are the same distance from the center. To draw circles, we can use a tool called a **compass**. Below we show two types of compasses:

Math Language

When we talk about one radius, we say “radius.” When we talk about more than one radius, we say “radii.” The plural of radius is **radii**.

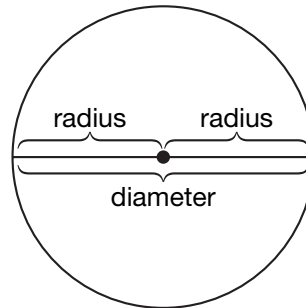


There are two points on a compass: a pivot point and a pencil point. We swing the pencil point around the pivot point to draw a circle. The distance between the two points is the **radius** of the circle.

The radius of a circle is the distance from the **center** of the circle to the edge of the circle. The **diameter** of a circle is the distance across the circle through the center. As the diagram below illustrates, the diameter of a circle equals two radii.

Math Language

The **circumference** of a circle is the distance around—or the perimeter of—a circle.



Activity

Drawing a Circle

Material needed:

- compass

Represent Use a compass to draw a circle with a radius of 2 cm. Label the diameter and the radius.

Example 4

If the radius of a circle is 2 cm, then what is the diameter of the circle?

Since the diameter of a circle equals two radii, the diameter of a circle with a 2-cm radius is **4 cm**.

Lesson Practice

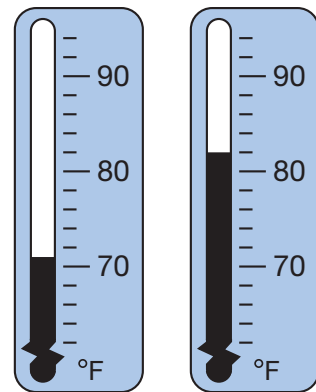
- Draw a triangle with two sides that are the same length.
- Draw a rectangle that is about twice as long as it is wide.
- Use a compass to draw a circle with a radius of 1 inch.
- What is the diameter of a circle that has a 3-cm radius?
- What is another name for a rectangle whose length is equal to its width?

Written Practice

Distributed and Integrated

Write and solve equations for problems 1 and 2.

- ^(1, 13) Hiroshi had four hundred seventeen marbles. Harry had two hundred twenty-two marbles. How many marbles did Hiroshi and Harry have in all?
- ^(11, 14) *2. Tisha put forty pennies into a pile. After Jane added all of her pennies, there were seventy-two pennies in the pile. How many pennies did Jane add to the pile?
- ⁽⁴⁾ *3. The ones digit is 5. The number is greater than 640 and less than 650. What is the number?
- ⁽¹⁶⁾ *4. **Represent** Write seven hundred fifty-three in expanded form.
- ⁽⁶⁾ *5. **Connect** If $x + y = 10$, then what is the other addition fact for x , y , and 10? What are the two subtraction facts for x , y , and 10?
- ⁽¹⁸⁾ *6. These thermometers show the average daily low and high temperatures in San Juan, Puerto Rico, during the month of January. What are those temperatures?



***7. Model** Use a centimeter ruler to measure the rectangle below.
(Inv. 2)

- What is the length?
- What is the width?
- What is the perimeter?



$$\begin{array}{r} \mathbf{8.} \quad 493 \\ (13) \quad + 278 \\ \hline \end{array}$$

$$\begin{array}{r} \mathbf{9.} \quad \$486 \\ (13) \quad + \$378 \\ \hline \end{array}$$

$$\begin{array}{r} \mathbf{10.} \quad \$524 \\ (13) \quad + \$109 \\ \hline \end{array}$$

***11. Represent** Draw a triangle. Make each side 2 cm long. What is the perimeter of the triangle?
(Inv. 2, 21)

***12. Represent** Draw a square with sides 2 inches long. What is the perimeter of the square?
(Inv. 2, 21)

$$\begin{array}{r} \mathbf{13.} \quad 17 \\ (12) \quad - a \\ \hline 9 \end{array}$$

$$\begin{array}{r} \mathbf{14.} \quad 45 \\ (15) \quad - 29 \\ \hline \end{array}$$

$$\begin{array}{r} \mathbf{15.} \quad 15 \\ (12) \quad - b \\ \hline 6 \end{array}$$

$$\begin{array}{r} \mathbf{16.} \quad 62 \\ (15) \quad - 45 \\ \hline \end{array}$$

$$\begin{array}{r} \mathbf{17.} \quad 24 \\ (14) \quad + d \\ \hline 45 \end{array}$$

$$\begin{array}{r} \mathbf{18.} \quad 14 \\ (16) \quad - b \\ \hline 2 \end{array}$$

$$\begin{array}{r} \mathbf{*19.} \quad y \\ (16) \quad - 36 \\ \hline 53 \end{array}$$

$$\begin{array}{r} \mathbf{*20.} \quad 75 \\ (16) \quad - p \\ \hline 45 \end{array}$$

$$\begin{array}{r} \mathbf{21.} \quad 46 \\ (17) \quad 35 \\ \quad 27 \\ + 39 \\ \hline \end{array}$$


$$\begin{array}{r} \mathbf{22.} \quad 14 \\ (17) \quad 28 \\ \quad 77 \\ + 23 \\ \hline \end{array}$$

$$\begin{array}{r} \mathbf{23.} \quad 14 \\ (17) \quad 23 \\ \quad 38 \\ + 64 \\ \hline \end{array}$$

$$\begin{array}{r} \mathbf{24.} \quad 15 \\ (17) \quad 24 \\ \quad 36 \\ + 99 \\ \hline \end{array}$$

***25. Conclude** Write the next three numbers in each counting sequence:
(3, Inv. 1)

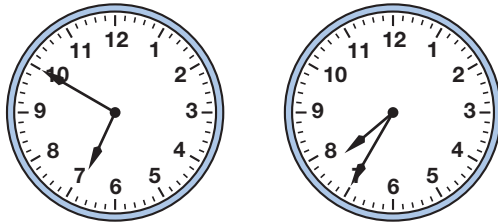
- ..., 28, 35, 42, _____, _____, _____, ...
- ..., 40, 30, 20, _____, _____, _____, ...

*** 26.**  **Explain** If you know the length and the width of a rectangle, how can you find its perimeter?
(Inv. 2)

*** 27. Multiple Choice** Alba drew a circle with a radius of 4 cm. What was the diameter of the circle?
(21)

- A** 8 in. **B** 2 in. **C** 8 cm **D** 2 cm

*** 28.** Each school morning, Christopher wakes up at the time shown on the left and leaves for school at the time shown on the right. What amount of time does Christopher spend each morning getting ready for school?
(19)



*** 29.** Round each number to the nearest ten. You may draw a number line.
(20)

- a.** 76 **b.** 73 **c.** 75

*** 30.** Round each amount of money to the nearest 25 cents.
(20)

- a.** \$6.77 **b.** \$7.97

Early Finishers

Real-World Connection

Erin and Bethany both drew circles on their paper. The radius of Erin's circle is 14 cm. The diameter of Bethany's circle is 26 cm. Bethany said that her circle is bigger. Was Bethany correct? Explain your answer.

- Naming Fractions
- Adding Dollars and Cents

Power Up

facts

Power Up A

count aloud

As a class, count by sevens from 7 to 35.

mental math

- Number Sense:** $63 + 21$
- Number Sense:** $36 + 29 + 30$
- Number Sense:** $130 + 200 + 300$
- Geometry:** If a triangle measures 1 centimeter on each side, what is the perimeter?
- Time:** What time is 2 hours after 1:00 p.m.?
- Money:** What is the total cost of two pens that are \$1 each and one pair of scissors that is \$4?
- Estimation:** Round \$2.22 to the nearest 25 cents.
- Measurement:** How many centimeters are equal to 1 meter?

problem solving

Seven days after Tuesday is Tuesday. Fourteen days after Tuesday is Tuesday. Twenty-one days after Tuesday is Tuesday. What day of the week is 70 days after Tuesday?

Focus Strategy: Find/Extend a Pattern

Understand We are asked to find which day of the week is 70 days after Tuesday. We are told that 7, 14, and 21 days after Tuesday are all Tuesdays. These numbers form a pattern.

Plan We will *find the pattern* that describes how the days of the week repeat. We can *extend the pattern* to help us answer the question.

Solve We look for a pattern in the numbers given to us: 7, 14, 21. We say these numbers when we count up by sevens. Counting up by sevens is a pattern that can be extended:

7, 14, 21, 28, 35, 42, 49, 56, 63, 70

Seven days is one week, 14 days is two weeks, 21 days is 3 weeks, and so on. Seventy days equals the number of days in 10 weeks. Ten weeks after Tuesday is Tuesday, which means that **70 days after Tuesday is Tuesday.**

Check We know our answer is reasonable because 70 days is the same as 10 weeks, and 10 weeks after a certain day of the week will be that day of the week again.

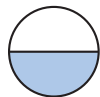
New Concepts

Naming Fractions

Part of a whole can be named with a **fraction**. A fraction is written with two numbers. The bottom number of a fraction is called the **denominator**. The denominator tells how many equal parts are in the whole. The top number of a fraction is called the **numerator**. The numerator tells how many of the parts are being counted. When naming a fraction, we name the numerator first; then we name the denominator using its ordinal number. Some fractions and their names are shown below:

Math Language

There are exceptions when we use ordinals to name denominators. For example, we use the word **half** instead of *second* to name a denominator of 2. Also, we sometimes use the word **quarter**, as well as *fourth*, to name a denominator of 4.



$\frac{1}{2}$ one half



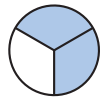
$\frac{3}{5}$ three fifths



$\frac{1}{3}$ one third



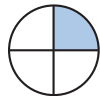
$\frac{5}{6}$ five sixths



$\frac{2}{3}$ two thirds



$\frac{7}{8}$ seven eighths



$\frac{1}{4}$ one fourth



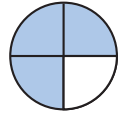
$\frac{1}{10}$ one tenth

Analyze Use the pictures to write these fractions in order from greatest to least.

Example 1

What fraction of the circle is shaded?

There are four equal parts and three are shaded.
Therefore, the fraction of the circle that is shaded is three fourths, which we write as



$$\frac{3}{4}$$

Justify Which is greater, $\frac{3}{4}$ or $\frac{3}{5}$? Explain how you know.

Example 2

A dime is what fraction of a dollar?



Ten dimes equal one dollar, so one dime is $\frac{1}{10}$ of a dollar.

Example 3

Three quarters are what fraction of a dollar?



Four quarters equal a dollar, so each quarter is $\frac{1}{4}$ of a dollar. Three quarters are $\frac{3}{4}$ of a dollar.

Adding Dollars and Cents

We add dollars and cents the same way we add whole numbers. The dot, called a **decimal point**, separates dollars from cents. To add dollars to dollars and cents to cents, we align the decimal points. We remember to write the dollar sign and the decimal point in the sum.



Visit www.SaxonMath.com/Int4Activities for a calculator activity.

Activity

Counting Money

Materials needed:

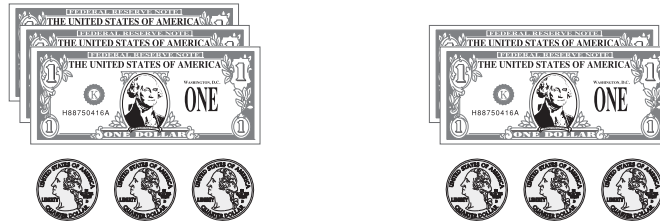
- money manipulatives (from **Lesson Activity 1**)
- money manipulatives (from **Lesson Activities 7, 8, and 9**)

Use money manipulatives to perform the following tasks:

1. Place \$1.43 in one stack and \$1.34 in another stack. Which amount is greater? Explain why.
2. Make three stacks of money: \$1.32, \$2.13, and \$1.23. Then arrange the stacks in order of value from least to greatest.
3. **Model** Act out the following problem: At a yard sale, J’Nessa bought a skateboard for \$3.50 and a basketball for \$2.75. How much did she spend on the two items?

Example 4

At the school book fair, Syaoran bought two books, one for \$3.75 and the other for \$2.75. How much did Syaoran pay for both books?



First we add the pennies, then we add the dimes, and then we add the dollars. Since ten pennies equals a dime and ten dimes equals a dollar, we regroup when the total in any column is ten or more.

