

## Reteaching 4-1 Divisibility and Factors

Find all the factors of 30.

Start with 1 and 30.

Is 30 divisible by 2? Yes, it ends in 0.

List 2 and 15.

Is 30 divisible by 3? Yes, the sum of the digits, 3, is divisible by 3.

List 3 and 10.

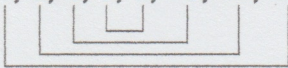
Is 30 divisible by 4? No,  $4 \cdot 7 = 28$  and  $4 \cdot 8 = 32$ .

Is 30 divisible by 5? Yes, it ends in 0.

List 5 and 6.

When you list all the factors in order, the pairs with products of 30 form a symmetric pattern.

**1, 2, 3, 5, 6, 10, 15, 30**



**Fill in the boxes to find all the factors for each number.**

1. 34    1, 2, , 34

2. 50    1, 2, 5, , , 50

3. 52    1, , , 13, 26, 52

4. 36    1, , 3, , 6, 9, , 18, 36

**Find all the factors of each number.**

5. 55 \_\_\_\_\_

6. 40 \_\_\_\_\_

7. 42 \_\_\_\_\_

8. 48 \_\_\_\_\_

## Practice 4-1 Divisibility and Factors

List all the factors of each number.

1. 12 \_\_\_\_\_
2. 45 \_\_\_\_\_
3. 41 \_\_\_\_\_
4. 54 \_\_\_\_\_
5. 48 \_\_\_\_\_
6. 100 \_\_\_\_\_
7. 117 \_\_\_\_\_

Test whether each number is divisible by 2, 3, 5, 9, and 10.

- |                 |                 |
|-----------------|-----------------|
| 8. 215 _____    | 9. 432 _____    |
| 10. 770 _____   | 11. 1,011 _____ |
| 12. 975 _____   | 13. 2,070 _____ |
| 14. 3,707 _____ | 15. 5,715 _____ |

Write the missing digit to make each number divisible by 9.

16.  $7\boxed{\phantom{0}}1$                       17.  $2,2\boxed{\phantom{0}}2$                       18.  $88,\boxed{\phantom{0}}12$

19. There are four different digits which, when inserted in the blank space in the number  $4\boxed{\phantom{0}}5$ , make the number divisible by 3. Write them.
- \_\_\_\_\_
20. There are two different digits which, when inserted in the blank space in the number  $7,16\boxed{\phantom{0}}$ , make the number divisible by 5. Write them.
- \_\_\_\_\_
21. There are five different digits which, when inserted in the blank space in the number  $99,99\boxed{\phantom{0}}$ , make the number divisible by 2. Write them.
- \_\_\_\_\_

## Reteaching 4-2 Exponents

Evaluate  $(-x)^2$ ,  $-x^2$ , and  $2(x - 4)^2 + 1$  when  $x = 9$ .

Substitute 9 for  $x$  in  $(-x)^2$ .

$$(-9)^2 = (-9)(-9) = 81$$

Substitute 9 for  $x$  in  $-x^2$ .

$$-9^2 = -(9 \cdot 9) = -81$$

Substitute 9 for  $x$  in  $2(x - 4)^2 + 1$ .

$2(x - 4)^2 + 1 = 2(9 - 4)^2 + 1$	Substitute 9 for $x$ .
$= 2(5)^2 + 1$	Work within parentheses first.
$= 2(25) + 1$	Simplify $(5)^2$ .
$= 50 + 1$	Multiply.
$= 51$	Add.

**Evaluate each expression.**

1.  $(-a)^2$ , for  $a = 10$   $(- \underline{\hspace{2cm}} )^2 = \underline{\hspace{2cm}}$

2.  $-a^2$ , for  $a = 10$   $- \underline{\hspace{2cm}}^2 = \underline{\hspace{2cm}}$

3.  $a^2$ , for  $a = -10$   $( \underline{\hspace{2cm}} )^2 = \underline{\hspace{2cm}}$

4.  $-a^2$ , for  $a = -10$   $-( \underline{\hspace{2cm}} )^2 = \underline{\hspace{2cm}}$

5.  $-3m^2$ , for  $m = 5$   $-3( \underline{\hspace{2cm}} )^2 = -3( \underline{\hspace{2cm}} ) = \underline{\hspace{2cm}}$

