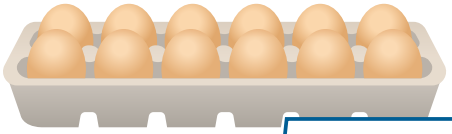
Essential Question

How Can You Model and Solve Multi-Step Problems?

A

Chef Angela needs 8 cartons of eggs to make the cakes that are ordered. She has 2 cartons of eggs and 4 single eggs in the refrigerator. How many more eggs does she need to make all of the cakes?



A carton has 12 eggs.

Multi-step problems can often be solved in more than one way.

The chef estimates she needs about 6 cartons or about $6 \times 12 = 72$ more eggs.

B One Way

How many eggs does the chef have?

$(2 \times 12) + 4 = 24 + 4$

$= 28$ eggs

How many more eggs does the chef need?

N = number of additional eggs needed

$N = (8 \times 12) - 28$

$= 96 - 28$

$= 68$

The expression 8×12 is how many eggs the chef needs in all.

The chef needs 68 more eggs.

Since 68 is close to 72, the answer is reasonable.

C Another Way

How many full cartons should the chef buy?

$8 - 2 = 6$ full cartons

How many more eggs does the chef need?

N = number of additional eggs needed

$N = (6 \times 12) - 4$

$= 72 - 4$

$= 68$

The expression 6×12 is the number of eggs in 6 cartons.

The chef needs 68 more eggs.

Since 68 is a close to 72, the answer is reasonable.

Convince Me! **Model with Math** Draw bar diagrams to represent a solution to the problem above.

Name _____

Guided Practice

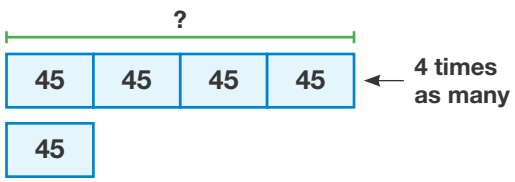
Do You Understand?

1. Explain the meaning of the expression $(2 \times 12) + 4$ in the problem on the previous page.

2. In the problem on the previous page, how many eggs will the chef have left over? Explain.

Do You Know How?

3. Carrie's stamp book has 20 pages and each page can hold 15 stamps. She has 45 international stamps. She has 4 times as many U.S. stamps. Can all her stamps fit in her book? Use the bar diagram below to help solve this problem. Draw other bar diagrams as needed. Show the equations used to solve this problem.



Independent Practice

For **4–5**, draw bar diagrams, and write equations to solve each problem. Use variables to represent unknown quantities and tell what each variable represents.

4. Five toymakers each carved 28 blocks and 17 airplanes. Three other toymakers each carved the same number of airplanes and twice as many blocks. How many toys did the eight carve in all?

5. Kendra is using 27 blue patches and some white patches to make a quilt. The quilt has a total area of 540 square inches. Each patch has an area of 9 square inches. How much of the area of the quilt is white?

Problem Solving

6. Make Sense and Persevere A ticket to a movie for a student is $7. The cost for an adult is $2 more than for a student. How much would it cost 5 adults and 29 students for tickets to the movie?

7. Vocabulary Give an example of an expression. Then give an example of an equation.

8. Higher Order Thinking Cody and Max both solve the problem below correctly. Explain how each solve.

Emma has $79 to spend at the toy store. She wants to buy a building set, a board game, and 2 action figures from her favorite movie. What else can she buy?

DATA

Toy Shop	
Toy	**Cost**
Building Set	$32
Board Game	$19
Stuffed Toy	$15
Doll	$12
Action Figure	$8

Cody

$79 - 32 = 47$
$47 - 19 = 28$
$2 \times 8 = 16$
$28 - 16 = 12$

Emma can buy a doll or another action figure.

Max

L = the money Emma has left.
$L = 79 - (32 + 19 + 16)$
$L = 79 - 67$
$L = 12$

She can buy a doll or action figure.

Assessment Practice

9. A company has 2 geothermal plants which can power a total of 2,034 homes. After they build 3 additional, more powerful, geothermal plants, they can power a total of 5,799 homes. How many homes does each of the new plants power? Explain how you solve. Use one or more equations and bar diagrams in your explanation. Tell what your variables represent.