

**LESSON**  
**1-1** **Ready to Go On? Skills Intervention**  
**Numbers and Patterns**

Numbers in a sequence follow a pattern. This means there is a consistent method to get from one number to the next in a sequence. If you analyze a pattern, you can make a **conjecture** about the next terms in the pattern.

**Vocabulary**  
conjecture

**Identifying and Extending Number Patterns**

Identify a possible pattern. Use your pattern to write the next three numbers.

**A.** 1, 3, 5, 7, 9, \_\_, \_\_, \_\_, ...

3 is \_\_\_\_\_ 1.

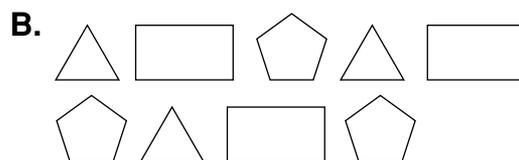
So a possible pattern is to \_\_\_\_\_.

Test this pattern on the other numbers.

3 + \_\_\_\_ = \_\_\_\_, 5 + \_\_\_\_ = \_\_\_\_,

7 + \_\_\_\_ = \_\_\_\_.

Use this pattern to continue and get the next three terms, \_\_\_\_\_.



Identify the order in which the shapes are repeated. The pattern is

\_\_\_\_\_

The next three terms are

\_\_\_\_\_

**Using Tables to Identify and Extend Patterns**

Make a table that shows the number of diamonds in each figure. Then tell how many diamonds are in the 6<sup>th</sup> figure of a pattern.

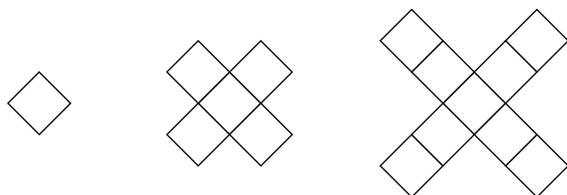


Figure 1

Figure 2

Figure 3

Count the diamonds in each figure. Find the difference in number of diamonds between Figures 1 and 2. Is it the same as the difference between Figures 2 and 3? \_\_\_\_

Figure	1	2	3	4	5	6
Diamonds	1	5	9	_____	_____	_____

A pattern is to \_\_\_\_\_ diamonds each time.

Figure 4 has  $9 + 4 =$  \_\_\_\_\_ diamonds

Figure 5 has \_\_\_\_\_  $+ 4 =$  \_\_\_\_\_ diamonds.

Figure 6 has \_\_\_\_\_  $+ 4 =$  \_\_\_\_\_ diamonds.

**LESSON**

**1-2**

**Ready to Go On? Skills Intervention**

**Exponents**

Numbers may be written as a **power**. The **exponent** tells how many times the **base** is multiplied by itself.

**Vocabulary**

power  
exponent  
base

**Evaluating Powers**

Find each value.

**A.**  $7^3$

$7^3 =$  \_\_\_\_\_

$=$  \_\_\_\_\_

How many times is 7 multiplied by itself? \_\_\_\_\_

What is the base? \_\_\_\_\_ What is the exponent? \_\_\_\_\_

Find the product.

**B.**  $2^5$

$2^5 =$  \_\_\_\_\_

$=$  \_\_\_\_\_

How many times is 2 multiplied by itself? \_\_\_\_\_

What is the base? \_\_\_\_\_ What is the exponent? \_\_\_\_\_

Find the product.

**Expressing Whole Numbers as Powers**

Write the number using an exponent and the given base.

64, base 4

$64 =$  \_\_\_\_\_

$= 4^$ \_\_\_\_\_

How many times must 4 be multiplied by itself to equal 64? \_\_\_\_\_

What is the exponent? \_\_\_\_\_

**Earth Science Application**

A radar altimeter measures the distance from a space satellite to the surface of the earth by measuring the time delay between the emission of a short microwave pulse and the echo it produces when it bounces off the earth. The microwave range between 100 MHz and 10,000 MHz is used for this measurement. Find the microwave range as a power of ten.

What is the microwave range? \_\_\_\_\_

Write each value as a product of 10.

