

## Are These All $214 \times 32$ ?

We know that the product of  $214 \times 32$  tells us the total number of items when there are 214 groups of 32.

Explain why each of the following problems may be solved by  $214 \times 32$ .

### PROBLEM A

Mr. Sims' home garden is rectangular shaped. It is 214 feet long and 32 feet wide. What is the area of Mr. Sims' garden?

### PROBLEM B

At JC's elementary school, there are 214 fourth graders and 32 teachers. They have to select one student and one teacher to represent his school at the city's July 4<sup>th</sup> festival planning committee. How many different student-teacher pairs are possible?

### PROBLEM C

LT can walk 214 feet in one minute. If he walked at this speed for 32 minutes, how far did he walk?

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### ***Discussion, Suggestions, Possible Solutions***

*Since when students are first introduced to multiplication in Grade 2, they have looked at multiplication is the operation that can be used to determine the total number of items when there are so many equal sized groups. Thus, one of the factors of a multiplication sentence is the multiplicand – or the number of items in a group – while the other factor is the multiplier – the number of groups.*

*There are, however, other situations where multiplication may be used. The three problems in this task come from such situations. In Problem (A), the product will be the area of the rectangular field while the two factors will be the dimensions of the rectangle. In Problem (B), the product is the total number of pairs one can make by selecting an element from one set and an element from a second set. This type of multiplication situation is sometimes called Cartesian product. Problem (C) involves a rate.*

*Problems (A) and (C) provide useful interpretations of multiplication when multiplier becomes a decimal number or fractions.*

*Although decimal or fraction multiplier is not studied in Grade 4, this task lays the groundwork toward expanding the meaning of multiplication.*

*Problem (A) may be considered as multiplication because the area of a rectangle is determined by the total number of unit squares necessary to cover the rectangle. When you measure the length of a rectangle, you are determining the number of unit squares that will fit along that dimension. Then, when we measure the width, we are determining the number of rows of unit squares that can fit in the rectangle. Thus, we do have an equal group situation, and the multiplication is the appropriate operation.*

*In Problem (B), you can see that for each teacher, there are 214 possible student partners. Since there are 32 teachers, we have 32 sets of 214 possible pairs, or  $214 \times 32$ .*

*Finally, in Problem (C), the total distance traveled by the train will equal to 32 sets of 214 feet, the distance LT will walk in one minute. Thus, it is also an equal group situation and multiplication is the appropriate operation.*

*Extension:*

*Have students come up with different word problems for a given multiplication statement.*