Add pennies.
Add dimes.
Add dollars.

$$\begin{array}{r} \$3.75 \\ + \$2.75 \\ \hline 11 \\ \hline \$6.50 \end{array}$$

Syaoran paid **\$6.50** for both books.

Compatible numbers are two or more numbers that are relatively easy to work with. Money amounts that end in 25¢, 50¢, and 75¢ are compatible with each other because we can add and subtract with these numbers mentally. In Example 5, we use compatible numbers to estimate a sum. When we **estimate**, we are finding an approximate value.

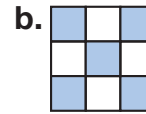
Example 5

For her garden, Imelda purchased some packets of vegetable seeds for \$3.27 and some tomato plants for \$4.49. What is a reasonable estimate for the total cost of her purchase?

To estimate, we can use the compatible numbers \$3.25 and \$4.50, which are close to \$3.27 and \$4.49. We mentally add the compatible numbers and find that the total cost is about **\$7.75**.

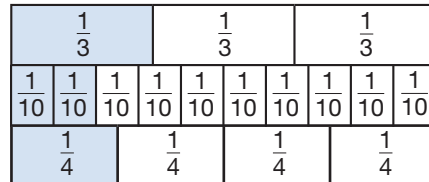
Lesson Practice

What fraction of each shape is shaded?

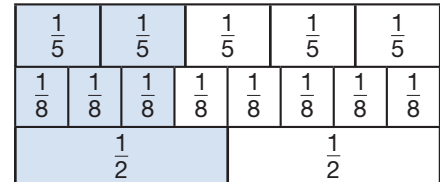


Use the models below to order the fractions from least to greatest.

c. $\frac{1}{3}, \frac{2}{10}, \frac{1}{4}$



d. $\frac{2}{5}, \frac{3}{8}, \frac{1}{2}$



Use your fraction manipulatives to order the fractions below from greatest to least.

e. $\frac{3}{4}, \frac{1}{5}, \frac{2}{3}$

f. $\frac{6}{10}, \frac{4}{5}, \frac{1}{2}$

g. Three dimes are what fraction of a dollar?

You may use money manipulatives to add.

h.
$$\begin{array}{r} \$2.75 \\ + \$2.75 \\ \hline \end{array}$$

i.
$$\begin{array}{r} \$3.65 \\ + \$4.28 \\ \hline \end{array}$$

j. A notebook at the school bookstore costs \$1.49. What is a reasonable estimate of the cost of two notebooks? Explain why your estimate is reasonable.

Written Practice

Distributed and Integrated

Write and solve equations for problems 1 and 2.

- *1. ^(11, 14) A carpenter has two boards. The sum of the lengths of the boards is 96 inches. The length of one board is 48 inches. What is the length of the other board?

2. Jafari was 49 inches tall at the beginning of summer. He grew 2 inches over the summer. How tall was Jafari at the end of summer?
(1, 9)

3. Use the digits 1, 2, and 3 to write an odd number less than 200. Each digit may be used only once.
(10)

Conclude Write the next three numbers in each counting sequence:

***4.** ... , 80, 72, 64, _____, _____, _____, ...
(3)

***5.** ... , 60, 54, 48, _____, _____, _____, ...
(3)

***6. Represent** Draw a square with sides 3 cm long. What is the perimeter of the square?
(Inv. 2, 21)

***7.** A yard is how many feet long?
(Inv. 2)

8. What is the place value of the 9 in 891?
(4)

***9.** Write 106 in expanded form. Then use words to write the number.
(7, 16)

10. Use the numbers 6, 9, and 15 to write two addition facts and two subtraction facts.
(6)

11. Use digits and symbols to write that eighteen is greater than negative twenty.
(Inv. 1)

***12. a.** Round 28 to the nearest ten.
(20)

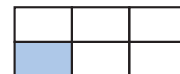
b. Round \$5.95 to the nearest dollar.

***13.** A desk is about how many meters high?
(Inv. 2)

***14.** The first four odd numbers are 1, 3, 5, and 7. What is their sum?
(1)

***15.** Draw a circle that has a diameter of 2 cm. What is the radius of the circle?
(21)

***16.** What fraction of this rectangle is shaded?
(22)



***17.** The door was two meters tall. Two meters is how many centimeters?
(Inv. 2)

18. $51 - 43$
(15)

19. $70 - 44$
(15)

20. $37 - 9$
(15)

21. $\$8.79 + \0.64
(22)

22. $\$5.75 + \2.75
(22)

23.
$$\begin{array}{r} n \\ + 13 \\ \hline 17 \end{array}$$

(14)

***24.**
$$\begin{array}{r} x \\ - 42 \\ \hline 27 \end{array}$$

(16)

***25.**
$$\begin{array}{r} 37 \\ - p \\ \hline 14 \end{array}$$

(16)

***26.** Sketch a circle. Draw two diameters to divide the circle into four equal parts. Shade one of the parts. What fraction of the circle is shaded?
(22)


***27. Multiple Choice** If the equation $20 + n = 60$ is true, then which of the following equations is *not* true?
(6)

A $60 - 20 = n$

B $60 - n = 20$

C $n - 20 = 60$


D $n + 20 = 60$

***28.**  **Explain** One item in a supermarket is marked \$1.26. Another item is marked \$3.73. What is a reasonable estimate for the cost of both items? Explain why your estimate is reasonable.
(22)

29. This table shows the heights of four waterfalls:
(7)

Name	Location	Height (ft)
Multnomah	Oregon	620
Maletsunyane	Lesotho, Africa	630
Wentworth	Australia	614
Reichenbach	Switzerland	656

Write the names of the waterfalls in order from least height to greatest height.

***30.**  **Predict** What is the tenth number in this counting sequence?
(3)

4, 8, 12, 16, 20, ...

• Lines, Segments, Rays, and Angles

Power Up

multiples

Power Up K

On your hundred number chart, circle the multiples of 9. Write the circled numbers from least to greatest in a column. What patterns can you find in the column of numbers?

mental math

Number Sense: Add hundreds, then tens, and then ones.

a.
$$\begin{array}{r} 320 \\ + 256 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 645 \\ + 32 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 145 \\ + 250 \\ \hline \end{array}$$

- d. **Geometry:** If each side of a square is 1 inch, what is the perimeter?
- e. **Time:** What time is 5 hours after 3:00 p.m.?
- f. **Money:** What is the total cost of three pieces of gum that are 8¢ each?
- g. **Estimation:** The lawn is 62 feet across. Round that length to the nearest ten feet.
- h. **Measurement:** How many millimeters are equal to 1 centimeter?

problem solving

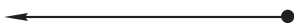
Choose an appropriate problem-solving strategy to solve this problem. The days of the week repeat. Seven days before Saturday was Saturday, and seven days after Saturday is Saturday again. What day is ten days after Saturday? What day was ten days before Saturday?

New Concept

Thinking Skill

Connect

Is this figure a ray?
Explain why or
why not.



A line goes on and on. When we draw a line, we draw two arrowheads to show that the line continues in both directions.



Line

Part of a line is a line segment, or just *segment*. When we draw a segment, we do not include arrowheads. We can, however, use dots to show the **endpoints** of the segment.



Segment

A **ray** is sometimes called a *half-line*. A ray begins at a point and continues in one direction without end. When we draw a ray, we include one arrowhead to show that the ray continues in one direction.



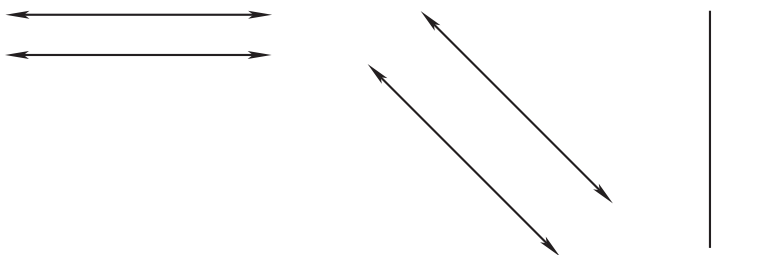
Ray

Example 1

Write “line,” “segment,” or “ray” to describe each of these physical models:

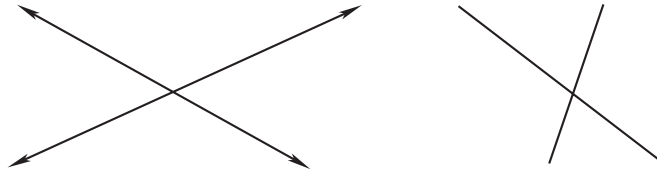
- a beam of starlight
 - a ruler
- a. A beam of starlight begins at a “point,” the star, and continues across space. This is an example of a **ray**.
- b. A ruler has two endpoints, so it is best described as an example of a **segment**.

Lines and segments that go in the same direction and stay the same distance apart are **parallel**.



Pairs of parallel lines and segments

When lines or segments cross, we call them **intersecting lines**.



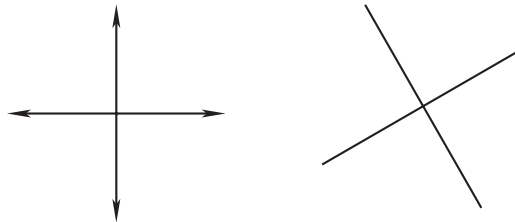
Pairs of intersecting lines and segments

Intersecting lines or segments that form “square corners” are **perpendicular**.

Thinking Skill

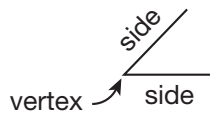
Model

Look for objects in your classroom that have parallel, perpendicular, or intersecting line segments. Describe how each segment is different.



Pairs of perpendicular lines and segments

Angles are formed where lines or segments intersect or where at least two rays begin. An angle has a **vertex** and two sides. The vertex is the point where the two sides meet (the “corner”).



An angle is named by how “open” it is. An angle like the corner of a square is called a **right angle**.



Square



Right angles



To show that an angle is a right angle, we can draw a small square in the corner of the right angle.

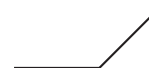


This mark shows that the angle is a right angle.

Angles that are smaller than right angles are called **acute angles**. Some people remember this by saying, “a cute little angle.” Angles that are larger than right angles are **obtuse angles**.



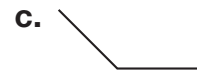
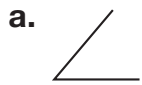
Acute angle



Obtuse angle

Example 2

Describe each of these angles:

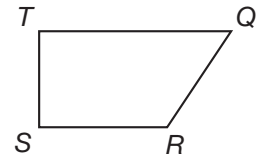


- The angle is smaller than a right angle, so it is an **acute angle**.
- The angle makes a square corner, so it is a **right angle**.
- The angle is larger than a right angle, so it is an **obtuse angle**.

The figure in the following example has four angles. We can name each angle by the letter at the vertex of the angle. The four angles in the figure are angle Q , angle R , angle S , and angle T .

Example 3

Identify each of the four angles in this figure as acute, right, or obtuse.

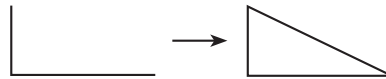


Angle Q is smaller than a right angle, so **angle Q is acute**. Angle R is larger than a right angle, so **angle R is obtuse**. Angles S and T both form square corners, so **angles S and T are right**.

Example 4

Draw a triangle that has one right angle.

We begin by drawing two line segments that form a right angle. Then we draw the third side.



Notice that the other two angles are acute angles.

Represent Draw and describe the characteristics of a triangle that has an obtuse angle.

Activity

Real-World Segments and Angles

- Look for examples of the following figures in your classroom. Describe and classify each example.
 - parallel segments
 - perpendicular segments

- c. intersecting segments
 - d. right angles
 - e. acute angles
 - f. obtuse angles
2. Bend your arm so that the angle at the elbow is an acute angle, then a right angle, and then an obtuse angle. Bend your leg so that the angle behind your knee is an acute angle, then a right angle, and then an obtuse angle.
 3. Using your own words:
 - a. describe acute, right, and obtuse angles.
 - b. describe parallel, perpendicular, and intersecting lines.

Lesson Practice

- a. Draw two segments that intersect but are *not* perpendicular.
- b. Draw two lines that are perpendicular.
- c. Draw a ray.
- d. Are the rails of a train track parallel or perpendicular? How do you know? Locate and describe the angles of items in or around your classroom.
- e. A triangle has how many angles?
- f. **Multiple Choice** Which of these angles does *not* look like a right angle?



