Problem

a) Suppose you have to place the house numbers from 1 to 100 on a row of 100 new homes. How many 3’s would you have to buy in order to do all the numbering?

b) For what digit(s) other than 3 is the answer the same as in a)? Explain your reasoning.

c) The remaining digits are required a different number of times. How many would you have to buy of each of these digits?

d) What is the total number of digits you have to buy for all the houses?
Hints

Part a)

*Suggestion:* Supply students with a 1-100 hundreds chart.

**Hint 1** - How many 3s are there from 1 to 10? How many 2s?

**Hint 2** - For what numbers does 3 occur as a units digit? A tens digit?

Part b)

**Hint 1** - Is the total number of 3s the same as the total number of 2s?

Part c)

**Hint 1** - What number occurs only once as a tens digit?
Solution

a) The digit 3 occurs 10 times as a tens digit (30 - 39), and 10 times as a units digit (3, 13, 23, \ldots, 93), giving a total of 20 times.

b) The answer is the same for the digits 2, 4, 5, \ldots, 9, for the same reasons.

c) The digits 0 and 1 give different answers. There are 11 occurrences of 0 (10, 20, \ldots, 90, 100), and 21 occurrences for 1 (20 as above, plus an extra in 100).

d) The total number of digits is thus $8 \times 20 + 11 + 21 = 192$. 