

• Writing Quotients with Mixed Numbers

Power Up

facts

Power Up G

mental math

- Estimation:** Round $18\frac{5}{8}$ in. to the nearest inch.
- Estimation:** Round $12\frac{3}{8}$ in. to the nearest inch.
- Estimation:** Round $4\frac{1}{16}$ in. to the nearest inch.
- Number Sense:** How much is $800 \div 10$? ... $800 \div 20$? ... $800 \div 40$?
- Percent:** 50% of 800
- Number Sense:** $3\frac{1}{2} + 3\frac{1}{2}$
- Measurement:** One pound equals 16 ounces. Vanessa bought $1\frac{1}{2}$ pounds of bananas. How many ounces did the bananas weigh?
- Fractional Parts:** Myra spends $\frac{1}{3}$ of each 24-hour day sleeping. How many hours does Myra sleep each day?

problem solving

Choose an appropriate problem-solving strategy to solve this problem. Audra purchased two books at the school book fair: a mystery novel and a science fiction novel. The length of the mystery novel was 192 pages, and the length of the science fiction novel was 128 pages. Audra read 32 pages each day. Assuming she finished one book before starting the other, how much longer did it take Audra to read the mystery novel than the science fiction novel?

New Concept

As we saw in Lessons 40 and 43, we sometimes need to write a division answer as a mixed number. In the problem on the next page, we do this by writing the remainder as a fraction.

If two children share 5 dumplings equally, how many dumplings will each receive?

We divide 5 into 2 equal parts. We find that the quotient is 2 and the remainder is 1; each child will receive 2 dumplings, and there will be 1 extra dumpling. We can take the extra dumpling and divide it in half. Then each child will receive $2\frac{1}{2}$ dumplings.

$$\begin{array}{r} 2\frac{1}{2} \\ 2 \overline{)5} \\ \underline{4} \\ 1 \end{array}$$

To write a remainder as a fraction, we simply make the remainder the numerator of the fraction and make the divisor the denominator of the fraction.

Connect If two people share \$5.00 equally, what amount of money will each person receive?

Example 1

Divide: $3 \overline{)50}$. Write the quotient as a mixed number.

We divide and find that the remainder is 2. We make the remainder the numerator of the fraction, and we make the divisor the denominator of the fraction. The quotient is $16\frac{2}{3}$.

$$\begin{array}{r} 16\frac{2}{3} \\ 3 \overline{)50} \\ \underline{3} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

Example 2

A 15-foot-long board is cut into 4 equal lengths. How long is each length?

We divide 15 feet by 4 and find that the quotient is not a whole number of feet. The quotient is more than 3 feet but less than 4 feet; it is 3 feet plus a fraction. To find the fraction, we write the remainder as the numerator of the fraction and write the divisor as the denominator of the fraction. We find that the length of each piece of wood is $3\frac{3}{4}$ feet.

$$\begin{array}{r} 3\frac{3}{4} \\ 4 \overline{)15} \\ \underline{12} \\ 3 \end{array}$$

Analyze How many inches long is each of the four boards? Explain your thinking.

Example 3

A group of four friends collected aluminum cans and received \$21 from a recycling center for the cans. Each friend received an equal share of the money. Which quotient represents the number of dollars each friend received?

$$\begin{array}{r} 5 \text{ R } 1 \\ 4 \overline{)21} \\ - 20 \\ \hline 1 \end{array} \qquad \begin{array}{r} 5\frac{1}{4} \\ 4 \overline{)21} \\ - 20 \\ \hline 1 \end{array}$$

Since we can divide \$21 into four equal parts, each friend received $5\frac{1}{4}$ dollars.

Connect How do we express $5\frac{1}{4}$ dollars as dollars and cents?

In the lesson practice that follows, we will continue to write quotients with remainders, unless a problem asks that the answer be written with a fraction.

