

H.W 1.

$$\begin{aligned} \text{1a)} \quad 100 &= 1 \cdot 2^6 + 36 = 1 \cdot 2^6 + 1 \cdot 2^5 + 4 \\ &= 1 \cdot 2^6 + 1 \cdot 2^5 + 0 \cdot 2^4 + 0 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0 \\ 100 &= (1100100)_2 \end{aligned}$$

$$\begin{aligned} \text{1b)} \quad 100 &= 1 \cdot 3^4 + 19 = 1 \cdot 3^4 + 0 \cdot 3^3 + 2 \cdot 3^2 + 0 \cdot 3^1 + 1 \cdot 3^0 \\ 100 &= (10201)_3 \end{aligned}$$

$$\begin{aligned} \text{1c)} \quad 100 &= 1 \cdot 4^3 + 36 = 1 \cdot 4^3 + 2 \cdot 4^2 + 1 \cdot 4^1 + 0 \cdot 4^0 \\ 100 &= (1210)_4 \end{aligned}$$

$$\text{1d)} \quad 100 = 4 \cdot 5^2 + 0 \cdot 5^1 + 0 \cdot 5^0 = (400)_5$$

$$\text{1e)} \quad 100 = 2 \cdot 6^2 + 4 \cdot 6^1 + 4 \cdot 6^0 = (244)_6$$

$$\text{1f)} \quad 100 = 2 \cdot 7^2 + 0 \cdot 7^1 + 2 \cdot 7^0 = (202)_7$$

$$\text{1g)} \quad 100 = 1 \cdot 8^2 + 36 = 1 \cdot 8^2 + 4 \cdot 8^1 + 4 \cdot 8^0 = (144)_8$$

$$\text{1h)} \quad 100 = 1 \cdot 9^2 + 2 \cdot 9^1 + 1 \cdot 9^0 = (121)_9$$

$$\text{1I)} \quad 100 = 1 \cdot 10^2 + 0 \cdot 10^1 + 0 \cdot 10^0 = (100)_{10}$$

$$\text{1j)} \quad 100 = 9 \cdot 11^1 + 1 \cdot 11^0 = (91)_{11}$$

$$\text{1k)} \quad 100 = 8 \cdot 12^1 + 4 \cdot 12^0 = (84)_{12}$$

$$2. \quad 101 = 1 \cdot 10^2 + 0 \cdot 10^1 + 1 \cdot 10^0 = (1, 0, 1)$$

$$97 = 1 \cdot 10^2 + 0 \cdot 10^1 - 3 \cdot 10^0 = (1, 0, -3)$$

$$\begin{array}{r} 1 \ 0 \ 1 \\ 1 \ 0 \ -3 \\ \hline -3 \ 0 \ -3 \\ 0 \ 0 \ 0 \\ \hline 1 \ 0 \ 1 \\ 1 \ 0 \ -2 \ 0 \ -3 \end{array}$$

$$(1, 0, -2, 0, -3) = (0, 9, 8, 0, -3) = (0, 9, 7, 9, 7)$$

$$101 \cdot 97 = 9797$$

3. Base 10 to Base 3

$$26 = 2 \cdot 3^2 + 2 \cdot 3^1 + 2 \cdot 3^0 = (222)_3$$

$$80 = 2 \cdot 3^3 + 2 \cdot 3^2 + 2 \cdot 3^1 + 2 \cdot 3^0 = (2222)_3$$

$$26 = 27 - 1 = 1 \cdot 3^3 + 0 \cdot 3^2 + 0 \cdot 3^1 - 1 \cdot 3^0 = (1, 0, 0, -1)$$

$$80 = 81 - 1 = 1 \cdot 3^4 + 0 \cdot 3^3 + 0 \cdot 3^2 + 0 \cdot 3^1 - 1 \cdot 3^0 = (1, 0, 0, 0, -1)$$

$$\begin{array}{r} 1 \ 0 \ 0 \ 0 \ -1 \\ 1 \ 1 \ 0 \ 0 \ -1 \\ \hline -1 \ 0 \ 0 \ 0 \ 1 \\ 0 \ 0 \ 0 \ 0 \ 0 \\ 0 \ 0 \ 0 \ 0 \ 0 \\ \hline 1 \ 0 \ 0 \ 0 \ -1 \\ 1 \ 0 \ 0 \ -1 \ -1 \ 0 \ 0 \ 1 \end{array} \left. \begin{array}{l} \rightarrow (1, 0, 0, -1, -1, 0, 0, 1) = \\ (0, 3, 0, -1, -1, 0, 0, 1) = \\ (0, 2, 2, 2, -1, 0, 0, 1) = \\ (0, 2, 2, 1, 2, 0, 0, 1) = \\ = (2212001)_3 \end{array} \right\}$$

$$80 \cdot 26 = (2212001)_3$$

4. 1, 4, 7, 10, 13, 16, 19, 22, 25

2, 5, 8, 11, 14, 17, 20, 23, 26

3, 4, 5, 12, 13, 14, 21, 22, 23

6, 7, 8, 15, 16, 17, 24, 25, 26

9, 10, 11, 12, 13, 14, 15, 16, 17

18, 19, 20, 21, 22, 23, 24, 25, 26