

**Topic: Computation and Estimation**

VA SOL (2008) 3.8 The student will solve problems involving the sum or difference of two whole numbers, each 9,999 or less, with or without regrouping, using various computational methods, including calculators, paper and pencil, mental computation, and estimation.

**Harry’s Book**

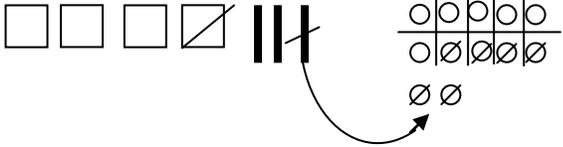
Harry is reading a chapter book that has 432 pages. He has already read 116 pages. How many pages does he have left to read?

**Expected Heuristics:** Use base ten block drawings (proof drawing) or Common US method of subtraction

**Answer:** Harry has 316 pages left to read.

**Possible Solution:**

Looking at the problem we can find out quickly that the problem involves subtraction because of two key words “have left”. To find out how many pages there are left to read we must subtract the number of pages Harry has read from the total number of pages in the book. Harry has read 116 pages and the book is 432 pages long. Therefore, we must subtract 116 from 432 to find out how many pages Harry has left to read.

Total # of pages 432      

# of pages read -116

The diagram shows four hundreds blocks, three tens blocks, and two ones blocks. One ten block is crossed out with a diagonal line. An arrow points from the crossed-out ten block to a base ten block drawing of 116, which consists of one ten block and six ones blocks.

$$316 = \# \text{ of pages left to read after reading 116 pages}$$

We start in the ones and since we know we can’t subtract 6 from 2 we ungroup a ten and add ten ones to the ones, leaving us with 12 ones and 2 tens. We then subtract 6 from 12 and get 6 ones. We then subtract 1 ten from 2 tens to get 1 ten. Finally, we subtract 1 from 4 hundreds to get 3 hundreds.

Additionally, we can find the number of pages Harry has left to read by subtracting using the Common US subtraction method. We subtract 116 pages from the total number of pages in the book (432) to find out how many pages Harry has left to read.

$$\begin{array}{r} 212 \\ \cancel{432} \text{ (# of total pages in book)} \\ -116 \text{ (# of pages Harry read)} \\ \hline 316 \text{ (# of pages Harry has left to read)} \end{array}$$

We start in the ones place and since we can't subtract 6 from 2 we must regroup a ten to create ten ones. We cross out the three in the tens and make it a 2 and then we add ten ones to the 2 in the ones place to get 12 ones. After regrouping we therefore have 12 ones and 2 tens. Subtract 6 from 12 and we get 6. Subtract 1 from 2 in the tens place to get 1 and 1 from 4 in the hundreds places to get 3. The answer is 316, the number of pages Harry has left to read.

Citation: My CT created a list of problems for the students to categorize as addition or subtraction and then solve, and I chose one of the problems to write up.