

• Dividing by Multiples of 10

Power Up

facts

mental math

problem solving

Power Up G

- Money:** $\$1.00 - \0.33
- Number Sense:** $7\frac{1}{2} + 1\frac{1}{2}$
- Money:** What coin equals 50% of 50¢?
- Money:** What coin equals 10% of 50¢?
- Measurement:** 4 feet 2 inches is how many inches?
- Geometry:** Each side of the square is $1\frac{1}{2}$ inches long. What is the perimeter of the square?
- Measurement:** The temperature reached a high of 82°F . Then it dropped to a low of 68°F . What was the difference between the high and low?
- Calculation:** $6 \times 6, -1, \div 5, \times 2, + 1, \div 3, \times 2$

Choose an appropriate problem-solving strategy to solve this problem. Carlos planted thirty-six carrots in his garden. He arranged the carrots into a square array of rows and columns. How many carrots are in each row?

New Concept

Reading Math

We use four steps for long division:

- Divide
- Multiply
- Subtract
- Bring down

In this lesson we will begin to divide by two-digit numbers that are multiples of 10. Multiples of 10 are the numbers 10, 20, 30, 40, 50, and so on. In later lessons we will practice dividing by other two-digit numbers.

We will continue to follow the four steps of the division algorithm: divide, multiply, subtract, and bring down. The divide step is more difficult when dividing by two-digit numbers because we may not quickly recall two-digit multiplication facts. To help us divide by a two-digit number, we may think of dividing by the first digit only.

To help us divide this: $30 \overline{)75}$
 ... we may think this: $3 \overline{)7}$

We use the answer to the easier division for the answer to the more difficult division. Since $3 \overline{)7}$ is 2, we use 2 in the division answer. We complete the division by doing the multiplication and subtraction steps.

$$\begin{array}{r} 2 \text{ R } 15 \\ 30 \overline{)75} \\ \underline{60} \\ 15 \end{array}$$

Notice where we placed the 2 above the box. Since we are dividing 75 by 30, we place the 2 above the 5 of 75 and not above the 7.

$$\begin{array}{r} 2 \\ 30 \overline{)75} \end{array}$$

The 2 above the 5 means there are two 30s in 75. This is the correct place.

It is important to place the digits in the quotient properly.

Example 1

The staff arranged 454 chairs in the school gymnasium. Each row of the arrangement contained 30 chairs, except the last row. How many complete rows of chairs are in the arrangement? How many chairs are in the last row?

We follow the four steps: divide, multiply, subtract, and bring down. We begin by finding $30 \overline{)45}$. If we are unsure of the answer, we may think " $3 \overline{)4}$ " to help us with the division step. We divide and write "1" above the 5 of 454. Then we multiply, subtract, and bring down. Since we brought down a digit, we divide again. This time we divide 154 by 30. To help us divide, we may mentally remove the last digit from each number and think " $3 \overline{)15}$." We write "5" above the box, and then multiply and subtract. The answer to the division is 15 R 4. This quotient means there are **15 rows** of 30 chairs and one row of **4 chairs**.

$$\begin{array}{r} 15 \text{ R } 4 \\ 30 \overline{)454} \\ \underline{30} \\ 154 \\ \underline{150} \\ 4 \end{array}$$

Thinking Skill

Connect

Why do we write a 1 above the tens place in the quotient?

Recall that we check a division answer by multiplying the quotient by the divisor and then adding any remainder. The result should equal the dividend.

$$\begin{array}{r} 15 \\ \times 30 \\ \hline 450 \\ + 4 \\ \hline 454 \end{array}$$

Example 2

Mr. Gibson has a small grove of 18 young orange trees that produced 782 pounds of oranges this year. Estimate the average number of pounds of oranges produced by each tree.

Round 18 trees up to 20 and 782 pounds up to 800 pounds and divide. We find that on average, each tree produced **about 40 pounds** of oranges.

Example 3

Taryn bought 20 bread rolls for \$4.60. What was the cost for each roll?

When dividing money by a whole number, we place the decimal point in the quotient directly above the decimal point in the dividend. Then we ignore the decimal points and divide just as we would divide whole numbers. By adding a zero before the decimal point, we get an answer of **\$0.23 for each roll.**

$$\begin{array}{r} \$.23 \\ 20 \overline{) \$4.60} \\ \underline{40} \\ 60 \\ \underline{60} \\ 0 \end{array}$$

Justify Explain why the answer is reasonable.