6.  $2n^2 - 4$ , for  $n = 3$   $2( \underline{\hspace{2cm}} )^2 - 4 = 2( \underline{\hspace{2cm}} ) - 4$   
 $= ( \underline{\hspace{2cm}} ) - 4 = \underline{\hspace{2cm}}$

7.  $5(2h - 4)^2$ , for  $h = 4$   $5(2 \cdot \underline{\hspace{2cm}} - 4)^2 = 5( \underline{\hspace{2cm}} - 4 )^2$   
 $= 5( \underline{\hspace{2cm}} )^2 = 5( \underline{\hspace{2cm}} ) = \underline{\hspace{2cm}}$

8.  $xy^2$ , for  $x = 7$ ,  $y = 2$   $( \underline{\hspace{2cm}} )( \underline{\hspace{2cm}} )^2 = ( \underline{\hspace{2cm}} )( \underline{\hspace{2cm}} )$   
 $= \underline{\hspace{2cm}}$

## Practice 4-2 Exponents

Evaluate each expression.

- $m^4$ , for  $m = 5$  \_\_\_\_\_
- $(5a)^3$ , for  $a = -1$  \_\_\_\_\_
- $-(2p)^2$ , for  $p = 7$  \_\_\_\_\_
- $-n^6$ , for  $n = 2$  \_\_\_\_\_
- $b^6$ , for  $b = -1$  \_\_\_\_\_
- $(e - 2)^3$ , for  $e = 11$  \_\_\_\_\_
- $(6 + h^2)^2$ , for  $h = 3$  \_\_\_\_\_
- $x^2 + 3x - 7$ , for  $x = -4$  \_\_\_\_\_
- $y^3 - 2y^2 + 3y - 4$ , for  $y = 5$  \_\_\_\_\_

Write using exponents.

- $3 \cdot 3 \cdot 3 \cdot 3$  \_\_\_\_\_
- $k \cdot k \cdot k \cdot k \cdot k$  \_\_\_\_\_
- $(-9)(-9)(-9)m \cdot m \cdot m$  \_\_\_\_\_
- $g \cdot g \cdot g \cdot g \cdot h$  \_\_\_\_\_
- $7 \cdot a \cdot a \cdot b \cdot b \cdot b$  \_\_\_\_\_
- $-8 \cdot m \cdot n \cdot n \cdot 2 \cdot m \cdot m$  \_\_\_\_\_
- $d \cdot (-3) \cdot e \cdot e \cdot d \cdot (-3) \cdot e$  \_\_\_\_\_

Simplify each expression.

- $(-2)^3$  and  $-2^3$  \_\_\_\_\_
- $0^{12}$  \_\_\_\_\_
- $2^8$  and  $4^4$  \_\_\_\_\_
- $-5^2 + 4 \cdot 2^3$  \_\_\_\_\_
- $3(8 - 6)^2$  \_\_\_\_\_
- $-6^2 + 2 \cdot 3^2$  \_\_\_\_\_
- $(-2)(-5)^2(3)$  \_\_\_\_\_
- $24 + (11 - 3)^2 \div 4$  \_\_\_\_\_
- $(17 - 3)^2 \div (4^2 - 3^2)$  \_\_\_\_\_
- $(5 + 10)^2 \div 5^2$  \_\_\_\_\_
- $4^3 \div (2^5 - 4^2)$  \_\_\_\_\_
- $(-1)^5 \cdot (2^4 - 13)^2$  \_\_\_\_\_

## Reteaching 4-3 Prime Factorization and Greatest Common Factor

Find the GCF of 36 and 54.

$$36 = 2^2 \cdot 3^2 = \boxed{2} \cdot \boxed{2} \cdot \boxed{3} \cdot \boxed{3} \quad \text{write the prime factorization}$$

$$54 = 2 \cdot 3^3 = \boxed{2} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3}$$

find the common factors

$$\text{GCF} = 2 \cdot 3 \cdot 3 = 2 \cdot 3^2 = 18$$

Notice 2 is the lesser power of  $2^2$  and 2, and  $3^2$  is the lesser power of  $3^2$  and  $3^3$ .

