1. $(725.6)_8 \rightarrow$ binary

$7 = 2^2 + 2^1 + 2^0 = 111$

$2 = 2^1 = 010$

$5 = 2^2 + 2^0 = 101$

$6 = 2^2 + 2^1 = 110$

$= \boxed{(111010101.11)_2}$

$(2F.D)_{16} \rightarrow$ binary convert each number to 4 digit binary

$2^1 = 2$

$2 = 0010$

$F = (15)_{10} = 2^3 + 2^2 + 2^1 + 2^0 = 1111$

$D = (13)_{10} = 2^3 + 2^2 + 2^0 = 1101$

$\boxed{= (10\,1111.1101)_2}$

2. 1.10 (b) from textbook

$(111.33)_{10} \rightarrow$ hexadecimal

$111 / 16 = 96 + \frac{15}{16}$

$6 / 16 = 0 + \frac{6}{16}$

(Turn to binary)

$(15)_{10} = (F)_{16}$

$(6)_{16}$

$(6F.54)_{16}$

$.33 \cdot 16 = (5).28$

$.28 \cdot 16 = (4).48$

$(111.33)_{10} \rightarrow (6F.54)_{16}$

$(6F.54)_{16} \rightarrow$ binary $\quad 2^4 = 16$

$(6)_{16} = (6)_{16} = 0 \cdot 2^3 + 1 \cdot 2^2 + 1 \cdot 2^1 + 0 \cdot 2^0 \rightarrow 0110$

$(F)_{16} = (15)_{10} = 1 \cdot 2^3 + 1 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 \rightarrow 1111$

$(5)_{16} = (5)_{10} = 0 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \rightarrow 0101$

$(4)_{16} = (4)_{10} = 0 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0 \rightarrow 0100$

$\rightarrow 01101111.01010100$

So $(6F.54)_{16} = (1101111.0101010)_2$

3. 1.16(b)

$(93.70)_{10} \rightarrow$ octal

$\frac{93}{8} = 11 + (5)_8$

$\frac{11}{8} = 1 + (3)_8$

$\frac{1}{8} = 0 + (1)_8$

$(135.54)_8$

$.70 \cdot 8 = (5).6$

.6 .8 = (4).8

$(93.70)_{16} \rightarrow (135.54)_8$

$(135.54) \rightarrow$ binar $2^3 = 8$

$1 = 0 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \rightarrow 001$

$3 = 0 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 \rightarrow 011$

$5 = 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \rightarrow 101$

$5 = 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \rightarrow 101$

$4 = 1 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0 \rightarrow 100$

$(135.54)_8 = (1011101.1011)_2$

4. 1000011

a. $+\ 01011001$

11011100

$\overset{1}{0}\overset{1}{\cancel{1}}\overset{1}{\cancel{0}}\overset{1}{\cancel{0}}\cancel{2}$

1000011

b. $-\ 01011001$

00101010

$(00101010)_2$

c.

$\begin{array}{r} 1\,1\,1\,1\,1\,1\,1 \\ 1111\,0011 \\ +\,1001\,1110 \\ \hline 1\,1001\,0001 \end{array}$

$(11001\,0001)_2$

4. $\begin{array}{r} 1111\,0011 \\ -\,1001\,1110 \\ \hline 0101\,0101 \end{array}$ $(0101\,0101)_2$

5. hex: $\begin{array}{r} 7AD2 \\ +\,1493 \\ \hline 8F65 \end{array}$ $(8F65)_{16}$

$(D)_{16} = (13)_{10}$ $(13+9)_{10} = (22)_{10}$

$(22)_{10} = ((1)_{10} \times (6)_{16} = (16)_{16}$ (16^1, 16^0)

$(A)_{16} = (10)_{10}$, $(10+4+1)_{10} = (15)_{10} = (F)_{16}$

$3+8=11$

$\begin{array}{r} 3011 \\ \text{octal } 413 \\ -\,237 \\ \hline 154 \end{array}$ $(154)_8$