Lesson Practice

Divide:

a. $30 \overline{) \$4.20}$

b. $60 \overline{) 725}$

c. $40 \overline{) \$4.80}$

d. $20 \overline{) \$3.20}$

e. $50 \overline{) 610}$

f. $10 \overline{) 345}$


g. Show how to check this division answer. Is the answer correct?

$$\begin{array}{r} 23 \text{ R } 5 \\ 40 \overline{) 925} \end{array}$$

h. Quan bought 18 eggs at the supermarket for \$4.60. Estimate the cost per egg. Show how you found your answer.

Written Practice

Distributed and Integrated

1.  **Justify** Camilla went to the store with \$5.25. She bought a box of cereal for \$3.18 and a half gallon of milk for \$1.02. How much money did Camilla have left? Explain why your answer is reasonable.

2. Round 1236 to the nearest ten.

***3. Represent** (46) A yard is 36 inches. How many inches is $\frac{2}{3}$ of a yard? Draw a diagram to illustrate the problem.

***4. Multiple Choice** (52) The 7 in 987,654,321 means which of the following?

- A 700 B 7,000,000 C 700,000 D 7000

5. Represent (Inv. 2, 37) Draw two circles. Shade $\frac{1}{2}$ of one and $\frac{2}{4}$ of the other. What percent of a circle is $\frac{2}{4}$ of a circle?

- 6. a.** How many cents is $\frac{1}{4}$ of a dollar?
(Inv. 2)
b. How many cents is $\frac{2}{4}$ of a dollar?

***7. Represent** (52) Use words to name the number 3,150,000,000.

8. List (25) Which factors of 9 are also factors of 12?

9. $30 \overline{)454}$
(54)

10. $40 \overline{)\$5.60}$
(54)

11. $50 \overline{)760}$
(54)

12. 500×400
(29)

13. 563×46
(51)

14. $68 \times \$4.32$
(51)

15. $25\frac{1}{4} + 8\frac{2}{4}$
(41)

16. $36\frac{2}{3} - 17\frac{2}{3}$
(41)

17. $2947 \div 8$
(26)

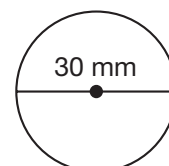
18. $7564 \div (90 \div 10)$
(34, 54)

19. $\begin{array}{r} 12,345 \\ - 6,789 \\ \hline \end{array}$
(9)

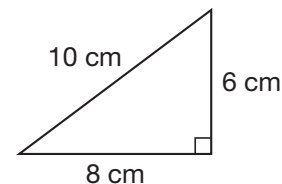
20. $\begin{array}{r} \$3.65 \\ \$2.47 \\ \$4.83 \\ + \$2.79 \\ \hline \end{array}$
(13)

21. (21) Thirty-six children were seated at tables with four children at each table. How many tables with children were there?

22. (53) If the diameter of this circle is 30 millimeters, then what is the radius of the circle?



23. What is the perimeter of this right triangle?
(53)



- *24. Use a ruler to find the length of this rectangle in inches:
(44)



25. What year was five decades after 1896, the year the first modern olympics were held in Athens, Greece?
(28, 35)

26. **Analyze** Irina wants to multiply 150 by 12. She thinks of 12 as $10 + 2$. Using the Distributive Property, show two ways Irina can multiply the numbers. What is the product?
(51)

27. Here is a sequence of numbers we say when counting by sixes:
(1, 42)

6, 12, 18, 24, 30, ...

Here is the same sequence in a function table:

Position of Term	1	2	3	4	5
Term	6	12	18	24	30

- a. Write a rule that describes how to find a term if you know its position.
- b. What number is the twentieth term of the sequence?
28. Sergio earns \$14 an hour for working up to 8 hours a day, and \$21 an hour for every hour he works beyond 8 hours. How much does Sergio earn for a day he works 11 hours?
(49)
- *29. **Conclude** Could a triangle with sides 8 cm, 6 cm, and 8 cm long be a scalene triangle? Why or why not?
(36)
30. **Estimate** What is a reasonable estimate for the quotient of $776 \div 38$? Explain your answer.
(54)