$$(.345)_{10} = (?)_{2}$$

$$345$$

$$\times 2$$

$$0.690$$

$$\times 2$$

$$1.380$$

$$\times 2$$

$$0.760$$

$$\times 2$$

$$0.760$$

$$\times 2$$

$$1.520$$

$$\times 2$$

$$1.040$$

$$\times 2$$

$$0.080 = (.010110)_{2}$$

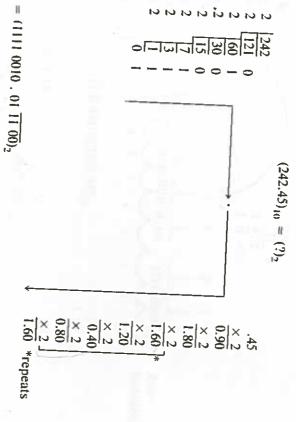
The fraction may never reach 0; stop when the required number of fraction digits is obtained; the fraction will not be accurate.

## Example 1.10

$$(.345)_{10} = (?)_{8}$$

$$\begin{array}{c} .345 \\ \times 8 \\ \hline 2.760 \\ \times 8 \\ \hline 6.080 \\ \times 8 \\ \hline 0.640 \\ \times 8 \\ \hline 5.120 = (.2605)_{8} \end{array}$$

## Example 1.11



The radix divide and multiply algorithms are applicable to the conversion of numbers from any base to any other base. When a number is multiplied from base p to base q, the number in base p is divided (or decimal arithmetic, these methods are convenient when p equals 10. In general, it is easier to convert a base p number to base q ( $p \neq 10$ ,  $q \neq 10$ ) that decimal number to base q (i.e.,  $(N)_p \rightarrow (?)_{10} \rightarrow (?)_q$ ), as shown by the following example.

## Example 1.12

$$(25.34)_8 = (?)_5$$

Convert to base 10:

$$(25.34)_{8} = 2 \times 8^{1} + 5 \times 8^{0} + 3 \times 8^{-1} + 4 \times 8^{-2}$$
 decimal  
=  $16 + 5 + \frac{1}{8} + \frac{1}{64}$  decimal  
=  $(21\frac{249}{64})_{10}$   
=  $(21.4375)_{10}$ 

1.3 Conversion 11