### Find the GCF.

1.  $50 =$  \_\_\_\_\_

2.  $75 =$  \_\_\_\_\_

$35 =$  \_\_\_\_\_

$30 =$  \_\_\_\_\_

GCF = \_\_\_\_\_

GCF = \_\_\_\_\_

3.  $48 =$  \_\_\_\_\_

4.  $45 =$  \_\_\_\_\_

$60 =$  \_\_\_\_\_

$72 =$  \_\_\_\_\_

GCF = \_\_\_\_\_

GCF = \_\_\_\_\_

5.  $98 =$  \_\_\_\_\_

6.  $24 =$  \_\_\_\_\_

$42 =$  \_\_\_\_\_

$80 =$  \_\_\_\_\_

GCF = \_\_\_\_\_

GCF = \_\_\_\_\_

7.  $315 =$  \_\_\_\_\_

8.  $156 =$  \_\_\_\_\_

$360 =$  \_\_\_\_\_

$208 =$  \_\_\_\_\_

GCF = \_\_\_\_\_

GCF = \_\_\_\_\_

## Practice 4-3 Prime Factorization and Greatest Common Factor

Find each GCF.

1. 8, 12 \_\_\_\_\_
2. 36, 54 \_\_\_\_\_
3. 63, 81 \_\_\_\_\_
4. 69, 92 \_\_\_\_\_
5. 15, 28 \_\_\_\_\_
6. 21, 35 \_\_\_\_\_
7.  $30m$ ,  $36n$  \_\_\_\_\_
8.  $75x^3y^2$ ,  $100xy$  \_\_\_\_\_
9. 15, 24, 30 \_\_\_\_\_
10. 48, 80, 128 \_\_\_\_\_
11.  $36hk^3$ ,  $60k^2m$ ,  $84k^4n$  \_\_\_\_\_
12.  $2mn$ ,  $4m^2n^2$  \_\_\_\_\_

Is each number prime, composite, or neither? For each composite, write the prime factorization.

13. 75 \_\_\_\_\_
14. 152 \_\_\_\_\_
15. 432 \_\_\_\_\_
16. 588 \_\_\_\_\_
17. 160 \_\_\_\_\_
18. 108 \_\_\_\_\_
19. 19 \_\_\_\_\_
20. 143 \_\_\_\_\_
21. 531 \_\_\_\_\_
22. 369 \_\_\_\_\_
23. 83 \_\_\_\_\_
24. 137 \_\_\_\_\_

25. The numbers 3, 5, and 7 are factors of  $n$ . Find four other factors of  $n$  besides 1.

\_\_\_\_\_

26. For which expressions is the GCF  $8x$ ?

- A.  $2xy$  and  $4x^2$       B.  $16x^2$  and  $24xy$       C.  $8x^3$  and  $4x$       D.  $24x^2$  and  $48x^3$

## Reteaching 4-4 Simplifying Fractions

Write  $\frac{8ab^2}{12a^2b}$  in simplest form.

$$\begin{aligned} \frac{8ab^2}{12a^2b} &= \frac{2 \cdot 2 \cdot 2 \cdot a \cdot b \cdot b}{2 \cdot 2 \cdot 3 \cdot a \cdot a \cdot b} \\ &= \frac{\overset{1}{2} \cdot \overset{1}{2} \cdot \overset{1}{2} \cdot \overset{1}{a} \cdot \overset{1}{b} \cdot \overset{1}{b}}{\overset{1}{2} \cdot \overset{1}{2} \cdot 3 \cdot \overset{1}{a} \cdot \overset{1}{a} \cdot \overset{1}{b}} \\ &= \frac{2b}{3a} \end{aligned}$$

Write as a product of prime factors.

Divide the numerator and denominator by the common factors.

Remove the common factors.

Write in simplest form.

