

Two interpretations of division

Task

- a. Maria cuts 12 feet of ribbon into 3 equal pieces so she can share it with her two sisters. How long is each piece?
- b. Maria has 12 feet of ribbon and wants to wrap some gifts. Each gift needs 3 feet of ribbon. How many gifts can she wrap using the ribbon?



Commentary

Both of the questions are solved by the division problem $12 \div 3$ but what happens to the ribbon is different in each case. In the first case, the number of pieces of ribbon is fixed at 3 and the question is asking "how long is each piece?" (12 feet divided into 3 pieces gives 4 feet per piece.) In the second question, the size of each piece is fixed and the question is "how many pieces does one get?" (12 feet divided by 3 feet per gift gives 4 gifts.) The problem can be solved with a drawing of a tape diagram or number line. For problem 1, the line must be divided into 3 equal parts. The second problem can be solved by successive subtraction of 3 feet to see how many times it fits in 12.

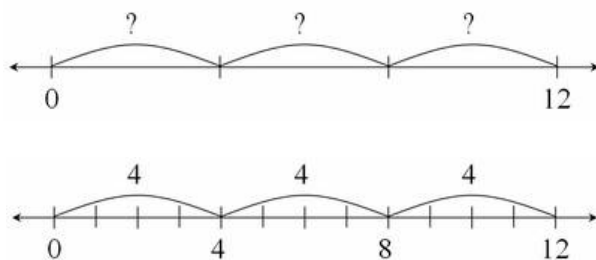
In this case it is particularly helpful for the teacher to require students to justify their answers with a diagram. The way in which a student represents the problem can reveal whether or not he or she really understands the distinction between the two types of division problems shown here.

Solutions

Solution: Number Line

- a. This question asks, "how long is each piece?" so is a "How many in each group?" division problem:

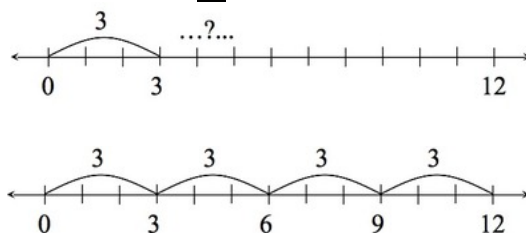
$$3 \times \boxed{?} = 12$$



$12 \div 3 = 4$, so each child gets a piece of ribbon that is 4 feet long.

- b. This question asks, "how many pieces does one get?" so is a "How many groups?" division problem:

$$\boxed{?} \times 3 = 12$$

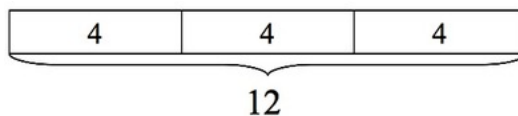
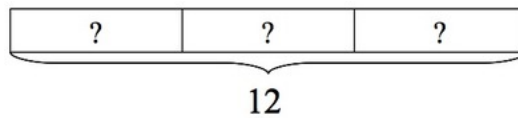


$12 \div 3 = 4$, so Maria can wrap 4 gifts.

Solution: Tape Diagram

- a. This question asks, "how long is each piece?" so is a "How many in each group?" division problem:

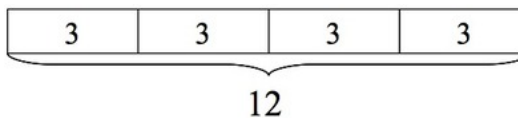
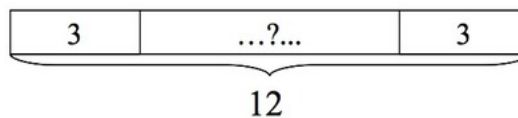
$$3 \times \boxed{?} = 12$$



$12 \div 3 = 4$, so each child gets a piece of ribbon that is 4 feet long.

- b. This question asks, "how many pieces does one get?" so is a "How many groups?" division problem:

$$\boxed{?} \times 3 = 12$$



$12 \div 3 = 4$, so Maria can wrap 4 gifts.