Lesson 3   pp. 10-13

Lessons 2, 3

Write the ratios as percents.

25. a. 58 out of 100 __58%__   **b.** 18:100 __18%__   **c.** $\frac{7}{100}$ __7%__

Answer the question.

26. If 72% of the fish in a pond are bluegills, what percent are not bluegills? __28%__

3

Changing Percents to Fractions

The Studyrite Publishing Company sold 70% of the books it
displayed at the homeschool convention. What fraction was this?

To change a percent to a decimal, write it as a two-place decimal. To change it to a fraction,
write it with a denominator of 100, and reduce to simplest form.

$$70\% = 0.70 = \frac{70}{100} \qquad\qquad \frac{70}{100} \text{ reduces to } \frac{7}{10}$$

The Studyrite company sold $\frac{7}{10}$ of the books displayed.

Here is another example.

$$3\% = 0.03 = \frac{3}{100} \qquad\qquad \frac{3}{100} \text{ cannot be simplified.}$$

Write each percent as a two-place decimal.

1. a. 52% __0.52__   **b.** 80% __0.80__   **c.** 60% __0.60__

Write each decimal as a fraction with a denominator of 100.

2. a. 0.35 __$\frac{35}{100}$__   **b.** 0.50 __$\frac{50}{100}$__   **c.** 0.03 __$\frac{3}{100}$__

10

Teaching the Lesson

Changing Percents to Fractions

To change a percent to a decimal, remove the percent sign and move the "invisible" decimal point two places to the left to make a two-place decimal. To change a percent to a fraction, write it as a fraction with a denominator of 100. Reduce it to simplest form if necessary.

Board Work for this lesson is found on page 229.

☆**Optional Activity on page 11.**

Write each percent as a fraction with a denominator of 100.

3. a. 40% $\frac{40}{100}$ **b.** 29% $\frac{29}{100}$ **c.** 6% $\frac{6}{100}$

Change each percent to a fraction showing hundredths. Then reduce to simplest form.

4. a. 60% = $\frac{60}{100}$ = $\frac{3}{5}$ **b.** 2% = $\frac{2}{100}$ = $\frac{1}{50}$

✎ *We Remember*

Write the ratios as percents.

5. a. 64 out of 100 __64%__   **b.** 11:100 __11%__   **c.** $\frac{25}{100}$ __25%__

Answer the question.

6. If 99% of the students like milk, what percent do not like milk? __1%__

$$100 - 99 = 1$$

Divide. Write remainders with *R*.

7. a.
$$\begin{array}{r} 6\ R242 \\ 600\overline{)3,842} \\ 3600 \\ \hline 242 \end{array}$$
b.
$$\begin{array}{r} 8\ R342 \\ 400\overline{)3,542} \\ 3200 \\ \hline 342 \end{array}$$
c.
$$\begin{array}{r} 6\ R128 \\ 300\overline{)1,928} \\ 1800 \\ \hline 128 \end{array}$$

Find the sum without adding each number. Look for patterns. No calculators!

☆ **8.** 11 + 12 + 13 + 11 + 12 + 13 + 11 + 12 + 13 + 11 + 12 + 13 + 11 + 12 + 13 + 11 + 12 + 13 = __216__

☆**Optional Activity.**

— ?. . . *Mental Math* —

9. $\frac{1}{3}$ of 90 − 15 ÷ 3 × 9 + 10 ÷ 11 = __5__

11

Board Work

➔ Change to decimals:

36%	75%	81%	99%	57%	44%	12%	4%	6%	2%
0.36	**0.75**	**0.81**	**0.99**	**0.57**	**0.44**	**0.12**	**0.04**	**0.06**	**0.02**

➔ Change to fractions in simplest form:

0.25	0.42	0.55	0.6	0.83	0.28	0.93
$\frac{1}{4}$	**$\frac{21}{50}$**	**$\frac{11}{20}$**	**$\frac{3}{5}$**	**$\frac{83}{100}$**	**$\frac{7}{25}$**	**$\frac{93}{100}$**

Lesson 3

— $+ \; \bar{} \; \times$ S*kill* B*uilders* —

$\frac{1}{2} = \frac{7}{14}$

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

10. a. $+ \; 2\frac{2}{7} = \frac{4}{14}$

$\qquad 4\frac{19}{14} = 5\frac{5}{14}$

$6\frac{3}{4} = \frac{9}{12}$

$8\frac{5}{6} = \frac{10}{12}$

b. $+ \; 2\frac{1}{3} = \frac{4}{12}$

$\qquad 16\frac{23}{12} = 17\frac{11}{12}$

```
  7 3
  1 9
  6 2
  8 7
  5 9
```
c. $+ \; 7\,6$