1.  $\frac{8}{22}$  \_\_\_\_\_

2.  $\frac{16}{24}$  \_\_\_\_\_

3.  $\frac{9}{21}$  \_\_\_\_\_

4.  $\frac{20h}{24h}$  \_\_\_\_\_

5.  $\frac{30a^2}{36ab} =$  \_\_\_\_\_  $=$  \_\_\_\_\_

6.  $\frac{4x^2y}{14xy^2} =$  \_\_\_\_\_  $=$  \_\_\_\_\_

7.  $\frac{18s^3t^2}{8st^2} =$  \_\_\_\_\_  $=$  \_\_\_\_\_

8.  $\frac{10pqr}{5p^2q} =$  \_\_\_\_\_  $=$  \_\_\_\_\_

9.  $\frac{11gh^3}{gh} =$  \_\_\_\_\_  $=$  \_\_\_\_\_

10.  $\frac{2m^2n}{16m^3n^2} =$  \_\_\_\_\_  $=$  \_\_\_\_\_

**Practice 4-4 Simplifying Fractions**

Write in simplest form.

1.  $\frac{10}{15}$  \_\_\_\_\_

2.  $\frac{18}{36}$  \_\_\_\_\_

3.  $\frac{27}{36}$  \_\_\_\_\_

4.  $\frac{12}{15}$  \_\_\_\_\_

5.  $\frac{26}{39}$  \_\_\_\_\_

6.  $\frac{7b}{9b}$  \_\_\_\_\_

7.  $\frac{16y^3}{20y^4}$  \_\_\_\_\_

8.  $\frac{8x}{10y}$  \_\_\_\_\_

9.  $\frac{6xy}{16y}$  \_\_\_\_\_

10.  $\frac{24n^2}{28n}$  \_\_\_\_\_

11.  $\frac{abc}{10abc}$  \_\_\_\_\_

12.  $\frac{30hxy}{54kxy}$  \_\_\_\_\_

13.  $\frac{mn^2}{pm^5n}$  \_\_\_\_\_

14.  $\frac{5jh}{15jh^3}$  \_\_\_\_\_

15.  $\frac{12h^3k}{16h^2k^2}$  \_\_\_\_\_

16.  $\frac{20s^2t^3}{16st^5}$  \_\_\_\_\_

Find two fractions equivalent to each fraction.

17.  $\frac{1}{4}$  \_\_\_\_\_

18.  $\frac{2}{3}$  \_\_\_\_\_

19.  $\frac{3}{5}$  \_\_\_\_\_

20.  $\frac{3}{18}$  \_\_\_\_\_

21.  $\frac{8k}{16k}$  \_\_\_\_\_

22.  $\frac{3m}{8n}$  \_\_\_\_\_

23.  $\frac{5pq}{10p^2q^3}$  \_\_\_\_\_

24.  $\frac{3s^2t^2}{7r}$  \_\_\_\_\_

25. Monty completed 18 passes in 30 attempts. What fraction of his passes did Monty complete? Write in simplest form.

\_\_\_\_\_

26. Five new state quarters will be issued by the United States mint this year. What fraction of the states will have quarters issued this year?

\_\_\_\_\_

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## Reteaching 4-6 Rational Numbers

Evaluate  $\frac{a+7}{b}$ , for  $a = 9$  and  $b = -2$ . Write in simplest form.

$$\begin{aligned} \frac{a+7}{b} &= \frac{9+7}{-2} \\ &= \frac{16}{-2} \\ &= -8 \end{aligned}$$

Substitute.

Add.

Write in simplest form.

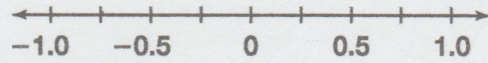
**Evaluate. Write in simplest form.**

1.  $\frac{a}{b}$ , for  $a = -12$  and  $b = 6$  \_\_\_\_\_
2.  $\frac{m-n}{-4}$ , for  $m = -5$  and  $n = 3$  \_\_\_\_\_
3.  $\frac{2x-5}{y}$ , for  $x = 6$  and  $y = 21$  \_\_\_\_\_
4.  $\frac{h}{h^2-2}$ , for  $h = 4$  \_\_\_\_\_
5.  $\frac{n}{2m-8}$ , for  $m = 2$  and  $n = 10$  \_\_\_\_\_
6.  $\frac{x}{3y+4}$ , for  $x = 4$  and  $y = 6$  \_\_\_\_\_
7.  $\frac{-r-s}{s+2}$ , for  $r = -4$  and  $s = 2$  \_\_\_\_\_
8.  $\frac{j^2-k}{k}$ , for  $j = 4$  and  $k = -12$  \_\_\_\_\_
9.  $\frac{10+f^2}{3f}$ , for  $f = 6$  \_\_\_\_\_
10.  $\frac{z+2}{z^2-4}$ , for  $z = 6$  \_\_\_\_\_
11.  $\frac{a^2+b^2}{2a+b}$ , for  $a = 4$  and  $b = -3$  \_\_\_\_\_
12.  $\frac{e}{f^2-2f+1}$ , for  $e = -6$  and  $f = 5$  \_\_\_\_\_
13.  $\frac{17-u^2}{v^2-4v}$ , for  $u = -3$  and  $v = 2$  \_\_\_\_\_
14.  $\frac{-50}{2x^2-3x+5}$ , for  $x = -1$  \_\_\_\_\_
15.  $\frac{y^3-4y+6}{y^3}$ , for  $y = -2$  \_\_\_\_\_

