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Problem	Operation	To Binary	Answer in Binary	Answer in Decimal
1	$91_{10} + C6_{16}$	$01011011_2 + 11000110_2$	100100001_2	289_{10}
2	$11_8 - 11_{10}$	$01001_2 - 01011_2$	11110_2 (2's complement)	-2_{10}
3	$12.3125_{10} + 0110_{12Q2}$	$11000101_{U4Q4} + 0110_{U2Q2}$	11011101_{U4Q4}	13.8125_{10}
4	$5.75_{10} - 7.125_{10}$	$0101110_{U4Q3} - 0111001_{U4Q3}$	0011_{I1Q3}	-1.375_{10}
5	$9_{10} * 3_{10}$	$1001_2 * 0011_2$	11011_2	27_{10}
6	$-5_{10} * -6_{16}$	$1111\ 1011_2 * \text{(sign extend)}$ $1111\ 1010_2$	00011110_2	30_{10}
7	$9.5_{10} * 2.625_{10}$	$1001100_{U4Q3} * 10101_{U2Q3}$	110001111_{U5Q4}	24.9375_{10}
8	$-1.25_{10} * 3.5_{10}$	$1111\ 111011_{I8Q2} * 0000\ 001110_{I8Q2}$	1011101_{I4Q3}	-4.375_{10}

Scratch Work Below

$$01001 - 01011$$

$$\cancel{01001} + \cancel{21000}$$

$$2 \quad 01001 + 10101 \rightarrow \emptyset$$

2

WA

$$01001$$

$$10101$$

$$11110 \rightarrow$$

$$00001 \rightarrow 00010$$

$$-2$$

$$12.3125$$

3

$$1100.0101$$

$$+ 01.10$$

$$1101.1101$$

$$13.8125$$

4

$$5.75 - 7.125$$

$$101.11 - 0111.001$$

$$0101.110 + 1001.110$$

$$+ 1001.110$$

$$1111.100$$

$$0000.011 + 1 = -1.011 = -1.375$$

$$5 \quad 9 \cdot 3$$

$$1001 \cdot 0011$$

$$\begin{array}{r} 1001 \\ \times 0011 \\ \hline 1001 \\ 10010 \\ \hline 11011 = 27 \end{array}$$

$$-S_{10} \cdot -6_{16} \quad 6_{16} = 0110_2$$

$$S = 0101 - 1 = 0100$$

$$-S = 1011_2$$

$$S_2 = 0101$$

$$-6_2 = 1010$$

$$\begin{array}{r} 1011 \\ \times 1010 \\ \hline 0010 \\ 10110 \\ 101100 \\ 1011000 \\ \hline 1001110 \end{array}$$

$$1001110 = 0010001 + 1 = 0010010 = -18$$

$$00110001 + = 00110010 =$$

TON

6 $5 = 0101$ $6 = 0110$
 $-5 = 1010 + 1 = 1011$ $-6 = 1001 + 1 = 1010$

sign extended

$\begin{array}{r} 1011 \\ \times 1010 \\ \hline 0000 \\ 10110 \\ 000000 \\ 1011000 \\ \hline 1101110 \end{array}$	$\begin{array}{r} 1111011 \\ \times 1111010 \\ \hline 11111011 \\ 0 \\ 11111011 \\ 11111011 \\ 11111011 \\ 11111011 \\ \hline 11111011 \\ 00001110 = 30 \text{ (wow!)} \end{array}$
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7 $9.5_{10} \cdot 2625_{10}$
 $1001.10010010.101$

$\begin{array}{r} 1001.100 \\ \times 0001 \\ \hline 1001100 \end{array}$	$\begin{array}{r} 1001.100 \\ \times 0010.101 \\ \hline 1001100 \\ 0 \\ 11001100 \\ 0 \\ 10011100 \\ 0 \\ \hline 11000111100 = 24.9375 \end{array}$
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(8)

$$-1.25 = -2 + .75 = -2 + \frac{1}{2} + \frac{1}{4}$$

$$0010 \oplus 1101 + 1 = 1110.11$$

$$3.5 = 0011.1$$

$$\begin{array}{r} 0101 \\ 1011.101 \end{array}$$

$$1101$$

$$\begin{array}{r} 1110.11 \\ \hline 0011.10 \end{array}$$

$$\begin{array}{r} 1110.11 \\ \times 0011.10 \\ \hline \begin{array}{|c|c|c|c|c|c|} \hline 1 & 1 & 1 & 0 & 1 & 1 \\ \hline 0 & 0 & 1 & 1 & 1 & 0 \\ \hline \end{array} \\ \hline 0011.1010 \end{array}$$

$$\begin{array}{r} 1110.11 \\ - 0011.10 \\ \hline 111011 \\ 111110 \\ 001110 \\ \hline 110011010 \end{array}$$

$$\begin{array}{r} 111011 \\ 11101 \\ \hline 11111011 \\ + 1110110 \\ \hline 110110001 \\ + 11101100 \\ \hline 110011010 \end{array}$$