Lesson Practice

Divide. Write each quotient as a mixed number.

a. $4 \overline{)17}$

b. $20 \div 3$

c. $\frac{16}{5}$

d. $5 \overline{)49}$

e. $21 \div 4$

f. $\frac{49}{10}$

g. $6 \overline{)77}$

h. $43 \div 10$

i. $\frac{31}{8}$

Written Practice

Distributed and Integrated

- (49) Cesar bought 8 baseball cards for 35 cents each. If he paid with a \$5 bill, how much should he have received in change?
- (21, 58) Davu bought a 21-inch ribbon. She cut it into 4 equal lengths. How long was each ribbon? Write the answer as a mixed number.
- (Inv. 3, 46) **Represent** Draw a diagram to illustrate and solve this problem:
T'Leesha used $\frac{3}{5}$ of a sheet of stamps to mail cards. If there are 100 stamps in a whole sheet, then how many stamps did T'Leesha use? What percent of the stamps did T'Leesha use?
- (33) Round 1776 to the nearest hundred.

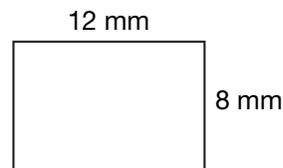
***5. Multiple Choice** In which of these numbers does the 5 have a value of 500,000?

(52)

- A** 186,542,039 **B** 347,820,516 **C** 584,371,269 **D** 231,465,987

6. What is the perimeter of this rectangle?

(53)



7. $30 \overline{)640}$

(54)

8. $40 \overline{)922}$

(54)

9. $50w = 800$

(26, 54)

10. $1400 + m = 7200$

(10)

11. $\$1.25 \times 80$

(29)

12. $700 \div 10$

(54)

***13.**
$$\begin{array}{r} 679 \\ \times 489 \\ \hline \end{array}$$

(55)

14.
$$\begin{array}{r} 8104 \\ - 5647 \\ \hline \end{array}$$

(9)

15.
$$\begin{array}{r} \$2.86 \\ \$6.35 \\ \$1.78 \\ \$0.46 \\ + \$0.62 \\ \hline \end{array}$$

(13)

16.
$$\frac{4228}{7}$$

(34)

17.
$$\frac{4635}{9}$$

(26)

18.
$$\frac{5}{5} - \frac{1}{5}$$

(41)

19.
$$3\frac{1}{3} - \frac{1}{3}$$

(43)

20.
$$4\frac{6}{6} - 2\frac{5}{6}$$

(41)

21. Divide: $3 \overline{)62}$. Write the quotient as a mixed number.

(58)

22. What is the denominator of the fraction in $6\frac{3}{4}$?

(Inv. 2)

23. In a division problem, if the divisor is 3 and the quotient is 9, then what is the dividend?

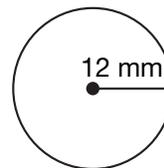
(20)

24. What year was five centuries before 1500?

(28, 35)

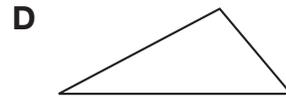
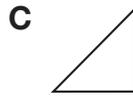
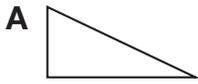
25. If the radius of this circle is 12 millimeters, then what is the diameter of the circle?

(53)

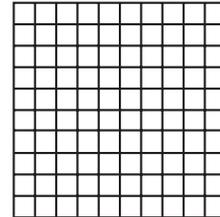


- *26. **Predict** (57) There are 2 red marbles, 3 blue marbles, and 6 yellow marbles in a bag. If Maureen takes one marble from the bag without looking, what is the probability that the marble will be red?

27. **Multiple Choice** (36) Which of these triangles appears to be both a right triangle and an isosceles triangle?



28. **Analyze** (Inv. 2) The large square has been divided into 100 smaller squares. How many small squares equal $\frac{3}{4}$ of the large square?



29. **Represent** (52) China has the largest population of all the countries in the world. In the year 2002, there were approximately one billion, two hundred eighty-four million, two hundred four thousand people living in China. Use digits to write the approximate number of people living in China.

30. **Explain** (49) Sharell bought 2 gallons of milk. She also bought a box of cereal that cost \$3.48. If she paid for the 3 items with a \$10 bill and received \$0.32 in change, then what was the price of each gallon of milk? Explain how you found your answer.

Early Finishers

Real-World Connection

The school choir is having a car wash to raise \$750 to buy new songbooks. Each car wash will cost \$3.50.

- If they wash 228 cars, how much money will they raise?
- Is this more than or less than their goal?
- Explain how you found the answer to part **a**.