## Practice 4-6 Rational Numbers

Graph the rational numbers below on the same number line.

1.  $\frac{3}{4}$                       2.  $-\frac{1}{4}$                       3.  $-0.5$                       4.  $0.3$



Evaluate. Write in simplest form.

5.  $\frac{x}{y}$ , for  $x = 12, y = 21$  \_\_\_\_\_                      6.  $\frac{n}{n+p}$ , for  $n = 9, p = 6$  \_\_\_\_\_  
 7.  $\frac{k}{k^2 + 4}$ , for  $k = 6$  \_\_\_\_\_                      8.  $\frac{x-y}{-21}$ , for  $x = -2, y = 5$  \_\_\_\_\_  
 9.  $\frac{m}{n}$ , for  $m = 6, n = 7$  \_\_\_\_\_                      10.  $\frac{x(xy - 8)}{60}$ , for  $x = 3, y = 9$  \_\_\_\_\_

Write three fractions equivalent to each fraction.

11.  $\frac{5}{7}$  \_\_\_\_\_                      12.  $\frac{22}{33}$  \_\_\_\_\_  
 13.  $\frac{24}{30}$  \_\_\_\_\_                      14.  $\frac{6}{16}$  \_\_\_\_\_

15. Which of the following rational numbers are equal to  $-\frac{17}{10}$ ?  
 $-17, -1.7, -\frac{34}{20}, 0.17$  \_\_\_\_\_
16. Which of the following rational numbers are equal to  $\frac{3}{5}$ ?  
 $\frac{12}{20}, -\frac{3}{5}, 0.3, \frac{6}{10}$  \_\_\_\_\_
17. Which of the following rational numbers are equal to  $\frac{12}{15}$ ?  
 $\frac{4}{5}, \frac{40}{50}, -\frac{8}{10}, \frac{8}{10}$  \_\_\_\_\_
18. The weight  $w$  of an object in pounds is related to its distance  $d$  from the center of Earth by the equation  $w = \frac{320}{d^2}$ , where  $d$  is in thousands of miles. How much does the object weigh at sea level which is about 4,000 miles from the center of Earth?  
 \_\_\_\_\_

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## Reteaching 4-8 Exponents and Division

Simplify  $\frac{a^3}{a^3}$  and  $\frac{m^2}{m^6}$ .

To divide variables with the same non-zero base, you subtract the exponents.

$$\frac{a^3}{a^3} = a^{3-3} \quad \text{Subtract the exponents.}$$

$$= a^0 \quad \text{Simplify the exponent.}$$

However,  $\frac{a^3}{a^3} = 1$  as long as  $a$  is not zero, just like  $\frac{2}{2} = 1$ ,  $\frac{9}{9} = 1$ , and so on.

$$\text{So } \frac{a^3}{a^3} = 1 \text{ and } a^0 = 1.$$

$$\frac{m^2}{m^6} = m^{2-6} \quad \text{Subtract the exponents.}$$

$$= m^{-4} \quad \text{Simplify the exponent.}$$

$$\text{However, } \frac{m^2}{m^6} = \frac{\underset{1}{\cancel{m}} \cdot \underset{1}{\cancel{m}} \cdot \overset{1}{\cancel{m}} \cdot \overset{1}{\cancel{m}} \cdot m \cdot m}{m \cdot m \cdot m \cdot m} = \frac{1}{m^4}$$

$$\text{So, } \frac{m^2}{m^6} = \frac{1}{m^4} \text{ and } m^{-4} = \frac{1}{m^4}.$$

The *simplified* form of  $\frac{a^3}{a^3}$  is 1, and the *simplified* form of  $\frac{m^2}{m^6}$  is  $\frac{1}{m^4}$ .