Written Practice

Distributed and Integrated

Write and solve equations for problems 1 and 2.

1. Twenty-eight children were in the first line. Forty-two children were in the second line. Altogether, how many children were in both lines?
(1, 9)
- *2. Tina knew that there were 28 books in the two stacks. Tina counted 12 books in the first stack. Then she figured out how many books were in the second stack. How many books were in the second stack?
(11, 14)

3. Use the digits 1, 2, and 3 to write an odd number greater than 300.
(10) Each digit may be used only once.

*4. **Conclude** Write the next three numbers in each counting sequence:
(3)

a. ... , 40, 36, 32, _____, _____, _____, ...

b. ... , 30, 27, 24, _____, _____, _____, ...

*5. **Connect** Use the numbers 15, 16, and 31 to write two addition facts and two subtraction facts.
(6)

6. Use digits and a comparison symbol to show that six hundred thirty-eight is less than six hundred eighty-three.
(Inv. 1)

*7. a. Round 92 to the nearest ten.
(20)

b. Round \$19.67 to the nearest dollar.

*8. **Explain** The radius of a nickel is 1 centimeter. If 10 nickels are placed in a row, how long will the row be? Describe how you found your answer.
(21)

*9. Use a centimeter ruler to measure this rectangle:
(Inv. 2)

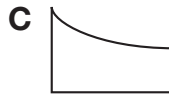


a. What is the length?

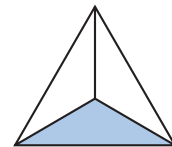
b. What is the width?

c. What is the perimeter?

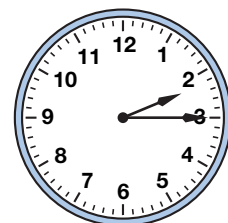
*10. **Multiple Choice** Which of these shapes has four right angles?
(23)



*11. What fraction of this triangle is shaded?
(22)



*12. The clock shows the time that Reginald's last class of the day begins. The class ends at 2:55 p.m. How long is Reginald's last class of the day?
(19)



$$\begin{array}{r} *13. \quad \$83 \\ (15) \quad - \$27 \\ \hline \end{array}$$

$$\begin{array}{r} *14. \quad 42 \\ (15) \quad - 27 \\ \hline \end{array}$$

$$\begin{array}{r} *15. \quad 72 \\ (15) \quad - 36 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad \$4.28 \\ (22) \quad + \$1.96 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad \$4.36 \\ (22) \quad + \$2.95 \\ \hline \end{array}$$

$$\begin{array}{r} 18. \quad 57 \\ (14) \quad + k \\ \hline 88 \end{array}$$

$$\begin{array}{r} *19. \quad 67 \\ (16) \quad - b \\ \hline 16 \end{array}$$

$$\begin{array}{r} *20. \quad k \\ (16) \quad - 22 \\ \hline 22 \end{array}$$

$$21. \quad 42 - 7 \\ (15)$$

$$*22. \quad 55 - 48 \\ (15)$$

$$23. \quad 31 - 20 \\ (14)$$

$$24. \quad 25 + 25 + 25 + 25 \\ (17)$$

25. a. How many nickels equal one dollar?
(22)

b. One nickel is what fraction of a dollar?

c. Seven nickels are what fraction of a dollar?

*26. **Multiple Choice** If $26 + m = 63$, then which of these equations is not true?
(6)

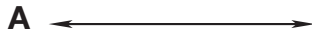
A $m + 26 = 63$


B $m - 63 = 26$

C $63 - m = 26$

D $63 - 26 = m$

*27. **Multiple Choice** Which of these figures illustrates a ray?
(23)



*28.  **Explain** A music store is having a sale. Single CDs cost \$11.99 each. Double CDs cost \$22.99 each. What is a reasonable estimate of the cost of 3 single CDs? Explain why your answer is reasonable.
(22)

29. Compare. Write $>$, $<$, or $=$.
(Inv. 1)

a. $68 \bigcirc 71$

b. $501 \bigcirc 267$

c. $706 \bigcirc 709$

*30. In the student council elections, 1300 votes were cast for the two candidates. One candidate received 935 votes. Write and solve an equation to find the number of votes the other candidate received.
(11, 14)

• Inverse Operations

Power Up

facts

Power Up B

count aloud

Count by sevens from 7 to 42.

mental math

- a. **Number Sense:** $365 + 321$ (Add hundreds, then tens, and then ones.)
- b. **Number Sense:** $40 + 300 + 25$
- c. **Number Sense:** $300 + 50 + 12$
- d. **Number Sense:** Seven can be split into $3 + 4$. If 7 is split into $2 + \square$, what number is represented by \square ?
- e. **Time:** What time is 4 hours after 6:15 p.m.?
- f. **Money:** What is the total value of 8 dimes and 12 pennies?
- g. **Estimation:** One wall of the classroom is 28 feet long. Round that length to the nearest ten feet.
- h. **Measurement:** How many meters are equal to 1 kilometer?

problem solving

Choose an appropriate problem-solving strategy to solve this problem. The two-digit numbers 18 and 81 are written with digits whose sum is nine. On your paper, list in order the two-digit numbers from 18 to 81 whose digits have a sum of nine.

18, _____, _____, _____, _____, _____, _____, 81

What do you notice about the sequence of numbers?

New Concept

Math Language

We can write related equations using the same numbers because addition and subtraction are **inverse operations**. One operation undoes the other.

We have seen that the three numbers in an addition or subtraction fact form three other facts as well. If we know that $n + 3 = 5$, then we know these four facts:

$$\begin{array}{r} n \\ + 3 \\ \hline 5 \end{array} \quad \begin{array}{r} 3 \\ + n \\ \hline 5 \end{array} \quad \begin{array}{r} 5 \\ - n \\ \hline 3 \end{array} \quad \begin{array}{r} 5 \\ - 3 \\ \hline n \end{array}$$

Notice that the last of these facts, $5 - 3 = n$, shows us how to find n . We subtract 3 from 5 to find that n equals 2.

Example 1

Write another addition fact and two subtraction facts using the numbers in this equation:

$$36 + m = 54$$

Which fact shows how to find m ?

We arrange the numbers to write three facts. Notice that the sum, 54, becomes the first number of both subtraction facts.

$$m + 36 = 54 \quad 54 - m = 36 \quad 54 - 36 = m$$

The fact that shows how to find m is

$$54 - 36 = m$$

Example 2

Write another subtraction fact and two addition facts using the numbers in this equation:

$$72 - w = 47$$

Which fact shows how to find w ?

Notice that the first number of a subtraction fact remains the first number of the second subtraction fact.

$$72 - 47 = w$$

Also notice that the first number of a subtraction fact is the sum when the numbers are arranged to form an addition fact.

$$47 + w = 72 \quad w + 47 = 72$$

The fact that shows how to find w is

$$72 - 47 = w$$

Example 3

Find the missing number: $r + 36 = 54$

We can form another addition fact and two subtraction facts using these numbers.

$$36 + r = 54 \quad 54 - r = 36 \quad 54 - 36 = r$$

The last fact, $54 - 36 = r$, shows us how to find r . We subtract 36 from 54 and get **18**.

Example 4

Find the missing number: $t - 29 = 57$

We can write the first number of a subtraction equation as the sum of an addition equation.

$$57 + 29 = t$$

Thus, t equals **86**.

Lesson Practice

Find each missing number:

a. $23 + m = 42$

b. $q + 17 = 45$

c. $53 - w = 28$

d. $n - 26 = 68$

e. $36 + y = 63$

f. $62 - a = 26$

Written Practice

Distributed and Integrated

- *1. (Inv. 2) Rafael placed two 1-foot rulers end to end. What was the total length of the two rulers in inches?
- *2. (11, 24) During the one-hour television show, there were 12 minutes of commercials. How many minutes of the hour were not commercials? Write an equation.
- *3. **Multiple Choice** (10) All the students lined up in two equal rows. Which could *not* be the total number of students?
A 36 B 45 C 60 D 24
- *4. **Connect** (3) Find the missing numbers in this counting sequence:
..., 9, 18, ____, ____, 45, ____, ...

- *5. **Predict** Find the sixth number in this counting sequence:

(3, 5)

7, 14, 21, ...

6. Compare: $15 - 9$ \bigcirc $13 - 8$

(Inv. 1)

7. a. Round 77 to the nearest ten.

(20)

- b. Round \$29.39 to the nearest dollar.

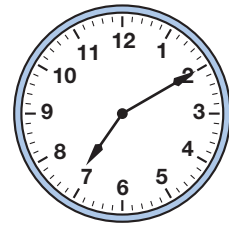
- c. Round \$9.19 to the nearest 25 cents.

- *8. **Estimate** A professional basketball player might be about how many meters tall?

(Inv. 2)

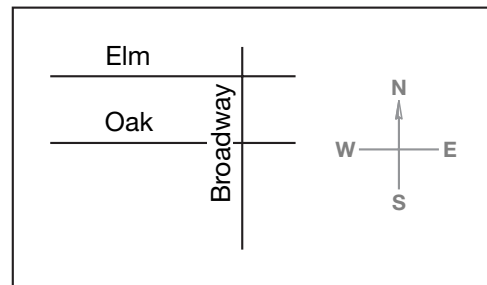
- *9. Jeong and her friends attended an evening movie that began at the time shown on the clock. The movie ended at 9:05 p.m. How long was the movie?

(19)



- *10. **Conclude** Which street is parallel to Elm?

(23)



- *11. a. How many dimes equal one dollar?
b. One dime is what fraction of a dollar?
c. Nine dimes are what fraction of a dollar?

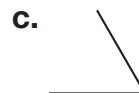
(22)

- *12. **Represent** Draw a rectangle that is 5 centimeters long and 2 centimeters wide. What is the perimeter?

(Inv. 2, 21)

- *13. Describe each type of angle shown below:

(23)



$$\begin{array}{r} 14. \quad \$31 \\ (15) \quad - \$14 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad \$468 \\ (13) \quad + \$247 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 57 \\ (14) \quad - 37 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad \$4.97 \\ (22) \quad + \$2.58 \\ \hline \end{array}$$

* 18. $36 - c = 19$
(24)

19. $b + 65 = 82$
(24)

* 20. $87 + d = 93$
(24)

* 21. $n - 32 = 19$
(24)

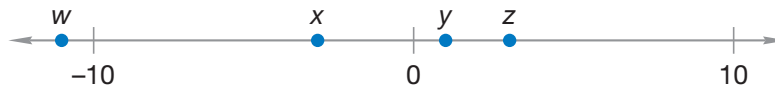
22. $48 - 28$
(14)

23. $41 - 32$
(15)

24. $76 - 58$
(15)

25. $416 + 35 + 27 + 43 + 5$
(17)

- * 26. **Multiple Choice** Which point on this number line could represent -3 ?
(Inv. 1)





A point w

B point x

C point y

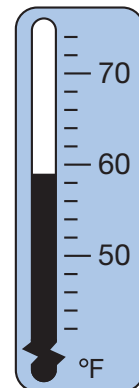
D point z

- * 27.  **Explain** How is a segment different from a line?
(23)

- * 28.  **Estimate** Concert tickets cost \$18 each, not including a \$4.25 transaction fee for each ticket. What is a reasonable estimate of the cost to purchase two concert tickets? Explain why your estimate is reasonable.
(22)

29. ⁽¹⁸⁾ The thermometer shows the high temperature on an April day in Nashville, Tennessee. What was the high temperature that day?

- * 30. **Formulate** Write and solve an addition word problem that has a sum of 43.
(1)



• Subtraction Word Problems

Power Up

facts

Power Up B

count aloud

Count down by tens from 250 to 10.

mental math

- Number Sense:** $35 + 60 + 100$
- Number Sense:** $200 + 50 + 432$
- Number Sense:** $56 + 19 + 200$
- Geometry:** What is the diameter of a circle that has a 1-centimeter radius?
- Time:** What time is 4 hours after 11:20 a.m.?
- Money:** What is the total cost of a \$19 hammer and a \$3 box of nails?
- Estimation:** The lunch cost \$5.47. Round \$5.47 to the nearest 25 cents.
- Measurement:** How many feet are equal to one mile?

problem solving

Choose an appropriate problem-solving strategy to solve this problem. In some sequences, the count from one number to the next increases. In the sequence below, from 1 to 4 is 3, from 4 to 9 is 5, and from 9 to 16 is 7. Continue this sequence to the tenth term, which is 100.

