Numbers and Numerals

LEARNING OBJECTIVES

1. Define *number*.
2. Define *numeral*.
3. Apply the rules for the use of Roman numerals to convert an Arabic numeral to a Roman numeral, and a Roman numeral to an Arabic numeral.
4. List an example of an integer, whole number, fraction, and decimal fraction.
5. Name the place value of the three digits to the left and the right of the decimal point.

Introduction

We use math every time we get change back from a cashier, calculate our gas mileage, or figure out if we have enough money to buy all the groceries we need. People who work in pharmacy must be especially confident in their understanding of numbers, basic math operations, and problem solving using basic algebra. In pharmacy, we must calculate doses, convert from one measuring system to another, and weigh and measure accurately in order to prepare safe and effective medications for patients.

People uncomfortable with mathematics may finish high school feeling relieved that they will never have to take another math class. However, if we who work in pharmacy do not develop our pharmacy math skills and practice them, we put patients' lives at risk. Because an understanding of numbers, number systems, and basic mathematical functions are the underpinnings for every math operation we perform in pharmacy, the first chapters in this text are devoted to a review of these concepts.

Numbers and Numerals

What is a number?

Humans have been counting since prehistoric days, as evidenced by scratch marks left on pre-historic artifacts. Even some animals have "number sense," the intuitive understanding of the relationship between numbers and things. The concept of "number" is one of the most basic concepts in science and mathematics. Yet the notion of number is difficult to define, because it is abstract. A number has no meaning except when it is used to count or measure a member of a group of similar things. For example, you can say you went to the grocery store for 10 apples, or a pound of fruit, and be understood. But if you say you went to the grocery store for 10, and don't define the purchase, the person you are speaking

Number—A label for counting or measuring objects or members of a set.

to is going to be confused. For the purposes of this text we will use the following definition of number:

> **TECH NOTE!**
>
> ***A number is a label for counting or measuring things that are members of a definable set.***

So, how does this apply to our use of numbers in pharmacy? What this means is that we must always be aware of what we are counting or measuring. In pharmacy, a number alone, without information about what units are attached, is worse than useless, it is dangerous.

EXAMPLE

Nurse Watters, a new nurse, received the following order for Betsy Ross:

7/15	Give Lasix 20 IVP x 1 now
	James Chalmers, M.D.

She wondered whether she should fill the order with 20 mg or 20mL. How should Nurse Watters proceed?

SOLUTION

When a confusing or incomplete order is received, a nurse or pharmacist must call to clarify it. In this case, Nurse Watters proceeded to draw 20 mL of Lasix into a syringe and gave it to Betsy. When Mrs. Ross became ill, Nurse Watters' error became apparent. The usual dose of Lasix is 20 mg, not 20 mL (200 mg).

If we understand and apply the rules of mathematics when we work with numbers, errors are prevented. In the case of Nurse Watters we see that if she had been aware of the importance of units, she would have checked with the physician instead of making an invalid assumption, and would have avoided the resulting overdose.

Mathematics is a system for conveying information about numbers, in a simple and effective way. When the rules of math are consistently followed, the results of problems will be accurate. Mathematics communicates information in a way that transcends language barriers. Of all the specialized tools and equipment used in pharmacy, a working mastery of basic mathematics may be the most important.

NUMBERS AT WORK
In the pharmacy as in every area of life, a number is meaningless without defining to what it relates. Units of measurement must always accompany a number to avoid dosing errors.