

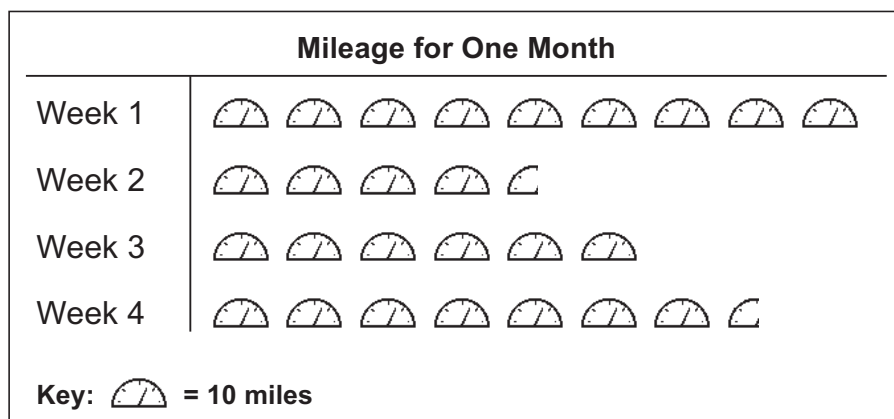
## Graphs and Statistics

### Pictographs

A pictograph is a graph which uses a symbol or picture to represent a specific number of units. Pictographs usually present information in horizontal rows. To read a pictograph, multiply the number of symbols in a row by the number of units each symbol represents. Look at the graph below. The  $4\frac{1}{2}$  symbols for Week 2 represent 45 miles, because  $4\frac{1}{2}$  times 10 equals 45.

The Smith girls keep track of their mileage for their cleaning business. The table and the graph show the mileage for one month.

Week	Miles
1	89
2	45
3	62
4	77



To draw a pictograph, follow these steps:

1. Locate the smallest and largest quantities in your data. Determine what scale to use so that the smallest number will have at least one symbol, and the largest will not have more than 15 symbols.
2. To determine the number of symbols needed for each row, divide each quantity in your data by the number you chose to represent each symbol. The whole number in the quotient is the number of symbols you will use to represent that number on the graph. If the quotient does not come out even, round to the nearest hundredth.
  - a. Drop any decimals less than 0.25. (For Week 3 above,  $62 \div 10 = 6.2$ , so only 6 symbols are needed.)
  - b. Add a half symbol for decimals that are at least 0.25, but less than 0.75. (Weeks 2 and 4 need half symbols, because  $45 \div 10 = 4.5$ , and  $77 \div 10 = 7.7$ ).
  - c. Add an additional symbol for decimals that are at least 0.75. (Week 1 above needed an extra symbol because  $89 \div 10 = 8.9$ )

3. Draw each row of symbols, keeping each row neatly aligned both horizontally and vertically in order to simplify the reading of the graph.
4. Under the graph, write the key which explains the number of items each symbol represents.
5. Write an appropriate title for the graph.

Amy enjoys baking when she volunteers to help mothers from her church. The table shows how many cookies of four different kinds Amy baked for the Musselman family one Saturday.

Draw a pictograph of the information given in the table.

△ 1.

Kind of Cookie	Number
Chocolate Chip	60
Peanut Butter	42
Sand Tarts	36
Jubilee Jumbles	30

Suggested symbol: 

 *We Remember*

Multiply. Simplify if possible.

2. a.  $\sqrt{7} \cdot \sqrt{7}$

b.  $\sqrt{3} \cdot \sqrt{7}$

c.  $\sqrt{c} \cdot \sqrt{c}$

3. a.  $\sqrt{6} \cdot \sqrt{24}$

b.  $\sqrt{3} \cdot \sqrt{10} \cdot \sqrt{2}$

c.  $\sqrt{n} \cdot \sqrt{n}$

Simplify these expressions.

4. a.  $p^{-8} \div p^{-5}$

b.  $m^5 \div m^7$

c.  $12c \cdot 4d^3$

d.  $6c^5 \cdot 12c^8$

## Lesson 9

Combine like terms.

5. a.  $-7s + 5t - 9 + 6 - 2t + 3s$

b.  $6b^2 - 2b - 8 + b^2 + 2b$

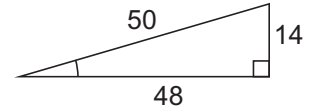
c.  $\frac{3x^2 - 2x + 4}{-6x^2 + 3x - 3}$

Write the length of each side of the triangle.

6. a. hypotenuse \_\_\_\_\_

b. opposite side \_\_\_\_\_

c. adjacent side \_\_\_\_\_



Multiply or divide in scientific notation. Give your answers in correct scientific notation.