1, 4, 9, 16, ...

What do you notice about the increase from one number to the next?

New Concept

We have practiced solving word problems with a “some and some more” plot. Recall that “some and some more” problems use an addition formula.

In this lesson, we will begin to practice solving word problems that have a subtraction plot. One type of problem with a subtraction plot is a “some went away” problem. Read this “some went away” problem:

Jannik had 7 marbles. Then he lost 3 marbles. He has 4 marbles left.

Reading Math

We translate the problem using a subtraction formula.

Jannik had:
7 marbles
He lost: 3 marbles
Marbles left: 4

We can write the information from this word problem in a subtraction formula like this:

Formula	Problem
Some	7 marbles
– Some went away	– 3 marbles
What is left	4 marbles

We can also write the formula horizontally.

Formula: Some – Some went away = What is left

Problem: 7 marbles – 3 marbles = 4 marbles

In a “some went away” problem there are three numbers. Any one of the numbers may be missing. We use the subtraction formula and write the numbers we know in a subtraction problem and then find the missing number.

Recall that we solve a word problem using the four-step problem-solving process.

Step 1: Read and translate the problem.

Step 2: Make a plan to solve the problem.

Step 3: Follow the plan and solve the problem.

Step 4: Check your answer for reasonableness.

A plan that can help us solve word problems is to *write an equation*. We do this by writing the numbers we know in an equation using the subtraction formula.

Example 1

Jaxon had some pencils. Then he gave away 15 pencils. Now he has 22 pencils left. How many pencils did Jaxon have in the beginning?

Jaxon gave away some pencils. This word problem has a “some went away” plot. We are told how many pencils “went away” and how many pencils are left. To find how many pencils Jaxon had in the beginning, we use the subtraction formula to write an equation. We fill in the numbers given and use a letter for the missing number.

Formula	Problem
Some	p pencils
$-$ Some went away	$-$ 15 pencils
What is left	22 pencils

We can solve for the missing number in this subtraction problem by adding.

$$\begin{array}{r} 22 \text{ pencils} \\ + 15 \text{ pencils} \\ \hline 37 \text{ pencils} \end{array}$$

Jaxon had **37 pencils** in the beginning. Now we check the answer in the original problem.

$$\begin{array}{r} 37 \text{ pencils} \\ - 15 \text{ pencils} \\ \hline 22 \text{ pencils} \end{array}$$

Example 2

Celia had 42 seashells. She sent some seashells to her aunt. She has 29 seashells left. How many seashells did Celia send to her aunt?

Celia sent some seashells to her aunt. This problem has a “some went away” plot. We are asked to find the number that went away. We know how many seashells she had before and after she sent some to her aunt. We write the numbers we know in the formula.

Formula	Problem
Some	42 seashells
$-$ Some went away	$-$ s seashells
What is left	29 seashells

To solve for the missing number, we subtract.

$$\begin{array}{r} 42 \\ - 29 \\ \hline 13 \end{array}$$

We find that Celia sent **13 seashells** to her aunt. Now we check to see whether 13 seashells makes the problem correct.

$$\begin{array}{r} 42 \text{ seashells} \\ - 13 \text{ seashells} \\ \hline 29 \text{ seashells} \end{array}$$

Example 3

LuAnn had 65 beads. Then she used 13 beads to make a necklace. How many beads does LuAnn have left to use?

This problem also has a “some went away” plot. We write the numbers in an equation using the subtraction formula and then find the missing number. This time, we practice writing the formula horizontally.

Formula: Some – Some went away = What is left

Problem: 65 beads – 13 beads = b beads

To find the missing number, we simply subtract.

$$65 \text{ beads} - 13 \text{ beads} = 52 \text{ beads}$$

We find that LuAnn has **52 beads** left.

Justify Is the answer reasonable? Explain why or why not.

Lesson Practice

Formulate Write and solve subtraction equations for problems **a–c**.

- a. Marko had 42 cards. Then he mailed some cards. Now he has 26 cards. How many cards did Marko mail?
- b. Tamika donated 42 books. Now she has 26 books. How many books did Tamika have in the beginning?
- c. Barbara had 75 cents. Then she spent 27 cents. How many cents does Barbara have now?

Written Practice

Distributed and Integrated

Formulate Write and solve equations for problems **1–3**.

- * **1.** Barke had 75 stamps. Then he gave some stamps to Joey. Now he has 27 stamps. How many stamps did Barke give away?
(25)
- * **2.** Rafiki had sixty-three baseball cards. He gave fourteen baseball cards to Amie. How many baseball cards does Rafiki have left?
(25)
- * **3.** Mrs. Rushing had a package of lined cards. She used seventy-five cards in class last week. She has forty-seven cards left. How many cards were in the package before last week?
(25)
- 4.** There are 12 months in a whole year. How many months are in half of a year?
(5)

***5. Connect** Find the missing numbers in each counting sequence:

(3,
Inv. 1)

a. ..., 5, 10, _____, _____, 25, _____, ...

b. ..., 5, 0, _____, _____, -15, _____, ...

***6. Represent** Use digits and a comparison symbol to write that seven hundred sixty-two is less than eight hundred twenty-six.

(Inv. 1)

***7. a.** Round 78 to the nearest ten.

(20)

b. Round \$7.80 to the nearest dollar.

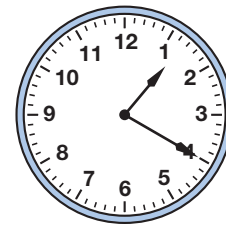
c. Round \$7.80 to the nearest 25 cents.

***8.** If the diameter of a wheel on Joshua's bike is 20 inches, then what is the radius of the wheel?

(21)

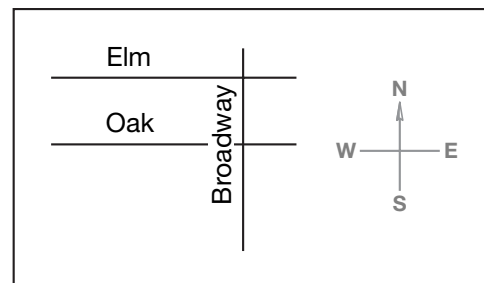
***9.** The last recess of the afternoon at Taft Elementary School begins at the time shown on the clock. The recess ends at 1:35 p.m. How long is the last recess of the afternoon?

(19)



***10. Conclude** Which street is perpendicular to Elm?

(23)



***11.** What fraction of this shape is shaded?

(22)

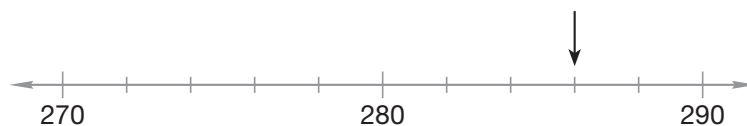


***12.** Draw a square whose sides are 4 cm long. What is the perimeter of the square?

(Inv. 2,
21)

***13. Represent** To what number is the arrow pointing?

(Inv. 1)



$$\begin{array}{r} 14. \quad \$52 \\ (15) \quad - \$14 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad 476 \\ (13) \quad + 177 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad 62 \\ (15) \quad - 38 \\ \hline \end{array}$$

$$\begin{array}{r} 17. \quad \$4.97 \\ (22) \quad + \$2.03 \\ \hline \end{array}$$

$$\begin{array}{r} *18. \quad 36 \\ (24) \quad - g \\ \hline 18 \end{array}$$

$$\begin{array}{r} *19. \quad 55 \\ (24) \quad + b \\ \hline 87 \end{array}$$

$$\begin{array}{r} *20. \quad d \\ (24) \quad - 23 \\ \hline 58 \end{array}$$

$$\begin{array}{r} *21. \quad y \\ (24) \quad + 14 \\ \hline 32 \end{array}$$

$$\begin{array}{r} 22. \quad 42 - 37 \\ (15) \end{array}$$


$$\begin{array}{r} 23. \quad 52 - 22 \\ (14) \end{array}$$

$$\begin{array}{r} 24. \quad 73 - 59 \\ (15) \end{array}$$

$$\begin{array}{r} 25. \quad 900 + 90 + 9 \\ (17) \end{array}$$

- *26. **Multiple Choice** Which of these measurements is *not* equivalent to one meter?
(Inv. 2)

A 1000 mm B 100 cm C 1000 km D 1 m

- *27.  **Explain** How is a ray different from a segment?
(23)

28. The Illinois River and the Potomac River have a combined length of 803 miles. The Illinois River is 420 miles long. Write and solve an equation to find the length of the Potomac River.
(11, 14)

29. At a school supply store, pencil erasers cost 59¢ each. A drawing pad costs \$3.39. What is a reasonable estimate of the total cost of a drawing pad and an eraser? Explain why your estimate is reasonable.
(22)

30. In Bismarck, North Dakota, the average high temperature in January is 21°F. The average low temperature is -1°F. How many degrees warmer is a temperature of 21°F than a temperature of -1°F?
(18)

Early Finishers

Real-World Connection

There were 119 third grade students, 121 fourth grade students and 135 fifth grade students in the auditorium. One hundred eighty-seven of the students returned to class. Which number is greater, the number of students still in the auditorium, or the number of students who returned to class? How do you know?

• Drawing Pictures of Fractions

Power Up

facts

Power Up B

count aloud

Count by sevens from 7 to 49.

mental math

Number Sense: Add from the left and then regroup ones. For example, $35 + 26$ is 50 plus 11, which is 61.

$$\begin{array}{r} \text{a.} \quad 55 \\ + 25 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 36 \\ + 26 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 48 \\ + 22 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 37 \\ + 45 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 235 \\ + 145 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 156 \\ + 326 \\ \hline \end{array}$$

g. Money: What is the total cost of a \$110 desk and a \$45 chair?

h. Estimation: The length of the whiteboard was 244 cm. Round this length to the nearest ten centimeters.

problem solving

Choose an appropriate problem-solving strategy to solve this problem. Jennifer has three coins in her left pocket that total 65¢. Which coins does Jennifer have in her left pocket?

New Concept

We can understand fractions better if we learn to draw pictures that represent fractions.

Example 1

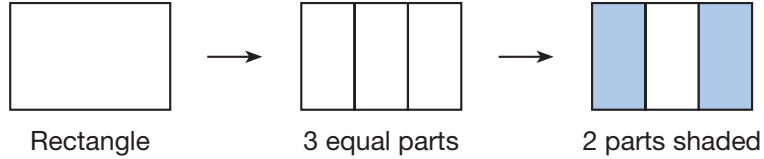
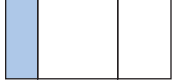
Draw a rectangle and shade two thirds of it.

We draw a rectangle. Then we divide the rectangle into three equal parts. As a final step, we shade any two of the equal parts.

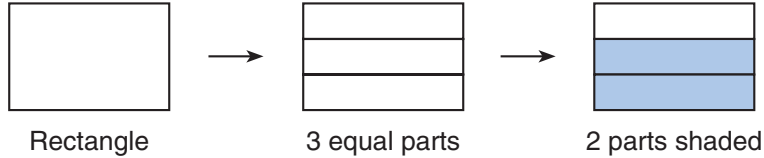
Thinking Skill

Verify

Is $\frac{1}{3}$ of this figure shaded? Explain why or why not.



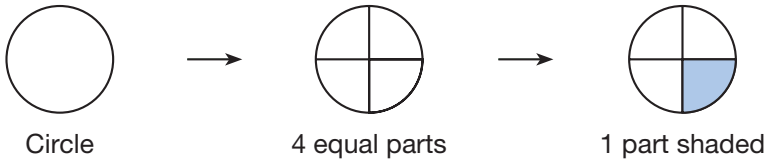
There are other ways to divide the rectangle into three equal parts. Here is another way we could shade two thirds of the rectangle:



Example 2

Draw a circle and shade one fourth of it.

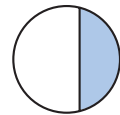
First we draw a circle. Then we divide the circle into four equal parts. Then we shade any one of the parts.



Lesson Practice

Represent Draw and shade each shape:

- Draw a square and shade one half of it.
- Draw a rectangle and shade one third of it.
- Draw a circle and shade three fourths of it.
- Draw a circle and shade two thirds of it.
- Is one half of this circle shaded? Why or why not?



