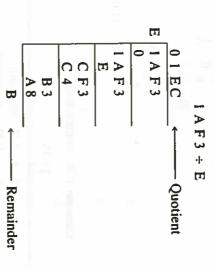
$$A \times F = 150 = 96$$

 $4 \times F = 60 = 3C$
 $E \times F = 210 = D2$
 $1 \times F = 15 = 0F$
 $1 \times F = 15 = 0F$

Example 1.30: Division



Representation of Negative Numbers

digit, is included in the representation, along with the magnitude digits. accommodate the sign of the number, an additional digit, called the sign a digital system must represent both positive and negative numbers. To have been used: the sign-magnitude system and the complement system Typically, the sign digit is the MSD. Two popular representation schemes The examples shown so far have used only positive numbers. In practice, Thus, to represent an n-digit number, we would need n + 1 digits.

1.5.1 Sign-Magnitude System

numbers, where r is the radix of the number system. Some sample representations follow. In this representation, n + 1 digits are used to represent a number, where The value of the sign digit is 0 for positive numbers and r-1 for negative the MSD is the sign digit and the remaining n digits are magnitude digits.

Example 1.31

number The sign and magnitude portions of the number are sepathe actual representation. Here, we assume that five digits are available to represent each rated by a ";" for illustration purposes only. The ";" is not used in

	(-1F) ₁₆	(+IF) ₁₆	$(-56)_{8}$	$(+56)_{8}$	$(-2)_{2}$	Number
Sign Magnitude	F,001F	0,001F	7,0056	0,0056	1,0010	Kepresentation
	All numbers are shown as five-digit numbers.					

arithmetic mode will be described later in this chapter. Complement number representation is the most prevalent representation mode in modsystems as digital meters and typically when the decimal mode of arithand then the appropriate sign is attached to the result, just as in decimal ern-day computer systems. metic is used in digital computers. The decimal (or binary coded decimal) arithmetic. The sign-magnitude system has been used in such small digital using sign-magnitude numbers. The magnitude of the result is computed The sign and magnitude portions are handled separately in arithmetic

1.5.2 Complement Number System

systems are radix complement and diminished radix complement represented in complement form. The two popular complement number convenient way of representing negative numbers (i.e., complements of tions using only the hardware for addition when the negative numbers are and subtraction, it is possible to perform the four basic arithmetic operamultiplication and division correspond respectively to repeated addition positive numbers), thus reducing the subtraction to an addition. Because alent to adding (-A) to B. The complement number system provides a Consider the subtraction of a number A from a number B. This is equiv-

The radix complement of a number (N), is defined as

$$[N]_r = r'' - (N)_r \quad \text{if } (N)_r \neq 0 \\ = 0 \quad \text{if } (N)_r = 0$$
 (1.3)