**Simplify each expression.**

1.  $\frac{7^8}{7^2}$  \_\_\_\_\_

2.  $\frac{x^5}{x}$  \_\_\_\_\_

3.  $5^0$  \_\_\_\_\_

4.  $n^{-3}$  \_\_\_\_\_

5.  $x^{-2}y^4$  \_\_\_\_\_

6.  $6a^{-3}$  \_\_\_\_\_

7.  $(-4)^0$  \_\_\_\_\_

8.  $\frac{b^3}{b^8}$  \_\_\_\_\_

9.  $\frac{y^2}{y^9}$  \_\_\_\_\_

10.  $7s^{-5}t^{-3}$  \_\_\_\_\_

11.  $\frac{3^{18}}{3^3}$  \_\_\_\_\_

12.  $(-729)^0$  \_\_\_\_\_

13.  $\frac{z^7}{z^{34}}$  \_\_\_\_\_

14.  $4e^3f^{-2}$  \_\_\_\_\_

**Practice 4-8 Exponents and Division****Complete each equation.**

1.  $\frac{8^n}{8^7} = 8^2$ ,  $n =$  \_\_\_\_\_

2.  $\frac{12x^5}{4x} = 3x^n$ ,  $n =$  \_\_\_\_\_

3.  $\frac{1}{h^5} = h^n$ ,  $n =$  \_\_\_\_\_

4.  $\frac{p^n}{p^8} = p^{-6}$ ,  $n =$  \_\_\_\_\_

5.  $\frac{1}{81} = 3^n$ ,  $n =$  \_\_\_\_\_

6.  $\frac{12^4}{12^n} = 1$ ,  $n =$  \_\_\_\_\_

**Simplify each expression.**

7.  $\frac{a^3}{a^7}$  \_\_\_\_\_

8.  $\frac{j^5}{j^6}$  \_\_\_\_\_

9.  $\frac{x^7}{x^7}$  \_\_\_\_\_

10.  $\frac{k^5}{k^9}$  \_\_\_\_\_

11.  $\frac{9x^8}{12x^5}$  \_\_\_\_\_

12.  $\frac{2f^{10}}{f^5}$  \_\_\_\_\_

13.  $\frac{3y^4}{6y^{-4}}$  \_\_\_\_\_

14.  $n^{-5}$  \_\_\_\_\_

15.  $\frac{3xy^4}{9xy}$  \_\_\_\_\_

16.  $(-15)^0$  \_\_\_\_\_

17.  $\frac{15h^6k^3}{5hk^2}$  \_\_\_\_\_

18.  $4b^{-6}$  \_\_\_\_\_

**Write each expression without a fraction bar.**

19.  $\frac{a^7}{a^{10}}$  \_\_\_\_\_

20.  $\frac{4x^2y}{2x^3}$  \_\_\_\_\_

21.  $\frac{x^3y^4}{x^9y^2}$  \_\_\_\_\_

22.  $\frac{12mn}{12m^3n^5}$  \_\_\_\_\_

23.  $\frac{16s^2t^4}{8s^5t^3}$  \_\_\_\_\_

24.  $\frac{21e^4f^2}{7e^2}$  \_\_\_\_\_

25. Write three different quotients that equal  $4^{-5}$ .

\_\_\_\_\_

## Exponents and Multiplication

**Simplify. Your answer should contain only positive exponents.**

1)  $4^2 \cdot 4^2$

2)  $4 \cdot 4^2$

3)  $3^2 \cdot 3^2$

4)  $2 \cdot 2^2 \cdot 2^2$

5)  $2n^4 \cdot 5n^4$

6)  $6r \cdot 5r^2$

7)  $2n^4 \cdot 6n^4$

8)  $6k^2 \cdot k$

9)  $5b^2 \cdot 8b$

10)  $4x^2 \cdot 3x$

11)  $6x \cdot 2x^2$

12)  $6x \cdot 6x^3$

$$13) 7v^3 \cdot 10u^3v^5 \cdot 8uv^3$$

$$14) 9xy^2 \cdot 9x^5y^2$$

$$15) 6m^3n^3 \cdot 8m^2n^3$$

$$16) 6x^2 \cdot 6x^3y^4$$

$$17) 7u^2v^5 \cdot 9uv^3$$

$$18) uv \cdot 4uv^5$$

$$19) 10xy^3 \cdot 8x^5y^3$$

$$20) 3u^4v^5 \cdot 7u^2v^3$$

$$21) (2x^2)^2$$

$$22) (p^4)^4$$

$$23) (k^3)^4$$

$$24) (7k)^2$$

$$25) (x^2)^3$$

$$26) (2b^2)^4$$

