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1)  $127_{(10)} = 1111111_{(2)} / 127_{(10)} = 177_{(8)} / 127_{(10)} = 7F_{(16)}$

a)

$$\begin{array}{r} 127 \overline{) 2} \\ \underline{1} \phantom{00} 63 \overline{) 2} \\ \phantom{00} \underline{1} \phantom{00} 31 \overline{) 2} \\ \phantom{000} \underline{1} \phantom{00} 15 \overline{) 2} \\ \phantom{0000} \underline{1} \phantom{00} 7 \overline{) 2} \\ \phantom{00000} \underline{1} \phantom{00} 3 \overline{) 2} \\ \phantom{000000} \underline{1} \phantom{00} 1 \end{array}$$

$$\begin{array}{r} 127 \overline{) 8} \\ \underline{7} \phantom{00} 15 \overline{) 8} \\ \phantom{00} \underline{7} \phantom{00} 1 \end{array}$$

$$\begin{array}{r} 127 \overline{) 16} \\ \underline{15} \phantom{00} 7 \end{array}$$

b)  $345_{(10)} = 101011001_{(2)} / 345_{(10)} = 531_{(8)} / 345 = 159_{(16)}$

$$\begin{array}{r} 343 \overline{) 2} \\ \underline{1} \phantom{00} 171 \overline{) 2} \\ \phantom{00} \underline{1} \phantom{00} 85 \overline{) 2} \\ \phantom{000} \underline{1} \phantom{00} 42 \overline{) 2} \\ \phantom{0000} \underline{0} \phantom{00} 21 \overline{) 2} \\ \phantom{00000} \underline{1} \phantom{00} 10 \overline{) 2} \\ \phantom{000000} \underline{0} \phantom{00} 5 \overline{) 2} \\ \phantom{0000000} \underline{1} \phantom{00} 2 \overline{) 2} \\ \phantom{00000000} \underline{0} \phantom{00} 1 \end{array}$$

$$\begin{array}{r} 345 \overline{) 8} \\ \underline{1} \phantom{00} 43 \overline{) 8} \\ \phantom{00} \underline{3} \phantom{00} 51 \end{array}$$

$$\begin{array}{r} 345 \overline{) 16} \\ \underline{9} \phantom{00} 21 \overline{) 16} \\ \phantom{00} \underline{5} \phantom{00} 1 \end{array}$$

c)  $456 = 111001000_{(2)} / 456 = 710_{(8)} / 456 = 1C8_{(16)}$

$$\begin{array}{r} 456 \overline{) 2} \\ \underline{0} \phantom{00} 228 \overline{) 2} \\ \phantom{00} \underline{0} \phantom{00} 114 \overline{) 2} \\ \phantom{000} \underline{0} \phantom{00} 57 \overline{) 2} \\ \phantom{0000} \underline{1} \phantom{00} 28 \overline{) 2} \\ \phantom{00000} \underline{0} \phantom{00} 14 \overline{) 2} \\ \phantom{000000} \underline{0} \phantom{00} 7 \overline{) 2} \\ \phantom{0000000} \underline{1} \phantom{00} 3 \overline{) 2} \\ \phantom{00000000} \underline{1} \phantom{00} 1 \end{array}$$

$$\begin{array}{r} 456 \overline{) 8} \\ \underline{0} \phantom{00} 57 \overline{) 8} \\ \phantom{00} \underline{1} \phantom{00} 7 \end{array}$$

$$\begin{array}{r} 456 \overline{) 16} \\ \underline{8} \phantom{00} 28 \overline{) 16} \\ \phantom{00} \underline{12} \phantom{00} 1 \end{array}$$

d)  $654 = 101\ 000\ 1110_{(2)} \quad / \quad 654 = 1216_{(8)} \quad / \quad 654 = 28E_{(16)}$

$$\begin{array}{r} 654 \overline{)2} \\ 0 \quad 327 \overline{)2} \\ \quad 1 \quad 163 \overline{)2} \\ \quad \quad 1 \quad 81 \overline{)2} \\ \quad \quad \quad 1 \quad 40 \overline{)2} \\ \quad \quad \quad \quad 0 \quad 20 \overline{)2} \\ \quad \quad \quad \quad \quad 0 \quad 10 \overline{)2} \\ \quad \quad \quad \quad \quad \quad 0 \quad 5 \overline{)2} \\ \quad \quad \quad \quad \quad \quad \quad 1 \quad 2 \overline{)2} \\ \quad \quad \quad \quad \quad \quad \quad \quad 0 \quad 1 \end{array}$$