$100 =$  \_\_\_\_\_

$= 10^$ \_\_\_\_\_ MHz

$10,000 =$  \_\_\_\_\_

$= 10^$ \_\_\_\_\_ MHz

The microwave range used by the radar altimeter is between \_\_\_\_\_ and \_\_\_\_\_MHz.

## LESSON

## 1-2

**Ready to Go On? Problem Solving Intervention****Exponents**

You can use expressions with exponents to help solve problems.

Each side of a metal cube is 6 inches long. Inside is a cube-shaped hollow space that is 3 inches on each side. How many cubic inches of metal does the cube contain?

**Understand the Problem**

1. How can you find the volume of a cube if you know the length of each side?

\_\_\_\_\_

2. Why can't you just evaluate  $6^3$  to find the amount of metal?

\_\_\_\_\_

**Make a Plan**

3. Write a numerical expression with exponents for the volume

of the hollow space inside the cube. \_\_\_\_\_

4. If you know the entire volume of the cube and the volume of the empty space, how can you find the volume of metal?

\_\_\_\_\_

**Solve**

5. Write a numerical expression with exponents for the volume of metal contained in

the cube. Evaluate the expression. \_\_\_\_\_

6. How much metal is in the cube? \_\_\_\_\_

**Look Back**

7. The hollow space inside the cube is half as long as the side of the cube. Why does it make sense that the metal takes up much more than half of the cube's volume?

\_\_\_\_\_

\_\_\_\_\_

**LESSON**

**1-3**

**Ready to Go On? Skills Intervention**

**Scientific Notation**

Numbers that are multiples of 10 can be written as a product using a base of ten and an exponent.

**Vocabulary**  
scientific notation

**Multiplying by Powers of Ten**

Multiply.

**A.**  $72 \cdot 10^3$

$$72 \cdot 10^3 = 72 \cdot (\text{_____})$$

$$= 72 \cdot \text{_____}$$

$$= \text{_____}$$

How many times do you multiply by 10?  
Multiply. Does the exponent of ten equal the number of zeros in the product? \_\_\_\_\_

**B.**  $512 \cdot 10^4$

$$512 \cdot 10^4 = \text{_____}$$

What is the exponent of 10? \_\_\_\_\_  
Move the decimal point \_\_\_\_\_ places to the \_\_\_\_\_.  
How many zeros do you add? \_\_\_\_\_

**Scientific notation** is a number written as the product of a number greater than or equal to 1 and less than 10 and a power of 10.

**Writing Numbers in Scientific Notation**

Write 65,200,000 in scientific notation.

Move the decimal point between the \_\_\_\_\_ and the \_\_\_\_\_.

How many places did you move the decimal point? \_\_\_\_\_

$65,200,000 = 6.52 \times 10^{\text{---}}$       What is the exponent?

**Writing Numbers in Standard Form**

The circumference of the earth is about  $4.0 \times 10^4$  km. Write this distance in standard form.

$$4.0 \times 10^4 = 4.0000 \times 10^4$$

$$= \text{_____}$$

How many places do you move the decimal? \_\_\_\_\_  
How many zeros do you need to add? \_\_\_\_\_  
Multiply.

The circumference of the earth is about \_\_\_\_\_ km.

## LESSON

## 1-3

**Ready to Go On? Problem Solving Intervention****Scientific Notation**

You can rewrite numbers that are in scientific notation to help you compare and order them.

The table lists some very long distances. Put them in order from greatest to least.

Description	Distance in Miles
Sun to nearest star	$2.5 \times 10^{13}$
Light-year	$5.88 \times 10^{12}$
4 billion trips around the world	$10^{14}$

**Understand the Problem**

- To compare the first two distances, why can't you just compare 2.5 and 5.88 to find which distance is greater?

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**Make a Plan**

- The values  $2.5 \times 10^{13}$  and  $5.88 \times 10^{12}$  do not have the same number of decimal places. The value  $5.88 \times 10^{12}$  has an exponent of 12. Fill in the blank to rewrite  $2.5 \times 10^{13}$  so it also has an exponent of 12.

$$2.5 \times 10^{13} = \underline{\hspace{2cm}} \times 10^{12}$$

**Solve**

- Which is greater,  $25 \times 10^{12}$  or  $5.88 \times 10^{12}$ ? \_\_\_\_\_
- How can you write  $10^{14}$  in the usual two-part scientific notation? Rewrite it with an exponent of 12? \_\_\_\_\_
- List the three distances in order from greatest to least.