7.  $(2.09 \times 10^{-5})(7 \times 10^{-7}) =$  \_\_\_\_\_

8.  $(1.2 \times 10^{-8}) \div (2.4 \times 10^3) =$  \_\_\_\_\_



Find the watts, volts, or amperes to the nearest tenth.

	watts	=	volts	×	amperes
9.			6		2.5
10.	60		115		
11.	9.6				0.8

Solve.

12. a.  $-6k = 2k + 24$

b.  $7t + 9 = 10t$

c.  $11x = 5x - 24$

Solve.

13. a.  $-7b = 56$

b.  $-n = 37$

c.  $-9c = -72$

d.  $\frac{5}{6}b = 30$

**Mastery Drill**

- 14. The *greater than or equal to* symbol is \_\_\_\_\_.
- 15. The formula for the Pythagorean Theorem is \_\_\_\_\_.
- 16. A negative number with an odd exponent simplifies to a \_\_\_\_\_ number.
- 17. A negative number with an even exponent simplifies to a \_\_\_\_\_ number.
- 18. Numbers in an expression that stand alone without variables are called \_\_\_\_\_.
- 19. a. 1 quart = \_\_\_\_\_ fluid ounces                      b. 1 gallon = \_\_\_\_\_ fluid ounces
- 20. a. 1 yard<sup>3</sup> = \_\_\_\_\_ feet<sup>3</sup>                                      b. 1 yard<sup>2</sup> = \_\_\_\_\_ feet<sup>2</sup>



21. Linda spent last Monday helping a young mother from her church. First thing in the morning, Linda collected all the dirty laundry and sorted it into six loads. She started the first load at 7:40 a.m. At an average of 35 minutes per load, at what time was the last load ready to hang on the line to dry?

\_\_\_\_\_

Fill in the chart to show what to say to count back change with no cash register.

Amount of purchase	1¢	5¢	10¢	25¢	\$1	\$5	Customer gave
22. \$6.08							\$6.28
23. \$0.26							\$0.50



Find the unit price to the nearest thousandth of a dollar.

24. 5 gallons for \$11.49 = \_\_\_\_\_



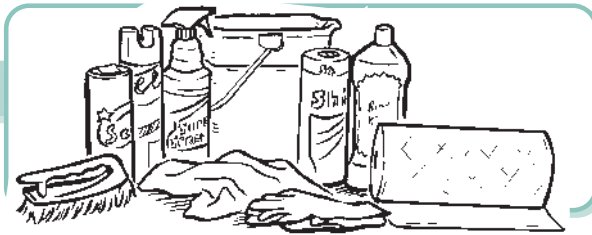
Find the unit price to the nearest tenth of a cent.

25. 300 oz for \$5.99 = \_\_\_\_\_

26. 36 oz for \$0.99 = \_\_\_\_\_



# Lesson 10



## Quiz 2

Tell your teacher when you are ready to take Quiz 2.



## Divisibility Rule for Nineteen

The multiples of 19 are 19, 38, 57, 76, 95, 114, 133, 152, 171, . . . Since 171 is the first multiple that ends with 1, multiply by 17 in step 2 to determine if the number is divisible by 19. That is somewhat cumbersome. There is a much easier rule to use.

Instead of multiplying by 17, then subtracting, multiply by 2, then add. Follow these steps to find if a number is divisible by 19.

1. Draw a line through the ones digit.
2. Multiply the ones digit by 2.
3. **Add** that doubled digit to the rest of the number.
4. Is it divisible by 19? If it has more than 2 digits, start over with Step 1. If it is a larger two digit number, you can compare it with the two-digit multiples of 19 above or just go through the steps again as in the second through fifth examples below.

$$\begin{array}{r} 36\cancel{1} \\ + 2 \\ \hline 38 \text{ yes} \end{array}$$

$$\begin{array}{r} 76\cancel{3} \\ + 6 \\ \hline 82 \\ + 4 \\ \hline 12 \text{ no} \end{array}$$

$$\begin{array}{r} 139\cancel{5} \\ + 10 \\ \hline 149 \\ + 18 \\ \hline 32 \text{ no} \end{array}$$

$$\begin{array}{r} 311\cancel{6} \\ + 12 \\ \hline 323 \\ + 6 \\ \hline 38 \text{ yes} \end{array}$$

$$\begin{array}{r} 8850\cancel{2} \\ + 4 \\ \hline 8854 \\ + 8 \\ \hline 893 \\ + 6 \\ \hline 95 \\ + 10 \\ \hline 19 \text{ yes} \end{array}$$

## Lessons 10, 11

Is the number divisible by 19? Write *yes* or *no*.