$\quad$ 3 7 6

11. a.
```
  0.1 4
× 0.4
-------
  0.056
```

b. $7\overset{11}{\cancel{8}}\overset{\cancel{2}}{9} = \frac{11}{9}$

$\quad - \; 3\frac{2}{3} = \frac{6}{9}$

$\qquad\qquad 4\frac{5}{9}$

Round to the
nearest hundredth.

c.
```
      0.0 5 8  ≈ .06
4 7 ) 2.7 5 0
      2 3 5
      -------
        4 0 0
        3 7 6
        -------
          2 4
```

⟫⟫ —— M*astery* D*rill* —— ◎

12. a. 1 millennium = __1,000__ years   **b.** 1 decade = __10__ years

13. a. 1 century = __100__ years   **b.** 1 kilometer = __1,000__ meters

14. a. 3^2 = __9__   **b.** 6^2 = __36__   **c.** 11^2 = __121__   **d.** 14^2 = __196__

15. An equilateral triangle has __3__ congruent sides.

16. A scalene triangle has __0__ congruent sides.

17. An isosceles triangle has __2__ congruent sides.

Answer the question.

18. What is the volume of a drawer 10 inches long,
8 inches wide, and 3 inches deep?

$\underline{\qquad\qquad 240 \; inches^3 \qquad\qquad}$

```
  10        80
×  8      ×  3
----      ----
  80       240
```

12

Teacher Notes:

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**19.** Six mobile homes on half-acre lots are for rent at the following costs per month: $650, $625, $590, $615, $625, and $642. What is the average cost of renting these mobile homes? Round to the nearest dollar. _____ $625.00 _____

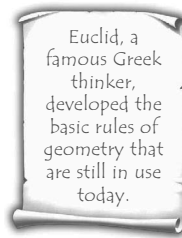(650 + 625 + 590 + 615 + 625 + 642) ÷ 6 = 624.50

20. Randy's new home is near Big Whaley Lake, shown below. Estimate the area of the lake, if each square in the picture measures 1 mi². Hint: Put parts of the squares together in your mind to count the squares that are not whole.

_____ 15 OR 16 mi² _____
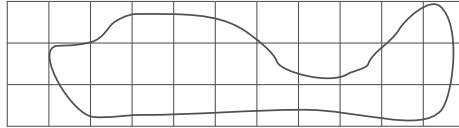
Match the words and expressions.

21. __c__ six minus two times four   **a.** 6(2)

22. __a__ six times two   **b.** 6n

23. __b__ six times a number   **c.** 6 − 2 • 4

24. __d__ six times four   **d.** 6 × 4

> Euclid, a famous Greek thinker, developed the basic rules of geometry that are still in use today.

Write the formulas without using multiplication symbols.

25. Area of a square __$A = s^2$__

26. Circumference of a circle __$C = \pi d$__

27. Area of a triangle __$A = \frac{1}{2} bh$__

28. Area of a rectangle __$A = lw$__

Change each percent to a fraction showing hundredths. Then reduce to simplest form.

29. **a.** 76% = __$\frac{76}{100}$__ = __$\frac{19}{25}$__   **b.** 90% = __$\frac{90}{100}$__ = __$\frac{9}{10}$__

30. **a.** 34% = __$\frac{34}{100}$__ = __$\frac{17}{50}$__   **b.** 8% = __$\frac{8}{100}$__ = __$\frac{2}{25}$__

13

Teacher Notes:

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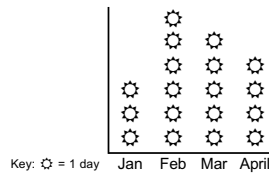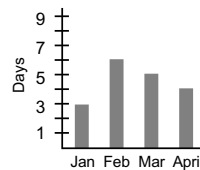**Lesson 4 pp. 14-19**

4
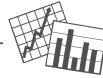
— Graphs and Statistics —

Choosing Suitable Graphs

Graphs are one of the ways to show collected information (called *statistics*) in an organized form.
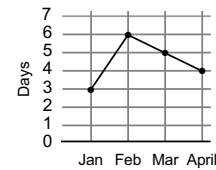
You have learned to recognize, use, and create three different kinds of graphs: pictographs, bar graphs, and line graphs.

pictograph   bar graph   line graph

These three graphs show the same basic information. Usually, however, there is a reason to choose a particular kind of graph for a particular kind of information.