Written Practice

Distributed and Integrated

Formulate Write and solve equations for problems 1–3.

- *1. Mandisa had 42 pebbles. She threw some into the lake. Then she had ⁽²⁵⁾ 27 pebbles left. How many pebbles did Mandisa throw into the lake?

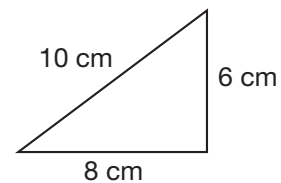
*2. Dennis had a bag of pebbles. He put 17 pebbles on the ground.
(25) Then there were 46 pebbles left in the bag. How many pebbles were in the bag before Dennis took some out?

*3. Salvador saw one hundred twelve stars. Eleanor looked the other way
(11, 13) and saw some more stars. If they saw three hundred seventeen stars in all, how many did Eleanor see?

4. Use the digits 4, 5, and 6 to write an even number less than 500. Each
(4, 10) digit may be used only once. Which digit is in the tens place?

*5. **Represent** Draw a square and shade three fourths of it.
(26)

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



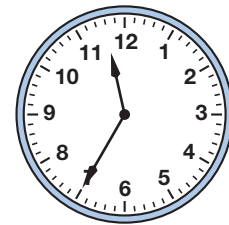
*7. **Represent** Use digits and symbols to show that negative twenty is
(Inv. 1) less than negative twelve.

8. a. Round 19 to the nearest ten.
(20)

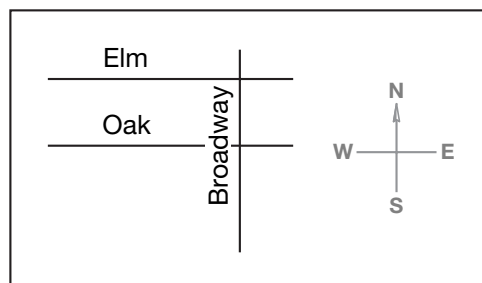
b. Round \$10.90 to the nearest dollar.

9. One meter equals how many centimeters?
(Inv. 2)

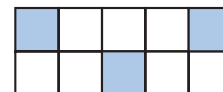
10. This clock represents a time during a school day.
(19) Write the time.



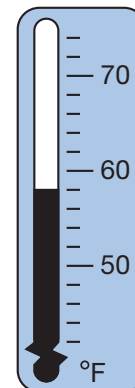
*11. **Conclude** Which street makes a right angle with Oak?
(23)



- *12. What fraction of this figure is shaded?
(22)



- *13. The thermometer at right shows the average temperature during February in Galveston, Texas. What is that temperature?
(18)



*14.
$$\begin{array}{r} y \\ + 63 \\ \hline 81 \end{array}$$

(24)

*15.
$$\begin{array}{r} \$486 \\ + \$277 \\ \hline \end{array}$$

(13)

*16.
$$\begin{array}{r} \$68 \\ - \$39 \\ \hline \end{array}$$

(15)

*17.
$$\begin{array}{r} \$5.97 \\ + \$2.38 \\ \hline \end{array}$$

(22)

*18. $n + 42 = 71$
(24)

*19. $87 - n = 65$
(24)

*20. $27 + c = 48$
(24)

*21. $e - 14 = 28$
(24)

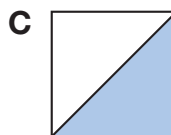
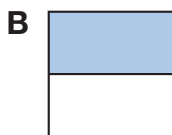
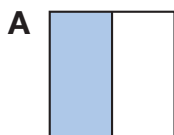
*22. $42 - 29$
(15)

*23. $77 - 37$
(14)

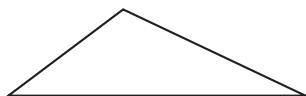
*24. $41 - 19$
(15)

*25. $4 + 7 + 15 + 21 + 5 + 4 + 3$
(17)

- *26. **Multiple Choice** In which figure is $\frac{1}{2}$ not shaded?
(26)



- *27. **Conclude** Is the largest angle of this triangle acute, right, or obtuse?
(23)



- *28. How many different three-digit numbers can you write using the digits 0, 7, and 3? Each digit may be used only once, and the digit 0 may not be used in the hundreds place. Label the numbers you write as even or odd.
(10)

- *29. **Estimate** Is \$14 a reasonable estimate for the sum of \$5.45 and \$8.59? Explain why or why not.
(22)

- *30. The numbers 8, 9, and 17 form a fact family. Write two addition facts and two subtraction facts using these three numbers.
(6)

- **Multiplication as Repeated Addition**
- **More Elapsed-Time Problems**

Power Up**facts**

Power Up B

count aloud

Count by fours from 4 to 40 and then back down to 4.

mental mathIn **a–c**, add ones, then tens, and then hundreds. Remember to regroup the ones.

- Number Sense:** $147 + 225$
- Number Sense:** $356 + 126$
- Number Sense:** $239 + 144$
- Number Sense:** $9 = 4 + \square$
- Geometry:** What is the radius of a circle that has a diameter of 2 inches?
- Money:** Hala had \$7. Then she spent \$2 on a toothbrush. How much money did Hala have left?
- Estimation:** The large dog weighed 88 pounds. Round that weight to the nearest ten pounds.
- Measurement:** Dan took two steps that were each 61 centimeters long. Altogether, how many centimeters did he move?

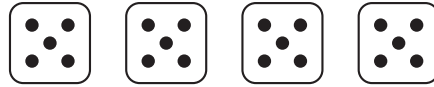
problem solving

Choose an appropriate problem-solving strategy to solve this problem. At 12:00 the hands of the clock point in the same direction. At 6:00 the hands point in opposite directions. Draw pictures of clocks to show the hours that the hands of a clock form right angles.

New Concepts

Multiplication as Repeated Addition

Suppose we want to find the total number of dots shown on these four dot cubes:



One way we can find the total number of dots is to count the dots one by one. Another way is to recognize that there are 5 dots in each group and that there are four groups. We can find the answer by adding four 5s.

$$5 + 5 + 5 + 5 = 20$$

We can also use **multiplication** to show that we want to add 5 four times.

$$\begin{array}{ccccccc} 4 & \times & 5 & = & 20 & \text{or} & 5 \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & & \times 4 \\ & & & & & & \hline & & & & & & 20 \end{array}$$

Four groups of five equals twenty

If we find the answer this way, we are multiplying. We call the \times a **multiplication sign**. We read 4×5 as “four times five.”

Example 1

Change this addition problem to a multiplication problem:

$$6 + 6 + 6 + 6 + 6$$

We see five 6s. We can change this addition problem to a multiplication problem by writing either

$$5 \times 6 \quad \text{or} \quad \begin{array}{r} 6 \\ \times 5 \\ \hline \end{array}$$

Elapsed Time

Recall that the amount of time between two different points in time is called elapsed time. We can count forward or backward on a clock to solve some elapsed-time problems.

Thinking Skill

Discuss

How do we decide which number to multiply times 5?

Activity

Finding Time

Material needed:

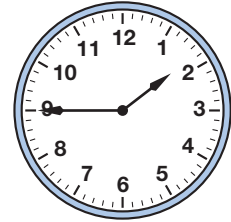
- **Lesson Activity 17**

Use **Lesson Activity 17** to complete these problems. You may use your student clock to solve.

1. Sketch a clock showing the time on the classroom clock. Then sketch a clock showing the time 2 hours ago. Write the time under both clocks.
2. Sketch a clock showing the time lunch begins. Then sketch a clock showing the time lunch ends. Write the time under both clocks. How many minutes long is lunch?

Example 2

In the afternoon, Siew-Ai arrives home from school 1 hour 50 minutes later than the time shown on the clock. What time does Siew-Ai arrive home from school?



The time on the clock is 1:45 p.m.

We will describe two ways to find the time that is 1 hour 50 minutes later.

Method 1: Count forward 1 hour 50 minutes.

Step 1: Count forward 1 hour from 1:45 p.m. to 2:45 p.m.

Step 2: Count forward 50 minutes from 2:45 p.m. to **3:35 p.m.**

Method 2: Count forward 2 hours and then count back 10 minutes.

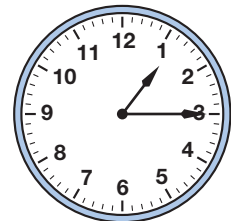
Step 1: Count forward 2 hours from 1:45 p.m. to 3:45 p.m.

Step 2: Count back 10 minutes from 3:45 p.m. to **3:35 p.m.**

Discuss Describe where the hands of the clock will be when it is 3:35 p.m.

Example 3

On Monday morning, an elementary school had a fire drill 4 hours 25 minutes before the time shown on the clock. When was the fire drill?



The time shown on the clock is 1:15 p.m. We count back 4 hours 25 minutes.

- Count back 4 hours from 1:15 p.m. to 9:15 a.m.
- Count back 25 minutes from 9:15 a.m. to **8:50 a.m.**

Discuss How do we know that the time shown on the clock is p.m. and not a.m.?

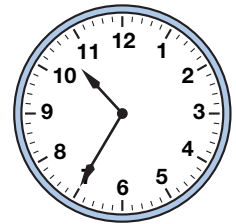
Verify Describe where the hands of the clock will be when it is 8:50 a.m.

Lesson Practice

Change each addition problem to a multiplication problem:

- a. $3 + 3 + 3 + 3$ b. $9 + 9 + 9$
- c. $7 + 7 + 7 + 7 + 7 + 7$
- d. $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5$

Use a student clock to answer problems e and f. Show 10:35 a.m. on your student clock.



- e. If it is morning, what time will it be in 2 hours 25 minutes?
- f. If it is morning, what time was it 6 hours 30 minutes ago?

Written Practice

Distributed and Integrated

*1. **Formulate** Just before noon Adriana saw seventy-eight people watching the game. At noon she saw only forty-two watching the game. How many people had left the game by noon? Write an equation and solve the problem.

*2. If each side of a square floor tile is one foot long, then

- a. each side is how many inches long?
- b. the perimeter of the tile is how many inches?

*3. **List** Write the even numbers between 31 and 39.

Conclude Find the next three numbers in each counting sequence:

*4. ..., 12, 15, 18, _____, _____, _____, ...

*5. ..., 12, 24, 36, _____, _____, _____, ...

***6.** **Represent** Write 265 in expanded form.
(16)

***7.** **Represent** Use words to write -19 .
(Inv. 1)

***8.** a. Round 63 to the nearest ten.
(20)

b. Round \$6.30 to the nearest dollar.

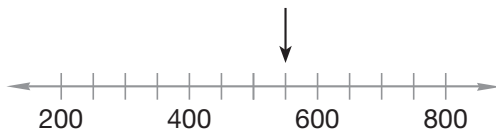
c. Round \$6.30 to the nearest 25 cents.

9. Compare:
(Inv. 1)

a. $392 \bigcirc 329$

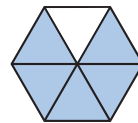
b. $-15 \bigcirc -20$

10. To what number is the arrow pointing?
(Inv. 1)

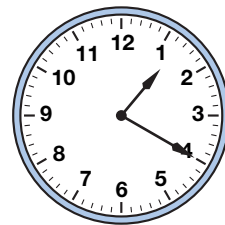


***11.** Draw a square with sides 2 centimeters long. Then shade one fourth of the square.
(21, 26)

***12.** **Explain** What fraction of this figure is shaded? Describe how you found your answer.
(22)



***13.** Aric plays percussion instruments in the school band. Band practice ends 3 hours after the time shown on the clock. What time does band practice end?
(27)



14. $\begin{array}{r} \$67 \\ - \$29 \\ \hline \end{array}$
(15)

15. $\begin{array}{r} 483 \\ + 378 \\ \hline \end{array}$
(13)

16. $\begin{array}{r} 71 \\ - 39 \\ \hline \end{array}$
(15)

17. $\begin{array}{r} \$5.88 \\ + \$2.39 \\ \hline \end{array}$
(22)

***18.** $\begin{array}{r} d \\ + 19 \\ \hline 36 \end{array}$
(24)

***19.** $\begin{array}{r} 66 \\ + f \\ \hline 87 \end{array}$
(24)

***20.** $\begin{array}{r} 87 \\ - r \\ \hline 67 \end{array}$
(24)

***21.** $\begin{array}{r} b \\ - 14 \\ \hline 27 \end{array}$
(24)

22. $400 - 300$
(14)

23. $663 - 363$
(14)

- *24. Change this addition problem to a multiplication problem:
(27)

$$9 + 9 + 9 + 9$$

- *25. a. One dollar equals how many pennies?
(22)

b. A penny is what fraction of a dollar?

c. Eleven pennies are what fraction of a dollar?