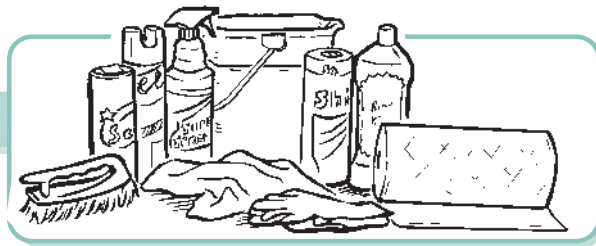
1. a. 209 \_\_\_\_\_      b. 741 \_\_\_\_\_      c. 402 \_\_\_\_\_      d. 385 \_\_\_\_\_

2. a. 1,292 \_\_\_\_\_      b. 1,244 \_\_\_\_\_      c. 4,902 \_\_\_\_\_      d. 18,753 \_\_\_\_\_

Why does this divisibility rule work? When you take off the 1 in the first example and add a two in the tens place, it is the same as subtracting 1 then adding 20, which is the same as adding 19. When the ones digit is 2, you subtract 2 and add 40 which is like adding 38, a multiple of 19. So in effect you are adding a multiple of 19 each time but dropping a digit. So you are getting a smaller number but one that is still divisible by 19.

## Lesson

# 11



## The Multiplication Principle of Counting

A craft store has two different vase styles and three different scented candles to fit inside the vases. How many different arrangements of vases and candles are possible?

Suppose we call the vases **A** and **B** and the candle scents **1**, **2**, and **3**. Note the number of arrangements that are possible.

A-1   A-2   A-3   B-1   B-2   B-3

For two vases and three candle scents  $2 \times 3$ , or 6 arrangements are possible.

Notice what happens if we add a third item to the choices.

A yellow or green bow can be tied around the vase. Now how many arrangements are possible with two vase styles (**A, B**), three candle scents (**1, 2, 3**), and two bow colors? (**G, Y**).

A-1-G   A-2-G   A-3-G   A-1-Y   A-2-Y   A-3-Y  
 B-1-G   B-2-G   B-3-G   B-1-Y   B-2-Y   B-3-Y

For two vases, three candle scents, and two bow colors,  $2 \times 3 \times 2$ , or 12 arrangements are possible.

How many different arrangements are possible using a single letter followed by a single digit?

Since there are 26 letters and 10 digits,  $26 \times 10$ , or 260 arrangements are possible.

We call this the **multiplication principle of counting**. We simply multiply the number of possibilities for each item or position.

**Solve. Use the multiplication principle of counting.** The first one is started for you.

1. How many possible arrangements could Linda make from 3 vases, 8 candle scents, and 4 bow colors?  $3 \times 8 \times 4$  = \_\_\_\_\_ possible arrangements.

To show their appreciation, an older couple took the girls from Spic and Span to Royal Buffet for dinner.

2. Royal Buffet features 3 meats, 4 starches, and 6 vegetables. How many combinations of a meat, a starch, and a vegetable are possible?

\_\_\_\_\_ = \_\_\_\_\_ possible combinations

3. Royal Buffet offers 5 kinds of pie and 6 flavors of ice cream. How many different desserts consisting of one kind of pie and one flavor of ice cream are possible?

\_\_\_\_\_ = \_\_\_\_\_ possible dessert combinations



*We Remember*

**Change to scientific notation.**

4. a.  $80,300,000 =$  \_\_\_\_\_

b.  $0.000035 =$  \_\_\_\_\_

## Lesson 11


The table shows the hours Rose worked last month.

Draw a pictograph of the information given in the table.

△ 5.

Week	Hours
1	$14\frac{1}{2}$
2	10
3	$20\frac{1}{4}$
4	23



Suggested symbol: 

Convert. Round to the nearest whole.

6. 75 L  $\approx$  \_\_\_\_\_ gal

7. 65 miles  $\approx$  \_\_\_\_\_ km

8. 150 kg  $\approx$  \_\_\_\_\_ lb

9. 72 in  $\approx$  \_\_\_\_\_ cm

Multiply. Simplify if possible.

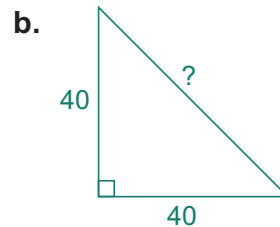
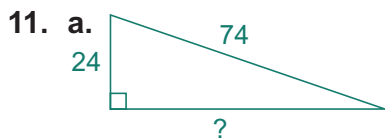
10. a.  $\sqrt{7} \cdot \sqrt{8}$

b.  $\sqrt{13} \cdot \sqrt{13}$

c.  $\sqrt{c} \cdot \sqrt{c}$



Use the Pythagorean Theorem to find the missing lengths. Round to the nearest tenth.