$$\begin{array}{r} 654 \overline{)8} \\ 6 \quad 81 \overline{)8} \\ \quad 1 \quad 108 \overline{)8} \\ \quad \quad 2 \quad 1 \end{array}$$

$$\begin{array}{r} 654 \overline{)16} \\ 14 \quad 40 \overline{)16} \\ \quad 8 \quad 2 \end{array}$$

e)  $321 = 101\ 000\ 001_{(2)} \quad / \quad 321 = 501_{(8)} \quad / \quad 321 = 141_{(16)}$

$$\begin{array}{r} 321 \overline{)2} \\ 1 \quad 160 \overline{)2} \\ \quad 0 \quad 80 \overline{)2} \\ \quad \quad 0 \quad 40 \overline{)2} \\ \quad \quad \quad 0 \quad 20 \overline{)2} \\ \quad \quad \quad \quad 0 \quad 10 \overline{)2} \\ \quad \quad \quad \quad \quad 0 \quad 5 \overline{)2} \\ \quad \quad \quad \quad \quad \quad 1 \quad 2 \overline{)2} \\ \quad \quad \quad \quad \quad \quad \quad 0 \quad 1 \end{array}$$

$$\begin{array}{r} 321 \overline{)8} \\ 1 \quad 40 \overline{)8} \\ \quad 0 \quad 5 \end{array}$$

$$\begin{array}{r} 321 \overline{)16} \\ 1 \quad 20 \overline{)16} \\ \quad 4 \quad 1 \end{array}$$

f)  $65 = 1000001_{(2)} \quad / \quad 65 = 101_{(8)} \quad / \quad 65 = 41_{(16)}$

$$\begin{array}{r} 65 \overline{)2} \\ 1 \quad 32 \overline{)2} \\ \quad 0 \quad 16 \overline{)2} \\ \quad \quad 0 \quad 8 \overline{)2} \\ \quad \quad \quad 0 \quad 4 \overline{)2} \\ \quad \quad \quad \quad 0 \quad 2 \overline{)2} \\ \quad \quad \quad \quad \quad 0 \quad 1 \end{array}$$

$$\begin{array}{r} 65 \overline{)8} \\ 1 \quad 8 \overline{)8} \\ \quad 0 \quad 1 \end{array}$$

$$\begin{array}{r} 65 \overline{)16} \\ 1 \quad 4 \end{array}$$

g)  $228 = 11100100_{(2)} \quad / \quad 228 = 344_{(8)} \quad / \quad 228 = E4_{(16)}$

$$\begin{array}{r} 228 \overline{)2} \\ 0 \quad 114 \overline{)2} \\ \quad 0 \quad 57 \overline{)2} \\ \quad \quad 1 \quad 28 \overline{)2} \\ \quad \quad \quad 0 \quad 14 \overline{)2} \\ \quad \quad \quad \quad 0 \quad 7 \overline{)2} \\ \quad \quad \quad \quad \quad 1 \quad 3 \overline{)2} \\ \quad \quad \quad \quad \quad \quad 1 \quad 1 \end{array}$$

$$\begin{array}{r} 228 \overline{)8} \\ 4 \quad 28 \overline{)8} \\ \quad 4 \quad 3 \end{array}$$

$$\begin{array}{r} 228 \overline{)16} \\ 4 \quad 14 \end{array}$$

$$\begin{array}{r}
 111 \mid 2 \\
 \downarrow \quad 55 \mid 2 \\
 \quad \downarrow \quad 27 \mid 2 \\
 \quad \quad \downarrow \quad 13 \mid 2 \\
 \quad \quad \quad \downarrow \quad 6 \mid 2 \\
 \quad \quad \quad \quad \downarrow \quad 0 \mid 3 \mid 2 \\
 \quad \quad \quad \quad \quad \downarrow \quad 1 \mid 1
 \end{array}$$

$$\begin{array}{r} 111 \overline{) 8} \\ \underline{7} \phantom{0} \\ 13 \overline{) 8} \\ \underline{5} \phantom{0} \\ 1 \end{array}$$