Pictographs work best to display information that can be easily shown with a picture or symbol. It is hard to show exact values with pictures, especially if the numbers are large. But a pictograph can show small numbers of items, or rounded numbers. This pictograph shows information gathered about a small number of students (21 students.)

Class Survey: Favorite Breakfast Foods	
Cereal	♀ ♀ ♀
Toast	♀
Eggs	♀ ♀
Pancakes	♀ ♀ ♀ ♀ ♀
♀ represents 2 students	

14

Teaching the Lesson

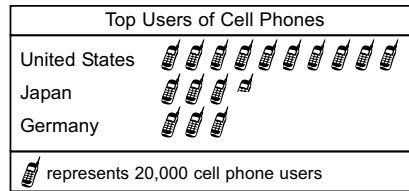### Graphs and Statistics: Choosing Suitable Graphs

This lesson explains the reasons for choosing particular kinds of graphs for particular kinds of data. Students will be tested on this knowledge. You may use the oral quiz under "Helpful Hints" below to help them retain the facts. However, encourage them to also use logical thinking when doing the review exercises for this graph increment. There may be more than one correct answer for some situations. Give credit to students for using good thinking skills if they can supply logical reasons for answers that differ from the answer key.

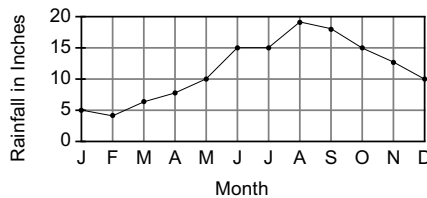△ **Teacher Aide Checks on page 19.**

☆ **Optional Activity on page 19.**

Lesson 4

This pictograph uses large numbers that are rounded.

Top Users of Cell Phones
United States 📱📱📱📱📱📱📱📱📱
Japan 📱📱📱📱
Germany 📱📱📱
📱 represents 20,000 cell phone users

Bar graphs show comparisons. They can be vertical or horizontal. They are usually more exact than pictographs. The following bar graphs compare the lengths of rivers (rivers run horizontally, so the bars are horizontal) and the heights of mountains (mountains are vertical, so the bars are vertical).

African Rivers

Length in miles

North American Peaks

Height in Feet
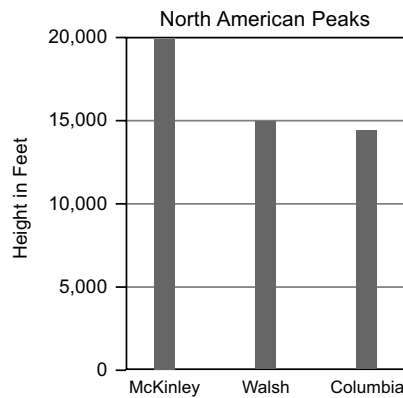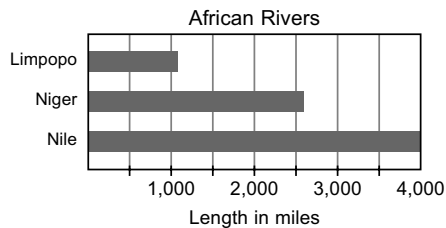
Line graphs are most often used to show a relationship between the numbers. They involve information (**data**) that changes. For instance, a line graph might show the rainfall changes from month to month in a tropical country with a rainy season and a dry season.

Rainfall in Inches

Month

15

➜ Have students tell whether a vertical bar graph or a horizontal bar graph would be best for each set of data:

1. Comparison of 5 tall buildings
   vertical bar graph

2. Comparison of the lengths of 3 major roads
   horizontal bar graph

233

Lesson 4

Or a line graph might show how the temperature changes each hour of a summer day, from cool at 2 a.m. to warmer after sunrise, to hot at noon, to cool again after sunset.

