• Relationship Between Multiplication and Division

Power Up

facts   Power Up C

count aloud   Count up and down by 5s between 2 and 52 (2, 7, 12, 17, …).

mental math

  a. Number Sense: $2 \times 5 \times 6$

  b. Number Sense: $6 \times 5 \times 3$

  c. Number Sense: 6×30 plus 6×2

  d. Number Sense: 4×60 plus 4×5

  e. Measurement: 1000 mm $- 800$ mm

  f. Number Sense: Claudia scored 640 points while playing a video game. Then she scored 24 more points. How many points total did she score?

  g. Money: Jazmyn had $5.00. She spent $0.50. How much did Jazmyn have left?

  h. Number Sense: $9 \times 9 - 1 + 10 + 10$

problem solving   Choose an appropriate problem-solving strategy to solve this problem. For breakfast, lunch, and dinner, Bethany ate soup and eggs and chicken, one for each meal, but not necessarily in that order. List all the possible arrangements of meals Bethany could have eaten. If Bethany never eats eggs for lunch, how many arrangements of meals are possible?

Searching for a missing factor is called **division.** A division problem is like a miniature multiplication table. The product is shown inside a symbol called a *division box* ($\overline{)}$). The two factors are outside the box. One factor is in front, and the other is on top. In the problem below, the factor on top is missing.

$$3\overline{)12}^{\,?}$$

To solve this problem, we need to know what number times 3 equals 12. Since $3 \times 4 = 12$, we know that the missing factor is 4. We write our answer this way:

$$3\overline{)12}^{\,4}$$

Example 1

What is the missing number in this problem? $\quad 4\overline{)20}^{\,?}$

To find the missing number, we think, "Four times what number equals 20?" We find that the missing number is 5, which we write above the division box:

$$4\overline{)20}^{\,5}$$

The missing number is **5.**

Example 2

To play a game during physical education class, 18 students must separate into 3 equal teams. What number of students will be on each team?

We need to find the missing number that goes above the box. We think, "Three times what number equals 18?" We remember that $3 \times 6 = 18$, so the answer to the division problem is 6.

$$3\overline{)18}^{\,6}$$

There will be **6 students** on each team.

Thinking Skills

Connect

Name the factors and the product.

Example 3

An art teacher plans to distribute 80 sheets of construction paper equally to each of 10 students. How many sheets of construction paper should each student receive?

We think, "How many 10s make 80?" Since $8 \times 10 = 80$, the answer is 8.

$$10\overline{)80}^{\,8}$$

Each student should receive **8 sheets.**

Thinking Skills

Connect

Why can we write a fact family using multiplication and division?

Multiplication and division are inverse operations. One operation undoes the other. If we start with 5 and multiply by 6, we get a product of 30. If we then divide 30 by 6, the result is 5, which is the number we started with. The division by 6 undid the multiplication by 6. Using the Commutative Property and inverse operations, we find that the three numbers that form a multiplication fact also form division facts.

Example 4

Write two multiplication facts and two division facts for the fact family 5, 6, and 30.

$$\begin{array}{r} 6 \\ \times\,5 \\ \hline 30 \end{array} \qquad \begin{array}{r} 5 \\ \times\,6 \\ \hline 30 \end{array} \qquad 5\overline{)30}^{\,6} \qquad 6\overline{)30}^{\,5}$$

Lesson

Find the missing number in each division fact:

a. $2\overline{)16}$ **b.** $4\overline{)24}$ **c.** $6\overline{)30}$ **d.** $8\overline{)56}$

e. $3\overline{)21}$ **f.** $10\overline{)30}$ **g.** $8\overline{)56}$ **h.** $9\overline{)36}$

i. **Connect** Write two multiplication facts and two division facts for the fact family 3, 8, and 24.

Written Practice

Distributed and Integrated

Formulate For problems **1** and **2,** write an equation and find the answer.

*1. The $45 dress was marked down to $29. By how many dollars had the
(16)   dress been marked down?

2. Room 15 collected 243 aluminum cans. Room 16 collected 487 cans.
(11) Room 17 collected 608 cans. How many cans did the three rooms collect in all?

3. There are 5 rows of desks with 6 desks in each row. How many
(11, 13) desks are there in all? Find the answer once by adding and again by multiplying.

*4. **Represent** Use words to name $4,587.20.
(5, 7)

5. **Connect** For the fact family 7, 8, and 56, write two multiplication
(19) facts and two division facts.

6. $3\overline{)24}$ **7.** $6\overline{)18}$ **8.** $4\overline{)32}$ **9.** $10\overline{)40}$
(19)   *(19)*   *(19)*   *(19)*

10. $4.83   **11.**   659   **12.** $706   **13.** $9m = 54$
(17) $\times\;\;\;\;7$ *(17)* $\times\;\;\;8$ *(17)* $\times\;\;\;\;4$ *(18)*

14. $8 \times 10 \times 7$ **15.** $9 \times 8 \times 5$
(18)   *(18)*

16. $65.40   **17.**   4000   **18.** r
(13) $-\;$19.18   *(14)* $-\;\;\;\;\;t$ *(14)* $-\;1915$
                          1357   269

19.   907   **20.** $3.67   **21.**   427
(6)   415   *(13)* $4.25   *(10)* $+\;\;\;\;k$
   $+\;653$ $+\;$7.40   813

22. $356 + l + 67 = 500$ **23.** $86 + w = 250$
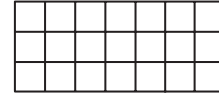*(10)*   *(10)*

**24.** Find the missing factor: $6 \times 6 = 4n$
(18)

*25. **Represent** Use digits and symbols to write this comparison:
(4, 15)   *Eight times six is less than seven times seven.*

26. **Explain** Dequon cut a 15-inch-long piece of wood in half. How
(2) long was each half? Explain your answer.

27. Write a multiplication fact that shows how many
squares cover this rectangle.
(13)

28. Write a three-factor multiplication fact that shows how many
blocks form this figure.
(18)
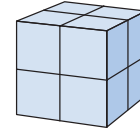
29. **Analyze** The Mississippi River begins in Minnesota. From there it
(7) flows 2340 miles to the Gulf of Mexico. The Missouri River is
2315 miles long and begins in Montana. The Colorado River is the
longest river in the U.S. west of the Rocky Mountains. It starts in
the Rocky Mountains and flows 1450 miles to the Gulf of California.
Write the names of the three rivers in order from shortest to
longest.

30. Write and solve a subtraction word problem that uses data from this
(Inv. 1) table:

Large Meteor Craters

Location	Diameter (miles)
Sudbury, Canada	125
Vredefort, South Africa	87
Popigai, Russia	62

Early Finishers

Real-World Connection

Four students earned a total of $136 doing various jobs. They had one
hundred dollar bill, 3 ten dollar bills, and 6 one dollar bills. How can the
students divide the money equally? Use your money manipulatives to
solve the problem.