

$$\begin{array}{rcl}
 1) & 91_{10} & \rightarrow 1011011_2 \\
 & 6_{16} & \rightarrow + \frac{11000110_2}{100100001_2} \\
 & (143_{10}) & \\
 & \boxed{289_{10}} & \leftarrow
 \end{array}$$

$$\begin{array}{rcl}
 2) & 11_8 - 11_{10} & \rightarrow 1011 \\
 & (9_{10}) & \\
 & \text{or} & \\
 & 11_8 + (-11_{10}) & \\
 & \begin{array}{r} 01011_2 \\ 10100_2 \\ \hline 10101_2 \end{array} & \rightarrow \boxed{-2_{10}} \\
 & \begin{array}{r} 01001_2 \\ 10101_2 \\ \hline 11110_2 \end{array} & 
 \end{array}$$

$$\begin{array}{rcl}
 3) & 00001.10000_{15015} & (1.5_{10}) \\
 + & 01100.01010_{15015} & (12.3125_{10}) \\
 \hline
 & 01101.11010_{15015} & (13.8125_{10})
 \end{array}$$

$$\begin{array}{rcl}
 4) & 0101.1100_{1424} & (5.75_{10}) \\
 & 1000.1110_{1424} & \\
 \hline
 & 1110.1010_{1424} & \\
 \leftarrow & \boxed{-1.375_{10}} & \\
 & 0001.0101_{1424} & \\
 & 0001.0110_{1424} & \\
 & 1.375_{10} & 
 \end{array}$$

$$\begin{array}{rcl}
 & 0111.0010_{1424} & (7.125_{10}) \\
 & 1000.1101_{1424} & \\
 & 1000.1110_{1424} & (-7.125_{10})
 \end{array}$$

5)

$$\begin{array}{rcl}
 1001_2 & 9_{10} \\
 0011_2 & 3_{10} \\
 1001_2 & \\
 10010_2 & \\
 11011_2 & \rightarrow 27_{10}
 \end{array}$$

6)

$$\begin{array}{rcl}
 11111011 & -5_{10} \\
 11111010 & -6_{10} = -6_{10}
 \end{array}$$

$$\begin{array}{r}
 11111011x \\
 0xx- \\
 11111011xxx \\
 1001xxx \\
 011x \\
 11x \\
 1x \\
 x
 \end{array}$$

$$100011110_2 = 30_{10}$$

7)

$$\begin{array}{rcl}
 1001.1000_{4Q4} & 4.5_{10} \\
 \times 0010.1010_{4Q4} & 2.625_{10}
 \end{array}$$

$$\begin{array}{r}
 10011000x \\
 0xx \\
 10011000xxx \\
 0x \\
 10011000x
 \end{array}
 \left. \vphantom{\begin{array}{r} 10011000x \\ 0xx \\ 10011000xxx \\ 0x \\ 10011000x \end{array}} \right\} 08Q8$$

$$00011000.11110000_{8Q8} \rightarrow 24.9375_{10}$$

$$8) \quad \begin{array}{r} \text{I3Q3} \\ 111[110.110]000 -1.25_{10} \\ \times 000[011.100]000 3.5_{10} \\ \text{I3Q3} \end{array}$$

$$\begin{array}{r} 01.01 -1.25_{10} \\ 10.10 \\ 10.11 -1.25_{10} \end{array}$$

$$\left. \begin{array}{r} 0 \\ 0X \\ 111110110XX \\ 111110110XX \\ 111110110XX \\ 111110110XX \\ 111110110XX \\ 111110110XX \end{array} \right\} 16Q6$$

$$111011.101000 \text{I6Q6} = \text{~~4.375~~}$$

$$\boxed{-4.375_{10}}$$

$$\begin{array}{r} 111011.101000 \text{I6Q6} \\ 000100.010000 \text{I6Q6} \\ 1 \\ 000100.011000 \rightarrow 4.375_{10} \\ \text{I6Q6} \end{array}$$