- *26. **Multiple Choice** If $\square = 3$ and $\triangle = 4$, then what does $\square + \triangle + \square$ equal?
(1)

A 343

B 7

C 10

D 11

- *27. **Represent** Draw a dot on your paper to represent a point. Then, from that point, draw two perpendicular rays.
(23)

- *28. **Formulate** Ronald Reagan was elected president in 1980 and again in 1984. During those elections, he won a total of 1014 electoral votes. In 1984, he won 525 electoral votes. Write and solve an equation to find the number of electoral votes Ronald Reagan won in 1980.
(11, 14)

- *29. **Estimate** The cost of a new T-shirt is \$15.95. Wendy would like to purchase two T-shirts. Is \$40 a reasonable estimate for the cost of her purchase? Explain why or why not.
(22)

30. Show six different ways to add 2, 4, and 6.
(1)

Early Finishers

Real-World Connection

Mr. Perez left work at 4:59 p.m. He stopped at the store for 15 minutes. Then he drove for 24 minutes to get home.

- What time did Mr. Perez arrive at his house?
- How much time elapsed from the time Mr. Perez left work and the time he arrived home?
- Describe where the hands on the clock will be when Mr. Perez gets home.

• Multiplication Table

Power Up

facts

Power Up A

count aloud

Count by sevens from 7 to 56.

mental math

- a. **Number Sense:** $54 + 120$
- b. **Number Sense:** $210 + 25 + 35$
- c. **Number Sense:** $350 + 30 + 200$
- d. **Number Sense:** $5 = 3 + \square$
- e. **Time:** What time will it be 3 hours after 4:40 a.m.?
- f. **Money:** Ebony had \$14. Then she spent \$5 on colored pencils. How much money did Ebony have left?
- g. **Measurement:** One yard is 3 feet. The tree is 7 yards tall. How many feet tall is the tree?
- h. **Estimation:** Mia has \$4.78 in her wallet. Round \$4.78 to the nearest 25 cents.

problem solving

The hour hand moves around the face of a clock once in 12 hours. How many times does the hour hand move around the face of the clock in a week?

Focus Strategy: Write a Number Sentence

Understand We collect the information from the problem and combine it with information we already know:

1. The hour hand moves around the face of a clock once in 12 hours.
2. There are 24 hours in a day.
3. One week is 7 days.

We are asked to find how many times the hour hand moves around the face of a clock in one week.

Plan We take the information we know and *write a number sentence* to solve the problem.

Solve The hour hand moves once around the clock in 12 hours. This means it moves 2 times around in 24 hours (1 day).

If the hour hand moves 2 times around in 1 day, then it moves $2 + 2$ times around in 2 days. To find how many times the hour hand moves around in 7 days, we can add the number 2 seven times: $2 + 2 + 2 + 2 + 2 + 2 + 2$. We can also multiply:

$$2 \text{ times around} \times 7 = 14 \text{ times around}$$

We find that the hour hand moves **14 times around the clock** in a week.

Check We know our answer is reasonable because there are 7 days in a week. We double the number 7 because the hour hand moves around the clock twice each day.

We wrote a number sentence to solve this problem. As a class, discuss other strategies that can be used to solve the problem.

New Concept

Here we show sequences for counting by ones and twos:

Ones: 1 2 3 4 5 6 7 8 9 10 11 12
Twos: 2 4 6 8 10 12 14 16 18 20 22 24

These sequences—and those for threes, fours, and so on through twelves—appear in the following **multiplication table**.

Multiplication Table

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Thinking Skill

Analyze

Each term in the sequence for 4s is double the corresponding term in the sequence for 2s. Name other sequences where the terms are doubled.

We can use a multiplication table to find the answer to problems such as 3×4 by using rows and columns. Rows run left to right, and columns run top to bottom. We start by finding the row that begins with 3 and the column that begins with 4. Then we look for the number where the row and column meet.

Column
↓

	0	1	2	3	4	5	6	7	8	9	10	11	12	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1	0	1	2	3	4	5	6	7	8	9	10	11	12	
2	0	2	4	6	8	10	12	14	16	18	20	22	24	
Row →	3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48	
5	0	5	10	15	20	25	30	35	40	45	50	55	60	
6	0	6	12	18	24	30	36	42	48	54	60	66	72	
7	0	7	14	21	28	35	42	49	56	63	70	77	84	
8	0	8	16	24	32	40	48	56	64	72	80	88	96	
9	0	9	18	27	36	45	54	63	72	81	90	99	108	
10	0	10	20	30	40	50	60	70	80	90	100	110	120	
11	0	11	22	33	44	55	66	77	88	99	110	121	132	
12	0	12	24	36	48	60	72	84	96	108	120	132	144	

Each of the two numbers multiplied is called a **factor**. The answer to a multiplication problem is called a **product**. In this problem, 3 and 4 are factors, and 12 is the product. Now look at the row that begins with 4 and the column that begins with 3. We see that the product of 4 and 3 is also 12. Changing the order of factors does not change the product. This is true for any two numbers that are multiplied and is called the **Commutative Property of Multiplication**.

Thinking Skill

Conclude

How are the Identity Property of Addition and the Identity Property of Multiplication alike? How are they different?

Here are two more properties of multiplication we can see in the multiplication table. Notice that the product of zero and any number is zero. This is called the **Property of Zero for Multiplication**. Also notice that the product of 1 and any other factor is the other factor. This is called the **Identity Property of Multiplication**.

The three properties we have looked at are summarized in this table. The letters m and n can be any two numbers. Later, we will learn about two other properties of multiplication.

Properties of Multiplication

Commutative Property	$m \times n = n \times m$
Identity Property	$1 \times n = n$
Zero Property	$0 \times n = 0$

Lesson Practice

Use the multiplication table to find each product:

a.
$$\begin{array}{r} 9 \\ \times 3 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 3 \\ \times 9 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 6 \\ \times 4 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$$

g.
$$\begin{array}{r} 5 \\ \times 8 \\ \hline \end{array}$$

h.
$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

i.
$$\begin{array}{r} 10 \\ \times 10 \\ \hline \end{array}$$

j.
$$\begin{array}{r} 10 \\ \times 8 \\ \hline \end{array}$$

k.
$$\begin{array}{r} 11 \\ \times 9 \\ \hline \end{array}$$

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

m. Which property of multiplication is shown below?

$$12 \times 11 = 11 \times 12$$

n. Use the Zero Property of Multiplication to find the product:

$$0 \times 25$$

o. Use the Identity Property of Multiplication to find the product:

$$1 \times 25$$

Formulate Write and solve equations for problems 1 and 2.

*1. Seventy-two children attend the morning session at a preschool.
 (1) Forty-two children attend the afternoon session. How many children attend those sessions altogether?

*2. Sherri needs \$35 to buy a baseball glove. She has saved \$18. How
 (11, 24) much more does she need?

*3. **Represent** Draw a rectangle that is 4 cm long and 3 cm wide.
 (Inv. 2, 21) What is the perimeter of the rectangle?

Connect Find the missing numbers in each counting sequence:

*4. ..., 12, ____, ____, 30, 36, ____, ...
 (3)

*5. ..., 36, ____, ____, 24, 20, ____, ...
 (3)

*6. **Connect** Change this addition problem to a multiplication problem.
 (27, 28) Then find the product on the multiplication table shown in this lesson.

$$6 + 6 + 6 + 6 + 6 + 6 + 6$$

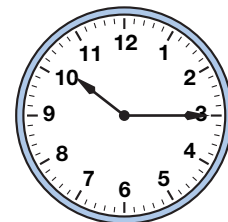
7. a. Round 28 to the nearest ten.
 (20)

b. Round \$12.29 to the nearest dollar.

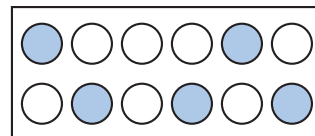
c. Round \$12.29 to the nearest 25 cents.

*8. **Represent** A *right triangle* has one right angle. Draw a right triangle.
 (Inv. 2, 23) Draw the two perpendicular sides 3 cm long and 4 cm long.

*9. On Saturday morning, Mason went to the public library
 (27) at the time shown on the clock. He arrived home 90 minutes later. What time did Mason arrive home from the library?

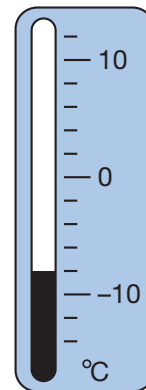


- * 10. What fraction of this group is shaded?
(22)



- * 11. **Represent** Write 417 in expanded form. Then use words to write the number.
(7, 16)

- * 12. a. What temperature is shown on this thermometer?
(18)
b. If the temperature increases by ten degrees, what will the temperature be?



$$\begin{array}{r} 13. \quad 76 \\ (15) \quad - 29 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad \$286 \\ (13) \quad + \$388 \\ \hline \end{array}$$

$$\begin{array}{r} 15. \quad \$73 \\ (15) \quad - \$39 \\ \hline \end{array}$$

$$\begin{array}{r} 16. \quad \$5.87 \\ (22) \quad + \$2.43 \\ \hline \end{array}$$

* 17. $46 - c = 19$
(24)

* 18. $n + 48 = 87$
(24)

* 19. $29 + y = 57$
(24)

* 20. $d - 14 = 37$
(24)

21. $78 - 43$
(14)

22. $77 - 17$
(14)

23. $53 - 19$
(15)

- * 24. **Interpret** Use the multiplication table to find each product:
(28)

a. 8×11

b. 7×10


c. 5×12

25. Compare: 1 yard \bigcirc 1 meter
(Inv. 1, Inv. 2)

- * 26. **Multiple Choice** Which of the following shows 3 ones and 4 hundreds?
(4)
- A 304 B 403 C 4003 D 3400

- * 27. **Analyze** The product of 9 and 3 is 27. How many times does this product appear in this lesson's multiplication table? What property of multiplication does this show?
(28)

- *28. ⁽²⁵⁾ For a short distance, a cheetah can run at a speed of 70 miles per hour. An elk can run at a speed of 45 miles per hour. Write and solve a subtraction equation to find the difference between the two animals' speeds.

- *29. ⁽²⁰⁾  **Estimate** During an online auction, D'Wayne bid \$37 for one item and \$54 for another item. If D'Wayne purchases both items at those prices, what is a reasonable estimate of his total cost? Explain why your estimate is reasonable.

30. ⁽³⁾ **Predict** What is the tenth number in this counting sequence?

90, 80, 70, 60, 50, ...

Early Finishers

Real-World Connection

Rebecca and her friend were placing pictures on pages of a scrapbook. Rebecca put 6 pictures on five pages, and her friend put 5 pictures on six pages. Did the girls have the same number of pictures? Explain how you know.

- **Multiplication Facts:**
0s, 1s, 2s, 5s

Power Up**facts**

Power Up B

count aloud

Count by threes from 3 to 45 and then back down to 3.

mental math

We can split numbers to help us add. Adding 35 and 8, we may notice that 35 needs 5 more to make 40 and that 8 splits into $5 + 3$. To add 35 and 8, we could add $35 + 5 + 3$.

- Number Sense:** $35 + 7$
- Number Sense:** $68 + 7$
- Number Sense:** $38 + 5$
- Measurement:** The width of a large paper clip is 1 centimeter. How many millimeters wide is the paper clip?
- Measurement:** The high temperature for the day was 84°F . Then the temperature dropped 14 degrees. What was the new temperature?
- Time:** What time was it 2 hours before 1:00 a.m.?
- Money:** Anne bought a notebook for \$2, a compass for \$4, and a ruler for \$1. What was the total cost of the items?
- Number Sense:** $8 = 3 + \square$

problem solving

Choose an appropriate problem-solving strategy to solve this problem. Hope has seven coins in her right pocket. None of the coins are dollar or half-dollar coins. What is the lowest possible value of all seven coins? What is the highest possible value of all seven coins?

New Concept

We will begin memorizing the basic multiplication facts. Eighty-eight of the facts in the multiplication table shown in Lesson 28 have 0, 1, 2, or 5 as one of the factors.

