Illustrative Mathematics

3.OA Analyzing Word Problems Involving Multiplication

Alignment 1: 3.OA.A.3

Many problems can be solved in different ways. Decide if the following word problems can be solved using multiplication. Explain your thinking.

a. Liam is cooking potatoes. The recipe says you need 5 minutes for every pound you are cooking. How many minutes will it take for Liam to cook 12 pounds of potatoes?

b. Mel is designing cards. She has 4 different colors of paper and 7 different pictures she can glue on the paper. How many different cards can she make with one color of paper and one picture?

c. Nina can practice a song 6 times in an hour. If she wants to practice the song 30 times before the recital, how many hours does she need to practice?

d. Owen is building a rectangular tile patio that is 4 tiles wide and 6 tiles long. How many tiles does he need?

Commentary:
Research indicates that students often do not make sense of word problems. Instead, to come up with an answer, they just apply the most recent algorithm taught, chose operations based on the types of numbers involved, or apply other approaches that do not require sense making. In this task, the students are not asked to find an answer, but are asked to analyze the problems and explain their thinking. In the process, they are faced with varying ways of thinking about multiplication.

Solution: 1

a. While you can solve this by repeated addition (5+5+5+….), this problem can also be solved by multiplication since adding 5 together 12 times is the same as 12×5.

b. This can be solved by multiplication, because for each of the four colors, there are seven different pictures from which to choose, so 7 pictures on the first color + seven pictures on the second color + 7 pictures on the third color + 7 pictures on the fourth color gives four groups of seven or 4×7.

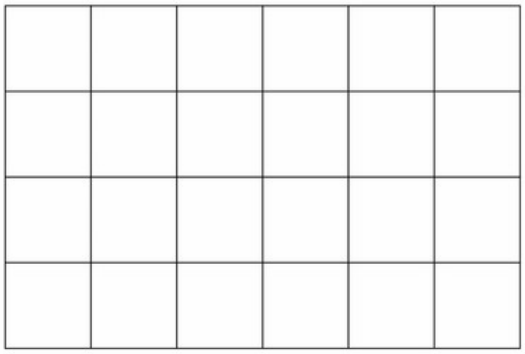
c. This is a division problem since the number of hours needed can be determined by counting the number of groups of six needed to make 30, or

$$30 \div 6 = ?$$

On the other hand, we can think about this in terms of multiplication by asking what times six equals 30, which we can write symbolically as

$$? \times 6 = 30$$

d. It is a good idea to draw a picture:



We can count the number of tiles one by one, or we can see that there are four rows, each with six tiles, so we can think of it as a multiplication problem 4×6.