

Review Question for Chapter 2 Solutions

1. (a) $A59.FCE = \underbrace{1010}_{10} \underbrace{0101}_{11} \underbrace{1001}_{12} \cdot \underbrace{1111}_{13} \underbrace{1100}_{14} \underbrace{1110}_{15}$

(b)
$$\begin{array}{r} 87 \\ 16 \overline{)1400} \leftarrow 16 \overline{)87} \leftarrow 16 \overline{)5} \\ \underline{1392} \qquad \underline{80} \qquad \underline{0} \\ 8 \qquad \qquad 7 \qquad \qquad 5 \end{array}$$

 $.16 \times 16 = 2.56 \rightarrow .56 \times 16 = 8.96 \rightarrow .96 \times 16 = \mathbf{F}.36 \rightarrow .36 \times 16 = 5.76 \dots$
 $= (578.28F5 \dots)_{16}$

(c)
$$\begin{array}{ccccccc} 10 & 101 & 1100 & 0001 & 11 \\ \hline 5 & 3 & 4 & 0 & 7 \end{array}$$

 $= (534.07)_8$

(d)
$$\begin{array}{r} 83 \\ 2 \overline{)166} \leftarrow 2 \overline{)83} \leftarrow 2 \overline{)41} \leftarrow 2 \overline{)20} \leftarrow 2 \overline{)10} \leftarrow 2 \overline{)5} \leftarrow 2 \overline{)2} \leftarrow 2 \overline{)1} \\ \underline{166} \qquad \underline{82} \qquad \underline{40} \qquad \underline{20} \qquad \underline{10} \qquad \underline{4} \qquad \underline{2} \qquad \underline{0} \\ 0 \qquad \qquad 1 \qquad \qquad 1 \qquad \qquad 0 \qquad \qquad 0 \qquad \qquad 1 \qquad \qquad 0 \qquad \qquad 1 \end{array}$$

 $= (10100110)_2$

2.

Decimal	Sign Mag.
127	01111111
-0	10000000
-55	10110111

3.

Decimal	1's Comp.
43	0000101011
-1	1111111110
-128	1101111111

4. (a) 01111001 (positive number) $\rightarrow 121$

(b) $11111111(2's) \xrightarrow{-1} 11111110(1's) \xrightarrow{\text{complement}} 00000001(\text{magnitude}) \rightarrow -1$

$$(c) \quad 10000(2's) \xrightarrow{-1} 01111(1's) \xrightarrow{\text{complement}} 10000(\text{magnitude}) \rightarrow -16$$

(d)

$$10000001(2's) \xrightarrow{-1} 10000000(1's) \xrightarrow{\text{complement}} 01111111(\text{mag.}) \rightarrow -127$$

5.

$$(a) \quad 27 + 38$$

$$\begin{array}{r} 00011011 \\ + 00100110 \\ \hline \end{array}$$

$$01000001 \longrightarrow 65$$

$$(b) \quad 55 + 75$$

$$\begin{array}{r} 00110111 \\ + 01001011 \\ \hline \end{array}$$

$$10000010 \longrightarrow -126$$

(reflect an overflow situation i.e. the correct result cannot be represented with the available number of bits.)

6.

$$(00100)_{SM} = (00100)_{2's} \quad [\text{the number is positive}]$$

$$(10100)_{2's} + (00100)_{SM} = (10100)_{2's} + (00100)_{2's} = (11000)_{2's}$$

Convert to integers and verify your result!