

# Chapter 1

## NUMBER SYSTEMS AND CODES

1.1

(1) Base 3

(a)  $(245)_{10} = (?)_3$

$$\begin{array}{r} 3 \overline{) 245} \\ 3 \overline{) 81} \\ 3 \overline{) 27} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 3 \overline{) 1} \\ 0 \end{array} \begin{array}{l} \uparrow \\ 2 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} = (100002)_3$$

(b)  $(461)_{10} = (?)_3$

$$\begin{array}{r} 3 \overline{) 461} \\ 3 \overline{) 153} \\ 3 \overline{) 51} \\ 3 \overline{) 17} \\ 3 \overline{) 5} \\ 3 \overline{) 1} \\ 0 \end{array} \begin{array}{l} \uparrow \\ 2 \\ 0 \\ 0 \\ 2 \\ 2 \\ 1 \end{array} = (122002)_3$$

(c)  $(76.5)_{10} = (?)_3$

$$\begin{array}{r} 3 \overline{) 76} \\ 3 \overline{) 25} \\ 3 \overline{) 8} \\ 3 \overline{) 2} \\ 0 \end{array} \begin{array}{l} \uparrow \\ 1 \\ 1 \\ 2 \\ 2 \end{array} \begin{array}{l} .5 \\ \times 3 \\ \hline 1.5 \end{array} \begin{array}{l} \uparrow \\ * \text{repeats} \end{array} = (2211.\overline{1})_3$$

(d)  $(46.45)_{10} = (?)_3$

$$\begin{array}{r} 3 \overline{) 46} \\ 3 \overline{) 15} \\ 3 \overline{) 5} \\ 3 \overline{) 1} \\ 0 \end{array} \begin{array}{l} \uparrow \\ 1 \\ 0 \\ 2 \\ 1 \end{array} \begin{array}{l} .45 \\ \times 3 \\ \hline 1.35 \\ \times 3 \\ \hline 1.05 \\ \times 3 \\ \hline 0.15 \\ \times 3 \\ \hline 0.45 \end{array} \begin{array}{l} \uparrow \\ * \text{repeats} \end{array} = (1201.\overline{1100})_3$$