$$\begin{array}{r} 111 \overline{)16} \\ 15 \phantom{0} \\ \hline 6 \end{array}$$

$$/ \quad 256 = 400_{(8)} \quad / \quad 256 = 100_{(16)}$$

256 | 2  
0 128 | 2  
0 64 | 2  
0 32 | 2  
0 16 | 2  
0 8 | 2  
0 4 | 2  
0 2 | 2  
0 1

$$\begin{array}{r} 256 \overline{) 8} \\ 0 \phantom{00} \underline{32} \phantom{00} \overline{) 8} \\ 0 \phantom{00} \underline{4} \phantom{00} \end{array}$$

$$\begin{array}{r} 256 \overline{) 16} \\ 0 \phantom{00} \overline{) 16} \\ 0 \phantom{00} \overline{) 16} \\ 0 \phantom{00} \overline{) 16} \\ 0 \phantom{00} \overline{) 16} \\ 0 \phantom{00} \overline{) 16} \end{array}$$

$$/ 318 = 476_{(8)} \quad / 318 = 13E_{(16)}$$

$$\begin{array}{r}
 318 \overline{) 2} \\
 \underline{0} \phantom{0} 159 \overline{) 2} \\
 \phantom{0} \underline{1} \phantom{0} 79 \overline{) 2} \\
 \phantom{0} \phantom{1} \underline{3} 9 \overline{) 2} \\
 \phantom{0} \phantom{1} \phantom{3} \underline{1} 9 \overline{) 2} \\
 \phantom{0} \phantom{1} \phantom{3} \phantom{1} \underline{9} \overline{) 2} \\
 \phantom{0} \phantom{1} \phantom{3} \phantom{1} \phantom{9} \underline{4} \overline{) 2} \\
 \phantom{0} \phantom{1} \phantom{3} \phantom{1} \phantom{9} \phantom{4} \underline{0} 2 \overline{) 2} \\
 \phantom{0} \phantom{1} \phantom{3} \phantom{1} \phantom{9} \phantom{4} \phantom{0} \underline{0} 1
 \end{array}$$

$$\begin{array}{r} 318 \overline{) 8} \\ \underline{6} \phantom{0} \\ 39 \phantom{0} \\ \underline{7} \phantom{0} \\ 4 \phantom{0} \end{array}$$

$$\begin{array}{r} 318 \overline{) 16} \\ 14 \overline{) 19} \overline{) 16} \\ 3 \quad 1 \end{array}$$

Tabela de conversão

binária  $\rightarrow$  decimal

$$\left[ \begin{array}{cccccccccccc} 2^{10} & 2^9 & 2^8 & 2^7 & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \\ 1024 & 512 & 256 & 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1 \end{array} \right]$$

$$a) 1110011_{(2)} = 115_{(10)}$$

$$\begin{array}{ccccccc} 1 & 1 & 1 & 0 & 0 & 1 & 1 \\ \underline{2^6} & + & \underline{2^5} & + & \underline{2^4} & + & \underline{2^3} & + & \underline{2^2} & + & \underline{2^1} & + & \underline{2^0} & = & 115 \\ 2^6 & + & 2^5 & + & 2^4 & + & 2^3 & + & 2^2 & + & 2^1 & + & 2^0 & = & 64 + 32 + 16 + 2 + 1 = 115 \end{array}$$

$$b) 1010100_{(2)} = 84_{(10)}$$

$$\begin{array}{ccccccc} 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ \underline{2^6} & + & \underline{2^5} & + & \underline{2^4} & + & \underline{2^3} & + & \underline{2^2} & + & \underline{2^1} & + & \underline{2^0} & = & 84 \end{array}$$

$$c) 111100_{(2)} = 60_{(10)}$$

$$\begin{array}{cccccc} 1 & 1 & 1 & 1 & 0 & 0 \\ \underline{2^5} & \underline{2^4} & \underline{2^3} & \underline{2^2} & \underline{2^1} & \underline{2^0} & = & 60 \end{array}$$

$$d) 1000001_{(2)} = 65_{(10)}$$

$$\begin{array}{ccccccc} 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ \underline{2^6} & \underline{2^5} & \underline{2^4} & \underline{2^3} & \underline{2^2} & \underline{2^1} & \underline{2^0} & = & 65 \end{array}$$

