

Chapter 1 Problems

1) In a warehouse you obtain 20% discount but you must pay a 15% sales tax. Which would you prefer to have calculated first, discount or tax?

2) Imagine a long thin strip of paper stretched out in front of you, left to right. Imagine taking both ends in your hands and placing the right hand end on top of the left. Now press the strip flat so that it is folded in half and has a crease. Repeat the whole operation on the new strip two more times. How many creases are there? How many creases will there be if the operation is repeated 10 times in total?

3) Find the following product:

$$(x - a)(x - b)(x - c)(x - d)(x - e) \cdots (x - y)(x - z)$$

4) A ten-volume encyclopedia stands on the shelf as shown. Each volume is two inches thick. Suppose a bookworm starts at the front cover of Volume 1 and eats his way in a straight horizontal line through the back cover of Volume 10. How far does the worm travel?



5) Check this out:

$$1 \cdot 1 = 1$$

$$11 \cdot 11 = 121$$

$$111 \cdot 111 = 12321$$

$$1111 \cdot 1111 = 1234321$$

What is happening here? Does it always happen?

6) A number like 12321 is called a palindrome because it reads the same backwards as forwards. A friend of mine claims that all palindromes with four digits are exactly divisible by eleven. Is this true?