LESSON 16

• Word Problems About Separating

Power Up

facts

Power Up C

mental math

a. **Multiplication:** 3 × 5

b. **Multiplication:** 3 × 50

c. **Multiplication:** 3 × 500

d. **Multiplication:** 5 × 6

e. **Multiplication:** 5 × 60

f. **Multiplication:** 5 × 600

g. **Money:** Carlos had $3.75. He spent $2.50 on popcorn and a drink. How much money did Carlos have left?

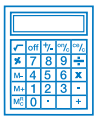
h. **Number Sense:** 20 + 15 − 5 + 10 + 4

problem solving

Choose an appropriate problem-solving strategy to solve this problem. Copy this addition problem and fill in the missing digits:

$$\begin{array}{r} \_6\_ \\ +\ 37\_ \\ \hline \_248 \end{array}$$

New Concept



Visit www.SaxonMath.com/Int5Activities for a calculator activity.

Problems about combining have an addition formula. In this lesson we will consider problems about separating. Problems about separating have a subtraction formula.

Here are two ways to write the formula for problems about separating:

$$\begin{array}{r} \text{Some} \\ -\ \text{Some went away} \\ \hline \text{What is left} \end{array}$$

Some − Some went away = What is left

Example 1

Cullen had $28. After he spent $12, how much money did Cullen have?

Reading Math

We translate the problem using a subtraction pattern.

Cullen had $28.

Cullen spent $12.

Cullen had *l* dollars left.

Cullen had some money ($28). Then he spent some of his money ($12), so some went away. He still had some money left. We write the equation using a subtraction formula.

$$s - a = l$$

$$\$28 - \$12 = l$$

To find what is left, we subtract.

$$\begin{array}{r} \$28 \\ -\ \$12 \\ \hline \$16 \end{array}$$

Then we check to see if our answer is reasonable and our arithmetic is correct. The answer is reasonable because Cullen has less money than he started with. We can check the arithmetic by "adding up."

$$\begin{array}{r} \$28 \\ -\ \$12 \\ \hline \$16 \end{array} \quad \uparrow$$

Add Up

$16 plus $12 is $28.

The answer is correct.

After spending $12, Cullen had **$16** left.

Example 2

After losing 234 pounds, Jumbo the elephant still weighed 4368 pounds. How much did Jumbo weigh before he lost the weight?

We translate the problem using a "some went away" pattern.

Before, Jumbo weighed . . .	*w* pounds
Then Jumbo lost . . .	− 234 pounds
Jumbo still weighed . . .	4368 pounds

To find the first number of a subtraction problem, we add.

$$\begin{array}{r} {\scriptstyle 11} \\ 4368 \text{ pounds} \\ +\ \ 234 \text{ pounds} \\ \hline 4602 \text{ pounds} \end{array}$$

Now we check the answer.

Justify Is it reasonable? Why or why not?

Is the arithmetic correct? We can check the arithmetic by using the answer in the original equation.

$$\begin{array}{rcr} w & \longrightarrow & {}^{5}4\,{}^{9}\cancel{6}\,{}^{1}\cancel{0}\,2 \\ -\ 234 & & -\ \ 2\,3\,4 \\ \hline 4368 & & 4\,3\,6\,8 \end{array}$$ This is correct.

Before losing weight, Jumbo weighed **4602 pounds.**

Example 3

Four hundred runners started the race, but some runners dropped out along the way. If 287 runners finished the race, then how many runners dropped out of the race?

We translate the problem using a "some went away" formula.

400 runners started.	400 runners
Some dropped out.	$-$ d runners
287 runners finished.	287 runners

We find the missing number by subtracting.

$$\begin{array}{r} {}^{3}\cancel{4}\,{}^{9}\cancel{0}\,{}^{1}0 \text{ runners} \\ -\ 2\,8\,7 \text{ runners} \\ \hline 1\,1\,3 \text{ runners} \end{array}$$

Justify Is the answer reasonable? Why or why not?

We check the arithmetic as follows:

$$\begin{array}{rcr} 400 & & {}^{3}\cancel{4}\,{}^{9}\cancel{0}\,{}^{1}0 \\ -\ \ d & \longrightarrow & -\ 1\,1\,3 \\ \hline 287 & & 2\,8\,7 \end{array}$$ This is correct.