## Reteaching 4-9 Scientific Notation

Write each number in scientific notation, then multiply:  $(8,600,000)(0.0042)$ .

8.6 is between 1  
and 10

$$8,600,000. = 8.6 \times 10^6$$

6 places  
to the left

4.2 is between 1  
and 10

$$0.0042 = 4.2 \times 10^{-3}$$

3 places  
to the right

$$\begin{aligned} (8.6 \times 10^6)(4.2 \times 10^{-3}) &= 8.6 \times 4.2 \times 10^6 \times 10^{-3} \\ &= 36.12 \times 10^6 \times 10^{-3} \\ &= 36.12 \times 10^3 \\ &= 3.612 \times 10^1 \times 10^3 \\ &= 3.612 \times 10^4 \end{aligned}$$

Use the commutative property of multiplication.

Multiply 8.6 and 4.2.

Add the exponents.

Write 36.12 as  $3.612 \times 10^1$ .

Add the exponents.

**Write each number in scientific notation.**

1. 745 million \_\_\_\_\_      2. 0.00034 \_\_\_\_\_  
3. 888,200,000 \_\_\_\_\_      4. 5,700 \_\_\_\_\_

**Multiply. Write your result using scientific notation.**

5.  $(1.6 \times 10^6)(3.7 \times 10^4)$  \_\_\_\_\_  
6.  $(3 \times 10^{-4})(2 \times 10^{-5})$  \_\_\_\_\_  
7.  $72,000 \times 143,000$  \_\_\_\_\_  
8.  $(2.3 \times 10^{-2})(1.5 \times 10^4)$  \_\_\_\_\_

## Practice 4-9 Scientific Notation

Write each number in standard notation.

1.  $3.77 \times 10^4$  \_\_\_\_\_      2.  $8.5 \times 10^3$  \_\_\_\_\_  
 3.  $9.002 \times 10^{-5}$  \_\_\_\_\_      4.  $1.91 \times 10^{-3}$  \_\_\_\_\_

Write each number in scientific notation.

5. Pluto is about 3,653,000,000 mi from the sun. \_\_\_\_\_  
 6. There are 63,360 in. in a mile. \_\_\_\_\_  
 7. At its closest, Mercury is about 46,000,000 km from the sun. \_\_\_\_\_  
 8. 77,250,000 \_\_\_\_\_      9. 526,000 \_\_\_\_\_  
 10. 8 billion \_\_\_\_\_      11. 8,100,000 \_\_\_\_\_  
 12. 0.00000073 \_\_\_\_\_      13. 0.000903 \_\_\_\_\_

Multiply. Express each result in scientific notation.

14.  $(2 \times 10^5)(3 \times 10^2)$  \_\_\_\_\_      15.  $(1.5 \times 10^5)(4 \times 10^9)$  \_\_\_\_\_  
 16.  $(6 \times 10^{-4})(1.2 \times 10^{-3})$  \_\_\_\_\_      17.  $(5 \times 10^3)(1.7 \times 10^{-5})$  \_\_\_\_\_

Order from least to greatest.

18.  $72 \times 10^5$ ,  $6.9 \times 10^6$ ,  $23 \times 10^5$   
 \_\_\_\_\_  
 19.  $19 \times 10^{-3}$ ,  $2.5 \times 10^{-4}$ ,  $1.89 \times 10^{-4}$   
 \_\_\_\_\_  
 20. An ounce is 0.00003125 tons. Write this number in scientific notation.  
 \_\_\_\_\_  
 21. A century is 3,153,600,000 seconds. Write this number in scientific notation.  
 \_\_\_\_\_