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**Look Back**

- Why does it make sense that  $2.5 \times 10^{13}$  is greater than  $5.88 \times 10^{12}$ , even though 2.5 is less than 5.88?

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## LESSON

**Ready to Go On? Skills Intervention****1-4****Order of Operations**

To simplify a **numerical expression**, an expression made up of numbers and operations, follow the **order of operations**. First, evaluate expressions within grouping symbols. Next, evaluate exponents. Then, multiply and divide, starting at the left. Finally, add and subtract from left to right.

**Vocabulary**

numerical  
expression  
order of operations

**Using the Order of Operations**

Evaluate  $41 + 3^2 \cdot 2$ .

$41 + 3^2 \cdot 2$  Circle your first operation.

$41 + \_\_\_ \cdot 2$  Evaluate.

$41 + 9 \cdot 2$  Circle the next operation.

$41 + \_\_\_\_\_\_$  Evaluate.

$\_\_\_\_\_\_$  Add.

**Using the Order of Operations with Grouping Symbols**

Evaluate.  $16 \div (11 - 9)^3 + 22$

$16 \div (11 - 9)^3 + 22$  Circle your first operation.

$16 \div (\_\_\_)^3 + 22$  Evaluate.

$16 \div (2)^3 + 22$  Circle your next operation.

$16 \div 8 + 22$  Evaluate.

$16 \div 8 + 22$  Should you add or divide next? \_\_\_\_\_

$2 + 22$  Evaluate.

$\_\_\_\_\_\_$  Add.

**Personal Finance Application**

Jane earns \$7.50 per hour cleaning houses. She worked 7 hours on Monday and 8 hours each on Tuesday and Thursday. Evaluate the expression  $(7 + 8 \cdot 2) \cdot 7.5$  to find her income for this week.

$(7 + 8 \cdot 2) \cdot 7.5$  Circle your first operation.

$(7 + \_\_\_) \cdot 7.5$  Evaluate.

$(7 + 16) \cdot 7.5$  Circle your next operation.

$23 \cdot 7.5$  Evaluate.

$\_\_\_\_\_\_$  Multiply.

Jane earned \_\_\_\_\_ in a week.

## LESSON

## 1-5

**Ready to Go On? Skills Intervention****Properties of Numbers**

Many properties are helpful when performing mathematical operations. The **Commutative Property** states that you can add or multiply numbers in any order and get the same result. The **Associative Property** states that when you add or multiply, you can group numbers together in any order and get the same result. The **Identity Property** states that any number plus 0 is equal to that number and any number times 1 is equal to that number. The **Distributive Property** states that when multiplying, you can break a number into smaller numbers, multiply each number by the second number, and add the products.

**Vocabulary**

Commutative Property

Associative Property

Identity Property

Distributive Property

**Using the Identity Property to Simplify Expressions**

Simplify.

A.  $73 + 0 = \underline{\hspace{2cm}}$

Any number plus 0 is equal to

 $\underline{\hspace{2cm}}$ .

B.  $45 \cdot 1 = \underline{\hspace{2cm}}$

Any number times 1 is equal to

 $\underline{\hspace{2cm}}$ .**Using Properties to Simplify Expressions**

Simplify each expression using one or more of the properties.

A.  $8 + 17 + 12 = 17 + 12 + 8$  is an example of the \_\_\_\_\_.

$= 17 + (12 + 8)$  is an example of the \_\_\_\_\_.

$= 17 + (\underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}}$

B.  $2 \cdot 14 \cdot 5 = 14 \cdot 2 \cdot 5$  is an example of the \_\_\_\_\_.

$= 14 \cdot (2 \cdot 5)$  is an example of the \_\_\_\_\_.

$= 14 \cdot (\underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}}$

**Using the Distributive Property to Multiply Mentally**

Use the Distributive Property to find the product.

$6(22) = 6(\underline{\hspace{2cm}})$

$= (6 \cdot \underline{\hspace{2cm}}) + (6 \cdot \underline{\hspace{2cm}})$

$= \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

$= \underline{\hspace{2cm}}$

Rewrite the number as two smaller parts.

Use the Distributive Property.

Multiply.

Add.