Temperatures on July 22

Time
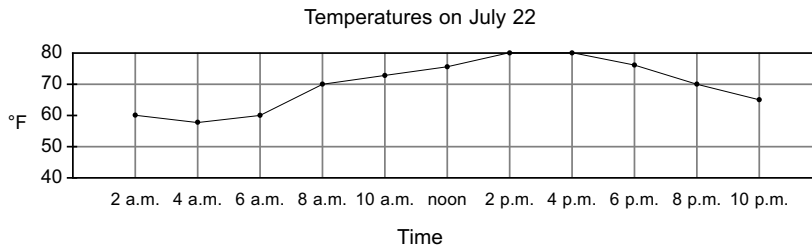
Match the kind of data with the best kind of graph to display it.
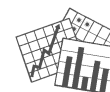
1. __b__ comparisons of heights, distances, and measurements

2. __a__ data for a small number of items or for large rounded numbers

3. __c__ a relationship between numbers

a. pictograph

b. bar graph

c. line graph

✏️ *We Remember*

Change each percent to a fraction showing hundredths. Then reduce to simplest form.

4. a. 5% = $\frac{5}{100}$ = $\frac{1}{20}$ b. 65% = $\frac{65}{100}$ = $\frac{13}{20}$

5. a. 84% = $\frac{84}{100}$ = $\frac{21}{25}$ b. 75% = $\frac{75}{100}$ = $\frac{3}{4}$

Divide mentally.

6. a. $600\overline{)18,000}$ = 30   b. $8,000\overline{)64,000}$ = 8   c. $60\overline{)360}$ = 6

16

Teacher Notes:

Lesson 4

— $+ \overset{-}{\div}$ **×** $\mathcal{S}\textit{kill } \mathcal{B}\textit{uilders}$ —

7. a. $\frac{1}{8} \times \frac{1}{2} \times \frac{1}{2} = \underline{\ \ \frac{1}{8}\ \ }$

b. $5\frac{1}{3} \times 4\frac{1}{2} \times 2\frac{2}{3} = \underline{\ \ 64\ \ }$

$\frac{16}{3} \times \frac{8}{2} \times \frac{8}{3} = \frac{8}{3} = 64$

c.
```
      2 8.3
    × 2 9.8
      2264
     25470
     56600
    843.34
```

Divide. Round each quotient to the nearest . . .

...tenth.

8. a.
```
        2.60  ≈ 2.6
   37)96.48
      74
      224
      222
       28
        0
       28
```

...hundredth.

b.
```
        2.084  ≈ 2.08
   43)89.630
      86
      363
      344
      190
      172
       18
```

...thousandth.

c.
```
        1.7246  ≈ 1.725
   28)48.2900
      28
      202
      196
       69
       56
      130
      112
      180
      168
       12
```

Use the commutative properties to finish the equations.

9. a. $o + n = \underline{\ \ n + o\ \ }$ **b.** $a \cdot 45 = \underline{\ \ 45 \cdot a\ \ }$ **c.** $7 \times \underline{\ 9\ } = 9 \times \underline{\ 7\ }$

Use the associative properties to finish the equations.

10. a. $(p + q) + r = \underline{\ \ p + (q + r)\ \ }$ **b.** $(7 \times 1) \times 5 = \underline{\ \ 7 \times (1 \times 5)\ \ }$

Write the ratios as percents.

11. a. 75 out of 100 $\underline{\ \ 75\%\ \ }$ **b.** 6:100 $\underline{\ \ 6\%\ \ }$ **c.** $\frac{40}{100}$ $\underline{\ \ 40\%\ \ }$

Answer the question.

12. If 35% of the people are believers, what percent are unbelievers? $\underline{\ \ 65\%\ \ }$

$100 - 35 = 65$

17

Teacher Notes:

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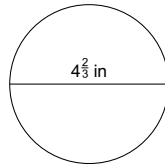
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Lesson 4

Complete the sentence.

13. The figure is a trapezoid because

___ It has only one pair of parallel sides ___.
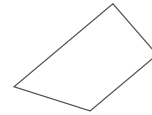
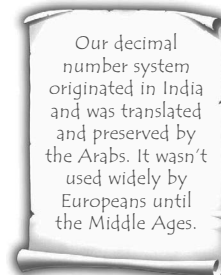**Use the formula to find the circumference. Use $\frac{22}{7}$ for pi.**

$4\frac{2}{3}$ in

$C = \pi\, d$

$C = \frac{22}{7} \times 4\frac{2}{3}$

$C = \frac{22}{\cancel{7}^1} \times \frac{\cancel{14}^2}{3}$

$C = \frac{44}{3}$

$C = 14\frac{2}{3}$

> *Our decimal number system originated in India and was translated and preserved by the Arabs. It wasn't used widely by Europeans until the Middle Ages.*

14. ___ $14\frac{2}{3}$ in ___

Match the words and expressions.