Zero times any number equals zero.

$$0 \times 5 = 0 \quad 5 \times 0 = 0 \quad 7 \times 0 = 0 \quad 0 \times 7 = 0$$

One times any number equals the number.

$$1 \times 5 = 5 \quad 5 \times 1 = 5 \quad 7 \times 1 = 7 \quad 1 \times 7 = 7$$

Two times any number doubles the number.

$$2 \times 5 = 10 \quad 2 \times 7 = 14 \quad 2 \times 6 = 12 \quad 2 \times 8 = 16$$

Five times any number equals a number that ends in zero or in five.

$$5 \times 1 = 5 \quad 5 \times 3 = 15 \quad 5 \times 7 = 35 \quad 5 \times 8 = 40$$

We say the multiples of 5 when counting by fives. The sixth number we say when counting by fives is 30, so $6 \times 5 = 30$.

However, counting is not a substitute for memorizing the facts.

Thinking Skill

Generalize

How can we decide if a number is divisible by 2? By 5?

Lesson Practice

Complete Power Up C.

Written Practice

Distributed and Integrated

Formulate Write and solve equations for problems 1 and 2.

- *1. Jasmine made ninety-two mums to sell at the school fundraiser. At the end of the fundraiser, twenty-four mums remained. How many mums did Jasmine sell?
(25)

- *2. Rochelle collected 42 seashells. Then Zuri collected some seashells. They collected 83 seashells in all. How many seashells did Zuri collect?
(11, 24)

***3.** Conner estimated that the radius of one of the circles on the playground was 2 yards. If Conner was correct, then

(Inv. 2, 21)

- a. the radius was how many feet?
- b. the diameter was how many feet?

Connect Find the missing numbers in each counting sequence:

4. ..., 8, _____, _____, 32, 40, _____, ...

(3)

5. ..., 14, _____, _____, 35, 42, ...

(3)

6. Use the digits 4, 5, and 6 to write a three-digit odd number less than 640. Each number may be used only once.

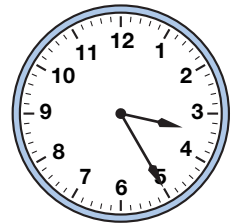
(10)

***7. Represent** Use digits and a comparison symbol to write that two hundred nine is greater than one hundred ninety.

(Inv. 1)

***8.** Fernando arrived home from school at the time shown on the clock. He snacked for 5 minutes, and then he spent 35 minutes completing his homework. What time did Fernando complete his homework?

(27)



***9. Represent** Draw a rectangle 3 cm long and 1 cm wide. Then shade two thirds of it.

(21, 26)

***10.** Find each product:

(28, 29)

a. 2×8

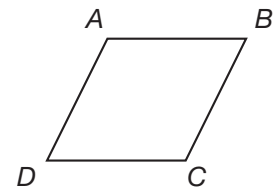
b. 5×7

c. 2×7

d. 5×8

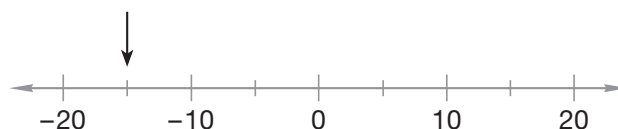
***11. Conclude** In this figure, what type of angle is angle A? Explain how you know.

(23)



***12. Connect** To what number is the arrow pointing?

(Inv. 1)



13. At what temperature does water freeze

(18)

a. on the Fahrenheit scale?

b. on the Celsius scale?

14. $\begin{array}{r} \$83 \\ - \$19 \\ \hline \end{array}$

(15)

15. $\begin{array}{r} \$286 \\ + \$387 \\ \hline \end{array}$

(13)

16. $\begin{array}{r} 72 \\ - 38 \\ \hline \end{array}$

(15)

17. $\begin{array}{r} \$5.87 \\ + \$2.79 \\ \hline \end{array}$

(22)

*18. $\begin{array}{r} 19 \\ + q \\ \hline 46 \end{array}$

(24)

*19. $\begin{array}{r} 88 \\ - n \\ \hline 37 \end{array}$

(24)

*20. $\begin{array}{r} 88 \\ - m \\ \hline 47 \end{array}$

(24)

*21. $\begin{array}{r} g \\ + 14 \\ \hline 47 \end{array}$

(24)

22. $870 - 470$

(14)

23. $525 - 521$

(14)

*24. **Connect** Change this addition problem to a multiplication problem. Then find the product on the multiplication table.

(27, 28)

$$8 + 8 + 8$$

25. $1 + 9 + 2 + 8 + 3 + 7 + 4 + 6 + 5 + 10$

(1)

*26. **Multiple Choice** Which of these does *not* equal 24?

(28)

A 3×8

B 4×6

C 2×12

D 8×4

*27. Name the property of multiplication shown by each of these examples:

(28)

a. $0 \times 50 = 0$

b. $9 \times 6 = 6 \times 9$

c. $1 \times 75 = 75$

28. a. Round \$3.49 to the nearest dollar.

(20)

b. Round \$3.49 to the nearest 25 cents.

*29. **Connect** Write a multiplication equation that has a product of 18.

(28)

*30. Suppose $x + y = z$. Write one more addition and two subtraction equations using x , y , and z .

(24)

• Subtracting Three-Digit Numbers with Regrouping

Power Up

facts

Power Up B

count aloud

Count by fives from 5 to 100 and then back down to 5.

mental math

Practice splitting the second number to add in **a–c**.

- a. **Number Sense:** $36 + 8$
- b. **Number Sense:** $48 + 6$
- c. **Number Sense:** $47 + 9$
- d. **Measurement:** One of the two identical chairs weighed 13 pounds. How much did the two chairs weigh?
- e. **Measurement:** How many inches equal 1 yard?
- f. **Time:** What time was it 4 hours before 6:25 a.m.?
- g. **Money:** Scott received his allowance of \$20. If he puts \$5 into his savings account, how much will Scott have left over to spend?
- h. **Estimation:** The ceiling was 274 cm above the floor. Round that measurement to the nearest ten centimeters.

problem solving

Choose an appropriate problem-solving strategy to solve this problem. How many times does the minute hand move around the face of a clock in 300 minutes?

New Concept

We have already learned how to subtract three-digit numbers without regrouping. In this lesson we will subtract three-digit numbers with regrouping.

Example 1

Thinking Skill

Discuss

How do we know when we need to regroup?

Find the difference: $\$365 - \187

We write the first number on top. We line up the last digits. We cannot subtract 7 ones from 5 ones.

$$\begin{array}{r} \$365 \\ - \$187 \\ \hline ? \end{array}$$

We exchange 1 ten for 10 ones. Now there are 5 tens and 15 ones. We can subtract 7 ones from 15 ones to get 8 ones.

$$\begin{array}{r} ^1 \\ \$3\cancel{6}5 \\ - \$187 \\ \hline 8 \end{array}$$

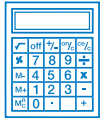
We cannot subtract 8 tens from 5 tens, so we exchange 1 hundred for 10 tens. Now there are 2 hundreds and 15 tens, and we can continue subtracting.

$$\begin{array}{r} ^1 ^1 \\ \$\cancel{3}\cancel{6}5 \\ - \$187 \\ \hline 78 \end{array}$$

We subtract 1 hundred from 2 hundreds to finish. The difference is $\$178$.

$$\begin{array}{r} ^1 ^1 \\ \$\cancel{3}\cancel{6}5 \\ - \$187 \\ \hline \$178 \end{array}$$

Example 2



Visit www.SaxonMath.com/Int4Activities for a calculator activity.

Before she spent $\$1.12$, Olivia had $\$4.10$. What amount of money does Olivia have now?



We subtract pennies, then dimes, and then dollars. We remember to align the decimal points.

$$\begin{array}{r} ^0 \\ \$4.\cancel{1}0 \\ - \$1.12 \\ \hline 8 \end{array} \quad \rightarrow \quad \begin{array}{r} ^1 ^0 \\ \$4.\cancel{1}0 \\ - \$1.12 \\ \hline .98 \end{array} \quad \rightarrow \quad \begin{array}{r} ^1 ^0 \\ \$4.\cancel{1}0 \\ - \$1.12 \\ \hline \$2.98 \end{array}$$

 **Activity****Subtracting Money**

Materials needed:

- money manipulatives from Lesson 22 (or **Lesson Activities 2, 8, and 9**)

Use your money manipulatives to complete the following tasks:

1. Model \$4.31 and \$3.42 using your manipulatives. Which amount is greater? Explain why.
2. Arrange \$2.31, \$3.21, and \$1.32 in order from least to greatest.
3. Using your manipulatives subtract \$5.46 from \$1.24. How much money is left?
4. **Model** Act out this problem:

Carla went to the store with \$7.54. She bought a container of juice for \$2.12. How much money did Carla have left?

Example 3

During a special 15%-off sale at a sporting goods store, the price of a \$9.49 baseball cap will be reduced by \$1.42. What is a reasonable estimate of the sale price of the cap?

We can use compatible numbers to estimate. The regular price of the cap is close to \$9.50 and the price is reduced by about \$1.50. Subtracting \$1.50 from \$9.50, we find that a reasonable estimate of the sale price is **\$8.00**.

Lesson Practice

Subtract:

a.
$$\begin{array}{r} \$365 \\ - \$287 \\ \hline \end{array}$$

b.
$$\begin{array}{r} \$4.30 \\ - \$1.18 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 563 \\ - 356 \\ \hline \end{array}$$

d. $240 - 65$

e. $459 - 176$

f. $157 - 98$

- g. L'Rae entered the store with \$8.24 and bought a gallon of milk for \$2.27. What is a reasonable estimate of how much money L'Rae has now? Explain.

Formulate Write and solve equations for problems 1 and 2.

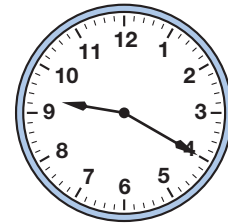
*1. ⁽²⁵⁾ The room was full of students when the bell rang. Then forty-seven students left the room. Twenty-two students remained. How many students were there when the bell rang? Use the subtraction formula to write an equation and solve the problem.

*2. ^(11, 24) On Friday, 56 fourth grade students wore black shoes to school. There are 73 fourth grade students in all. How many fourth grade students did not wear black shoes to school on Friday?

*3. **Multiple Choice** ⁽¹⁰⁾ A nickel is worth 5¢. Gilbert has an even number of nickels in his pocket. Which of the following could *not* be the value of his nickels?

- A 45¢ B 70¢ C 20¢ D 40¢

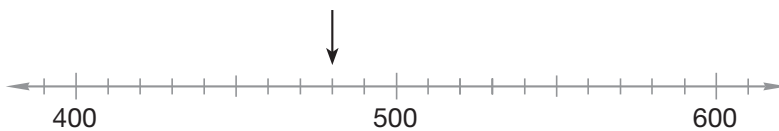
*4. ⁽²⁷⁾ Jillian's social studies class ends 15 minutes later than the time shown on the clock. What time does Jillian's class end?



*5. **Predict** ⁽³⁾ What is the sixth number in this counting sequence?

6, 12, 18, ...

*6. **Represent** ^(Inv. 1) To what number is the arrow pointing?



*7. **Model** ^(21, 26) Use a compass to draw a circle with a radius of 1 inch. Then shade one fourth of the circle.

*8. ^(7, 16) **Represent** Write 843 in expanded form. Then use words to write the number.

***9.** Multiply:
(28, 29)

a. 6×8

b. 4×2

c. 4×5

d. 6×10

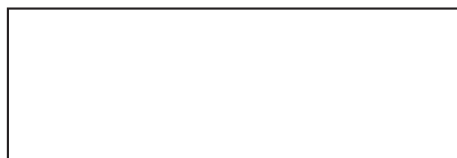
***10.** **Connect** Write two addition facts and two subtraction facts using the numbers 10, 20, and 30.
(6)

***11.** **Model** Use a centimeter ruler to measure the rectangle below.
(Inv. 2)

a. How long is the rectangle?

b. How wide is the rectangle?

c. What is the perimeter of the rectangle?