$$e) 1001001_{(2)} = 73_{(10)}$$

$$\begin{array}{ccccccc} 1 & 0 & 0 & 1 & 0 & 0 & 1 \\ \underline{2^6} & \underline{2^5} & \underline{2^4} & \underline{2^3} & \underline{2^2} & \underline{2^1} & \underline{2^0} & = & 73 \end{array}$$

$$f) 11001100_{(2)} = 204_{(10)}$$

$$\begin{array}{cccccccc} 1 & 1 & 0 & 0 & 1 & 1 & 0 & 0 \\ \underline{2^7} & \underline{2^6} & \underline{2^5} & \underline{2^4} & \underline{2^3} & \underline{2^2} & \underline{2^1} & \underline{2^0} & = & 204 \end{array}$$

### Ex03

$$a) 137_{(8)} + 1101_{(2)} \Rightarrow 95_{(10)} + 13_{(10)} = 108$$

$$b) 137_{(16)} + 101_{(2)} \Rightarrow 311_{(10)} + 5_{(10)} = 316$$

$$c) AF_{(16)} + 101_{(2)} \Rightarrow 175_{(10)} + 5_{(10)} = 180$$

$$d) 8C_{(16)} - 37_{(8)} \Rightarrow 140_{(10)} - 31_{(10)} = 109$$

$$e) 125_{(8)} - 1101_{(2)} \Rightarrow 85_{(10)} - 13_{(10)} = 72$$

$$f) 13_{(8)} + E_{(16)} \Rightarrow 11_{(10)} + 14_{(10)} = 25$$

$$g) A3F_{(16)} + 1111_{(2)} \Rightarrow 2623_{(10)} + 15_{(10)} = 2638$$

$$h) AAA_{(16)} + 55_{(8)} \Rightarrow 2730_{(10)} + 45_{(10)} = 2775$$



### Exo3

$$\begin{aligned} \text{a) } 137_{(8)} + 1101_{(2)} &\Rightarrow 95_{(10)} + 13_{(10)} = 108_{(10)} \\ &\Rightarrow 1011111_2 + 1101_2 = 1101100_{(2)} \end{aligned}$$

$$\begin{aligned} \text{b) } 137_{(16)} + 101_{(2)} &\Rightarrow 311_{(10)} + 5_{(10)} = 316_{(10)} \\ &\Rightarrow 100110111_2 + 101_2 = 100111100_{(2)} \end{aligned}$$

$$\begin{aligned} \text{c) } AF_{(16)} + 101_{(2)} &\Rightarrow 175_{(10)} + 5_{(10)} = 180_{(10)} \\ &\Rightarrow 10101111_2 + 101_2 = 10110100_{(2)} \end{aligned}$$

$$\begin{aligned} \text{d) } 8C_{(16)} - 37_{(8)} &\Rightarrow 140_{(10)} - 31_{(10)} = 109_{(10)} \\ &\Rightarrow 10001100_2 - 11111_2 = 1101101_{(2)} \end{aligned}$$

$$\begin{aligned} \text{e) } 125_{(8)} - 1101_{(2)} &\Rightarrow 85_{(10)} - 13_{(10)} = 72_{(10)} \\ &\Rightarrow 1010101_2 - 1101_2 = 1001000_{(2)} \end{aligned}$$

$$\begin{aligned} \text{f) } 13_{(8)} + E_{(16)} &\Rightarrow 11_{(10)} + 14_{(10)} = 25_{(10)} \\ &\Rightarrow 1011_2 + 1110_2 = 11001_{(2)} \end{aligned}$$

$$\begin{aligned} \text{g) } A3F_{(16)} + 1111_{(2)} &\Rightarrow 2623_{(10)} + 15_{(10)} = 2638 \\ &\Rightarrow 10100011111_2 + 1111_2 = 101001001110_{(2)} \end{aligned}$$

$$\begin{aligned} \text{h) } AAA_{(16)} + 55_{(8)} &\Rightarrow 2730_{(10)} + 45_{(10)} = 2775 \\ &\Rightarrow 101010101010_2 + 101101_2 = \\ &\quad 101011010111_{(2)} \end{aligned}$$