15. _b_ eight divided by two, times seven   **a.** $4n$

16. _a_ four times a number   **b.** $8 \div 2 \times 7$

17. _d_ three times two   **c.** $7 \cdot 3$

18. _c_ seven times three   **d.** 3×2

Write the formulas without using multiplication symbols.

19. Area of a rectangle ___ $A = lw$ ___

20. Area of a triangle ___ $A = \frac{1}{2} bh$ ___

21. Circumference of a circle ___ $C = \pi d$ ___

22. Area of a square ___ $A = s^2$ ___

Rewrite each decimal as a fraction or mixed number with a denominator of 10, 100, or 1,000. Reduce to simplest form.

23. **a.** $4.15 = \underline{4\frac{15}{100}} = \underline{4\frac{3}{20}}$ **b.** $7.5 = \underline{7\frac{5}{10}} = \underline{7\frac{1}{2}}$ **c.** $0.05 = \underline{\frac{5}{100}} = \underline{\frac{1}{20}}$

18

Teacher Notes:

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Lesson 4

➤➤ ——— M*astery* D*rill* ——— ➤

24. a. The fraction we use for π is ___22/7___ .   **b.** A straight angle measures ___180___°.

25. An obtuse angle measures between ___90___° and ___180___°.

26. An acute angle measures between ___0___° and ___90___°.

27. A scalene triangle has ___0___ congruent sides.

28. An equilateral triangle has ___3___ congruent sides.

29. An isosceles triangle has ___2___ congruent sides.

30. 1 millennium = ___1,000___ years

31. 1 century = ___100___ years

32. 1 decade = ___10___ years

Complete the pattern.

☆ **33.** 119, ___102___ , ___85___ , ___68___ , ___51___ , 34, 17, 0   Subtract 17 from each number to complete the pattern. Work backwards if that's easier.

Round to the nearest dollar.

34. a. $32.56 ___$33.00___   **b.** $6.50 ___$7.00___   **c.** $23.65 ___$24.00___

Substitute 7 for *a* and 1 for *b*. Simplify the expressions.

35. a. 9 – *b* × *a*   **b.** (*b* + 13) ÷ *a*   **c.** *a* × 4   **d.** *a* × *b*

    9 – 1 × 7   (1 + 13) ÷ 7   7 × 4   7 × 1

    9 – 7   14 ÷ 7   28   7

    2   2

If you were constructing a pictograph, what symbol might you use to show the following?
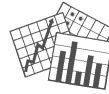
△ **36.** Prices of various kinds of fruits ___Answers will vary. Example: coins or dollar bills___

△ **37.** Number of people in several cities ___Answers will vary. Example: stick figures of people___

△ **38.** Number of trees logged in various states ___Answers will vary. Example: trees___

19

☆**Optional Activity.**

△**Teacher Aide Checks:** (Nos. 36-38) Make sure students' answers make sense. The Answer Key gives suggested answers.

Teacher Notes:

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Lesson Preparation

• Quiz 1 for each student

○**Teacher Check.**

When student is ready for the quiz, initial circle and administer quiz.

➔ **Assign Quiz 1.**
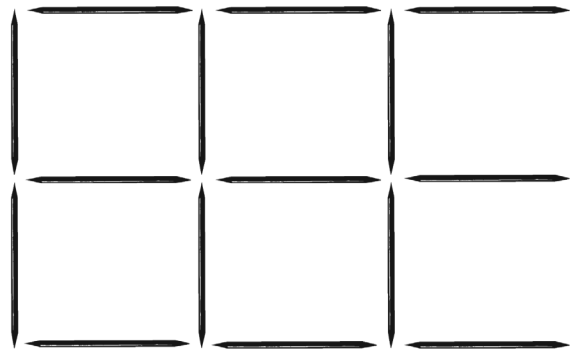
➔ **Fascinating Discoveries: Toothpick Puzzles**

5

Quiz 1

○ **Tell your teacher when you are ready to take Quiz 1.**
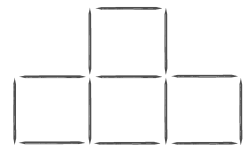
Fascinating Discoveries

Toothpick Puzzles

Arrange 17 toothpicks like this.

Other possible arrangements.

1. Remove 4 toothpicks to leave only 4 squares.

2. Set up the toothpicks again like before. Now remove 4 toothpicks to leave only 3 squares.

20

Teaching the Lesson

Toothpick Puzzles

   This optional activity encourages logical thinking.

○**Teacher Check on page 20.**