There were **113 runners** who dropped out of the race.

Lesson Practice

Formulate In problems **a–c,** write an equation for the word problem. Then answer the question.

a. Five hundred runners started the race. Only 293 finished the race. How many runners dropped out of the race?

b. After paying $85 rent, Kaamil still had $326. How much money did Kaamil have before he paid the rent?

c. The 26 members of the hiking club split into two groups. Fourteen members hiked into the mountains, while the rest hiked down to the river. How many members hiked down to the river?

d. **Formulate** For the following equation, write a word problem about separating. Then answer the question in your problem.

$$\$20 - \$12 = I$$

Written Practice

Distributed and Integrated

1. (11) The price went up from $26 to $32. By how many dollars did the price increase? Write an equation and find the missing number.

***2.** (12) **Represent** Use tally marks to show the number 15.

3. (5) **Represent** Use words to name $205.50.

***4.** (8) **Connect** For the fact family 6, 8, and 14, write two addition facts and two subtraction facts.

Formulate For problems **5–7,** write an equation and find the answer.

5. (11) School officials estimated that 400 people attended an afternoon performance of a school play and 600 people attended the evening performance. What is a reasonable estimate of the total attendance for those performances?

6. (16) The custodian put away 24 chairs, leaving 52 chairs in the room. How many chairs were in the room before the custodian put some away? Use a subtraction formula to solve the problem.

7. (16) Azura had $24. She spent $8. How much money did Azura have left?

8. (15) 3×7

9. (15) 6×7

10. (15) 3×8

11. (15) 7×10

12. (14)
$$\begin{array}{r} b \\ -\ 256 \\ \hline 56 \end{array}$$

13. (14)
$$\begin{array}{r} 900 \\ -\ c \\ \hline 90 \end{array}$$

14. (13)
$$\begin{array}{r} \$4.18 \\ -\ \$2.88 \\ \hline \end{array}$$

15. (9)
$$\begin{array}{r} \$406 \\ -\ \$278 \\ \hline \end{array}$$

16. (6)
$$\begin{array}{r} \$357 \\ \$946 \\ +\ \$130 \\ \hline \end{array}$$

17. (10)
$$\begin{array}{r} g \\ +\ 843 \\ \hline 1000 \end{array}$$

18. (6)
$$\begin{array}{r} 365 \\ 52 \\ +\ 548 \\ \hline \end{array}$$

19. (13)
$$\begin{array}{r} \$3.15 \\ \$2.87 \\ +\ \$1.98 \\ \hline \end{array}$$

*20. (2, 15) **Verify** Think of two one-digit odd numbers. Multiply them. Is the product odd or even? Explain how you know.

*21. (12) **Multiple Choice** Which of these is a horizontal line?

A 

B

C

D 

22. (4) **Represent** Use digits and a comparison symbol to write this comparison:

Eight hundred forty is greater than eight hundred fourteen.

23. (1) **Connect** What number is missing in this counting sequence?

…, 24, 30, 36, ____, 48, 54, …

24. (4, 15) Compare: $4 \times 3 \bigcirc 2 \times 6$

25. (10) **Multiple Choice** The letter *y* stands for what number in this equation?

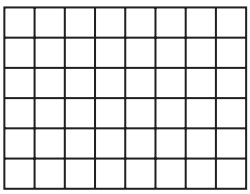
$$36 + y = 63$$

A 24 **B** 32 **C** 99 **D** 27

26. (12) What word is used to describe a line that goes straight up and down?

27. (2) How many cents is half a dollar? How many cents is half of half a dollar?

28. (13) Write a multiplication problem that shows how to find the number of small squares in this rectangle.



*29. (16) **Formulate** Josefina had $32. She spent $15. Use this information to write a word problem about separating. Then answer the question in your problem.

*30. (11) **Formulate** Nine students completed a science project early, fifteen students completed the project on time, and two students completed the project late. Use this information to write a word problem about combining. Then answer the question in your problem.

Real-World Connection

A museum has $9000 in their budget to spend on artwork. The museum bought a painting for $5675 and a statue for $1859. How much more can the museum spend on artwork?