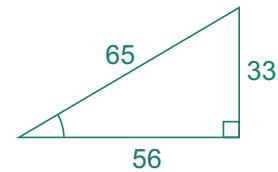


## Mastery Drill

12. Any number that can be written as a fraction is \_\_\_\_\_.
13. Any number with an exponent of \_\_\_\_\_ equals the number itself.
14. A number factor in a term used with a variable is known as a numerical \_\_\_\_\_.
15. a. 1 kilogram  $\approx$  \_\_\_\_\_ pounds                      b. 1 kilometer  $\approx$  \_\_\_\_\_ mile
16. a.  $\frac{5}{8} =$  \_\_\_\_\_%                      b.  $\sqrt{169} =$  \_\_\_\_\_                      c.  $\sqrt{144} =$  \_\_\_\_\_                      d.  $2^6 =$  \_\_\_\_\_


Write the length of each side of the triangle.

17. a. hypotenuse \_\_\_\_\_                      b. opposite side \_\_\_\_\_  
 c. adjacent side \_\_\_\_\_




Solve. Leave non-perfect squares under the radical sign.

18. a.  $10n^2 - 12 - 9n^2 = 84 \div 12$                       b.  $z^2 - 18 = 18$                       c.  $k \cdot k + 12 = 76$

-  19. Linda and Rose discussed purchasing a blower to dry wet floors quickly. A blower costs \$59.89 plus 10% for shipping and handling. What is the total cost for the blower? \_\_\_\_\_

☆ Solve the logic problem.

-  20. Amy baked 10 dozen cookies for a large family. She divided the fresh cookies into small bags containing 2 or 3 cookies each to freeze for school lunches. She made equal numbers of bags containing 2 cookies or 3 cookies. How many bags of cookies did she prepare? \_\_\_\_\_

**Lesson 11**

**+ · × Skill Builders**

21. a.  $6 \overline{) 83' 10''}$

b.  $\frac{5}{12} \div \frac{2}{3} = \underline{\hspace{2cm}}$

c.  $\frac{5}{6} \div \frac{2}{3} = \underline{\hspace{2cm}}$



Find the probability ratio. Convert to a percent rounded to the nearest tenth.



22. A bag of assorted candy contains 5 miniature chocolate bars, 5 peppermint sticks, and 8 licorice twists. If Rose reaches into the bag and selects two pieces at random for her small niece and nephew, what is the probability that she will choose a peppermint stick twice in a row?

$\underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$  or  $\underline{\hspace{1cm}}\%$

Reduce to simplest form.

23. a.  $\frac{7k^3}{21k^6} =$

b.  $\frac{32g^3h}{24g^2h^3} =$



24. In the last two weeks Linda spent these hours per day cleaning : 5, 7, 8, 6, 7, 6, 6. How many hours per day did she average? Round to the nearest tenth.  $\underline{\hspace{2cm}}$

**?... Mental Math**

25.

$$\sqrt{196} \quad -\sqrt{64} \quad \times \sqrt{25} \quad \div 10 \quad \times 3^2 \quad - 40 = \underline{\hspace{2cm}}$$



26. One morning, Edna and her three daughters helped a group of women from their church clean a house that one family had purchased. The group of 14 women and girls started at 9:00 a.m. and had the house completely cleaned by 12:15 p.m. How many man-hours did it take to clean the house? Note: a “man-hour” is one hour of labor done by one person.
- \_\_\_\_\_

**Translate into an equation and solve. Use  $n$  for the variable.**

27. Two-thirds of a number is forty-two.
- a. Equation: \_\_\_\_\_      b. Answer: \_\_\_\_\_



28. Rose discovered that using a squeegee cut her window-cleaning time on one job from  $1\frac{1}{2}$  hours to 40 minutes. The time required using the squeegee is what percent of the original time required? Round to the nearest whole percent. \_\_\_\_\_

**Solve.**

29. \$500 loaned out at 10% interest for 90 days.
- a. Amount of interest earned: \_\_\_\_\_
- b. Total principal with interest: \_\_\_\_\_

**Simplify.**

30.  $\frac{(7 \cdot 12) \div (6 \cdot 7)}{24 \div 6 + 8(9 - 4)}$

**Solve. Use the multiplication principle of counting.**

31. Rose and Amy stopped for ice cream on the way home from work. The ice cream shop features 16 flavors of hand-dipped ice cream in either a waffle cone or a regular cone. How many possible combinations were available?
- \_\_\_\_\_ = \_\_\_\_\_ possible combinations