***12.** **Conclude** What type of angle is each angle of a rectangle?
(23)

***13.**
$$\begin{array}{r} 746 \\ - 295 \\ \hline \end{array}$$

(30)

14.
$$\begin{array}{r} \$3.86 \\ + \$2.78 \\ \hline \end{array}$$

(22)

15.
$$\begin{array}{r} 61 \\ - 48 \\ \hline \end{array}$$

(24)

***16.**
$$\begin{array}{r} \$4.86 \\ - \$2.75 \\ \hline \end{array}$$

(30)

17. $51 + m = 70$
(24)

18. $86 - a = 43$
(24)

19. $25 + y = 36$
(24)

20. $q - 24 = 37$
(24)

21.  **Explain** How can you round 89 to the nearest ten? Explain.
(20)


22. $25\text{¢} + 25\text{¢} + 25\text{¢} + 25\text{¢}$
(17)

23. There are 100 cents in a dollar. How many cents are in half of a dollar?
(22)

***24.** **Represent** Change this addition problem to a multiplication problem. Then find the product on the multiplication table.
(27, 28)

$$7 + 7 + 7 + 7 + 7 + 7 + 7$$

25. $4 + 3 + 8 + 4 + 2 + 5 + 7$
(1)

- *26. **Multiple Choice** Which of these sets of numbers is not an addition/subtraction fact family?
(6)
A 1, 2, 3 B 2, 3, 5 C 2, 4, 6 D 3, 4, 5
- *27. Find each product on the multiplication table:
(28)
a. 10×10 b. 11×11 c. 12×12
- *28. **Formulate** Write a subtraction word problem using the numbers 8, 10, and 18.
(2)
29.  **Justify** Is \$500 a reasonable estimate for the difference \$749 – \$259? Explain why or why not.
(30)
30. Suppose $a + b = c$. Write one more addition and two subtraction equations using a , b , and c .
(24)

Early Finishers

Real-World Connection

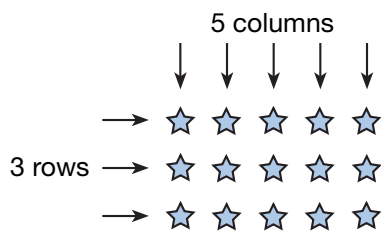
Paolo had \$12.70. Then his mother paid him \$3.25 for mopping. He bought a paperback book that costs \$4.99.

- Use compatible numbers to estimate how much money Paolo has now.
- Then find the actual amount of money Paolo has now.
- Was your estimate reasonable? Explain why or why not.

Focus on

- Multiplication Patterns
- Area
- Squares and Square Roots

One model of multiplication is a rectangular **array**. An array is a rectangular arrangement of numbers or symbols in columns and rows. Here we see an array of 15 stars arranged in five columns and three rows. This array shows that 5 times 3 equals 15. This array also shows that 5 and 3 are both factors of 15.



Refer to this array of Xs to answer problems 1–4 below.



1. How many rows are in the array?
2. How many columns are in the array?
3. How many Xs are in the array?
4. **Connect** What multiplication fact is illustrated by the array?

Some numbers of objects can be arranged in more than one array. In problems 5–7 we will work with an array of 12 Xs that is different from the array we discussed above.

5. **Represent** Draw an array of 12 Xs arranged in two rows.
6. How many columns of Xs are in the array you drew?
7. **Connect** What multiplication fact is illustrated by the array you drew?

Below we show an array of 10 Xs:

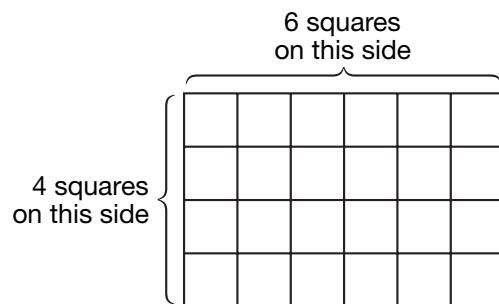


8. Which two factors of 10 are shown by this array?

9. **Verify** Can you draw a rectangular array of ten Xs with three rows?
10. **Verify** Can you draw a rectangular array of ten Xs with four rows?
11. **Verify** Can you draw a rectangular array of ten Xs with five rows?
12. **Represent** Draw an array of Xs arranged in six columns and three rows. Then write the multiplication fact illustrated by the array.
13. **Represent** The chairs in a room were arranged in six rows with four chairs in each row. Draw an array that shows this arrangement, and write the multiplication fact illustrated by the array.

Area

Another model of multiplication is the **area** model. The area model is like an array of connected squares. The model below shows that $6 \times 4 = 24$.



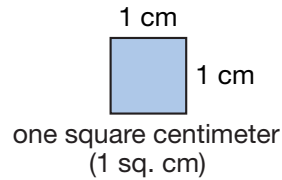
Represent Use **Lesson Activity 9** (1-cm grid paper) to work problems **14–16, 20, and 23–25**.

14. Outline a 6 cm by 4 cm rectangle like the one shown above. How many small squares are in the rectangle?
15. Outline a 8 cm by 3 cm rectangle. How many small squares are in the rectangle? What multiplication fact is illustrated by the rectangle?
16. Outline another rectangle that is made up of 24 squares. Make this rectangle 2 cm wide. How long is the rectangle? What multiplication fact is illustrated by the rectangle?

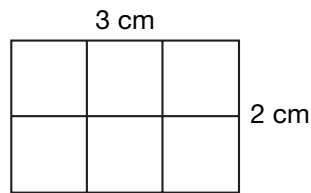
Model With your finger, trace the edges of a sheet of paper. As your finger moves around the paper, it traces the perimeter of the paper. Now use the palm of your hand to rub over the surface of the paper. As you do this, your hand sweeps over the *area* of the paper. The area is the amount of surface within the perimeter (boundary) of a flat figure.

17. Use your finger to trace the perimeter of your desktop.
18. Use the palm of your hand to sweep over the area of your desktop.

We measure the area of a shape by counting the number of squares of a certain size that are needed to cover its surface. Here is a **square centimeter**:

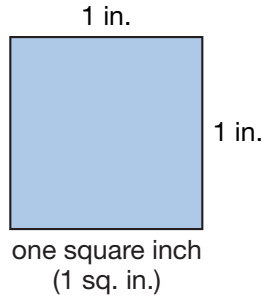


19. How many square centimeters cover the area of this rectangle?

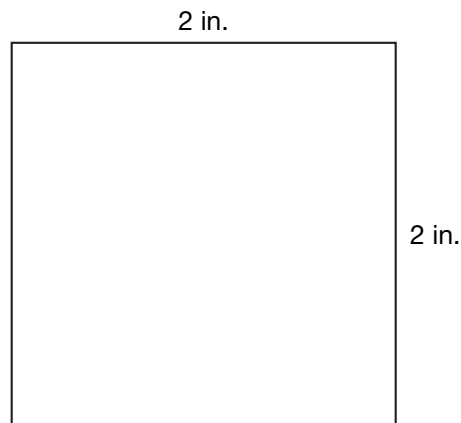


20. **Represent** Use 1-cm grid paper or a centimeter ruler to outline a 4 cm by 3 cm rectangle. What is the area of the rectangle? What is the perimeter?

Here is a **square inch**:

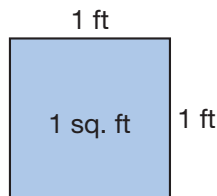


21. How many square inches are needed to cover the rectangle below?



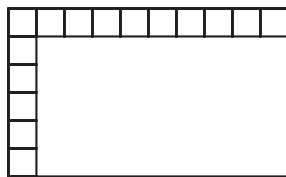
22. **Represent** Use your inch ruler to draw a rectangle 3 in. long and 3 in. wide. What is the area of the rectangle? What is the perimeter?

The floors of buildings such as classrooms are often measured in square feet. A square tile with sides one foot long can be a model of a square foot.



We tile an area by completely covering the area with shapes so that there are no gaps or overlaps.

23. Jarrod began tiling the floor of the kitchen with square tiles that were one foot on each side. The first tiles he placed are shown below.



- What is the total number of tiles Jarrod will use to cover the floor?
- What is the area of the room?

Activity 1

Finding Perimeter and Area

Materials needed:

- construction paper squares (1 foot on each side)

Use a one-foot square to estimate the perimeter and area of these objects. Record the approximate length, width, perimeter, and area of each object in a table like the one shown at the end of this activity.

- your desktop
- the front cover of your math book
- a rectangular surface of your choice

Sample Table

Object	Length	Width	Perimeter	Area
Desktop				
Book cover				
Bulletin board				

Activity 2

Estimating Perimeter and Area

Material needed:

- ruler

Use an inch ruler or a centimeter ruler to estimate the perimeter and area of some smaller rectangular items in your classroom. Make a list of the items you chose. Record your estimate of the perimeter and area of each item.

Squares and Square Roots

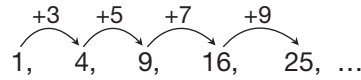
Some rectangles are squares. A square is a rectangle whose length and width are equal.

- 24. Represent** On 1-cm grid paper, outline four squares, one each with the following unit measurements: 1 by 1, 2 by 2, 3 by 3, and 4 by 4. Write the multiplication fact for each square.

We say that we “square a number” when we multiply a number by itself. If we square 3, we get 9 because $3 \times 3 = 9$. Likewise, 4 squared is 16 because 4×4 is 16.

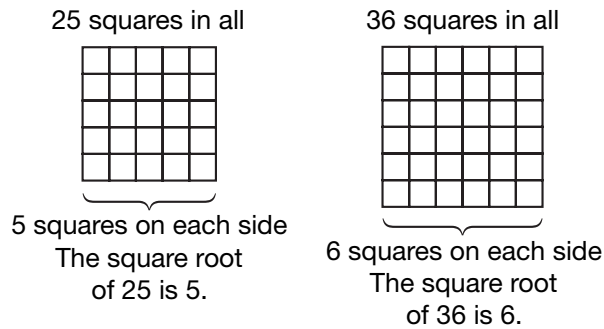
- 25.** What number do we get if we square 6? Outline a square on grid paper to show the result.
- 26.** What number equals 7 squared? Outline a square on grid paper to illustrate the answer.

The numbers 1, 4, 9, 16, 25, and so on form a sequence of **square numbers**, or **perfect squares**. Notice that the increase from one term to the next term forms a sequence of odd numbers.



- 27. Conclude** Find the next five terms in this sequence of square numbers.
- 28.** Look back at the multiplication table in Lesson 28. What pattern do the square numbers make in the table?

To find the **square root** of a number, we find a number that, when multiplied by itself, equals the original number. The square root of 25 is 5 because $5 \times 5 = 25$. The square root of 36 is 6. A square drawn on grid paper can help us understand the idea of square roots. When searching for a square root, we know the number of small squares in all, and we are looking for the length of a side.



We indicate the square root of a number by using a square root symbol.

$$\sqrt{\quad}$$

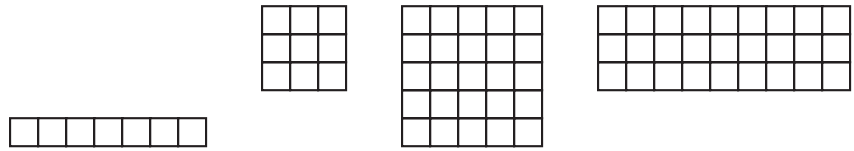
Square root symbol

We read the symbol as “the square root of.” To read $\sqrt{25} = 5$, we say, “The square root of twenty-five equals five.”

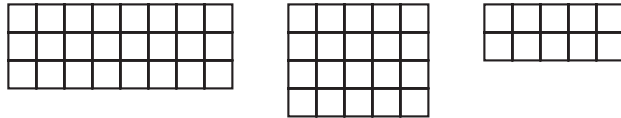
- 29. a.** What number equals 9 squared?
b. What is the square root of 9?
- 30.** Find each square root:
a. $\sqrt{4}$ **b.** $\sqrt{16}$ **c.** $\sqrt{64}$
- 31. Analyze** If the area of a square is 49 square centimeters, how long is each side of the square?



a. One common attribute was used to group these figures:



These figures do not belong in the group:



Find the area of each figure, and explain why the figures were sorted in this way. Draw another figure that belongs in the first group, and explain why that figure belongs.

b. Describe the relationship between the two sets of data in this table:

Area of Squares

Area (sq. in.)	1	4	9	16	25	36
Side Length (in.)	1	2	3	4	5	6

Predict What is the area of a square with a side length of 10 inches? How do you know?

Generalize Write a formula that could be used to find the perimeter of any square.