

① (A) $114_{(10)} = \underline{01110010}_{(2)}$

$\begin{array}{r} 37 \\ 2 \overline{) 74} \end{array} r=0$

$\begin{array}{r} 28 \\ 2 \overline{) 57} \end{array} r=1$

$\begin{array}{r} 14 \\ 2 \overline{) 28} \end{array} r=0$

(B) $-49_{(10)} = \underline{11001111}_{(2)}$

$\begin{array}{r} 7 \\ 2 \overline{) 14} \end{array} r=0$

$\begin{array}{r} 17 \\ 2 \overline{) 34} \end{array} r=1$

$\begin{array}{r} 8 \\ 2 \overline{) 16} \end{array} r=1$ $\begin{array}{r} 1 \\ 2 \overline{) 2} \end{array} r=1$

(C) $87_{(10)} = \underline{01010111}_{(2)}$

$\begin{array}{r} 43 \\ 2 \overline{) 87} \end{array} r=1$

$\begin{array}{r} 24 \\ 2 \overline{) 48} \end{array} r=1$

$\begin{array}{r} 12 \\ 2 \overline{) 24} \end{array} r=0$

(D) $-108_{(10)} = \underline{10010100}_{(2)}$

$\begin{array}{r} 21 \\ 2 \overline{) 43} \end{array} r=1$

$\begin{array}{r} 6 \\ 2 \overline{) 12} \end{array} r=0$

$\begin{array}{r} 3 \\ 2 \overline{) 6} \end{array} r=0$

(E) $-97_{(10)} = \underline{10011111}_{(2)}$

$\begin{array}{r} 10 \\ 2 \overline{) 21} \end{array} r=1$

$\begin{array}{r} 5 \\ 2 \overline{) 10} \end{array} r=0$

$\begin{array}{r} 2 \\ 2 \overline{) 5} \end{array} r=1$

$\begin{array}{r} 110001 \\ 00 \end{array}$

$\begin{array}{r} 11001110 \\ 11 \end{array}$

$\begin{array}{r} 11001111 \\ 11 \end{array}$

②

(A) $11011001_{(2)} = -39_{(10)}$

0100110

0100111

00110100

$32+4+2+1 = 39$

(B) $01110100_{(2)} = 116_{(10)}$

$64+32+16+4$

$46+70 = 116$

(C) $10110001_{(2)} = -71_{(10)}$

1001110

1001111

00110100

$64+8+4+2+1$

16

01010111

$\begin{array}{r} 48 \\ 2 \overline{) 97} \end{array} r=1$

$\begin{array}{r} 24 \\ 2 \overline{) 48} \end{array} r=0$

$\begin{array}{r} 12 \\ 2 \overline{) 24} \end{array} r=0$

$\begin{array}{r} 6 \\ 2 \overline{) 12} \end{array} r=0$

$\begin{array}{r} 3 \\ 2 \overline{) 6} \end{array} r=0$

$\begin{array}{r} 1 \\ 2 \overline{) 3} \end{array} r=1$

$\begin{array}{r} 0 \\ 2 \overline{) 1} \end{array} r=1$

$\begin{array}{r} 54 \\ 2 \overline{) 108} \end{array} r=0$ $\begin{array}{r} 22 \\ 2 \overline{) 44} \end{array} r=0$

$\begin{array}{r} 11 \\ 2 \overline{) 22} \end{array} r=0$ $\begin{array}{r} 5 \\ 2 \overline{) 11} \end{array} r=1$

$\begin{array}{r} 2 \\ 2 \overline{) 5} \end{array} r=1$ $\begin{array}{r} 1 \\ 2 \overline{) 2} \end{array} r=0$

$\begin{array}{r} 0 \\ 2 \overline{) 1} \end{array} r=1$

01011010

10100101

10100110

01100001

10011110

10011111

(D) $10111101_{(2)} = -67_{(10)}$

1000010

1000011

0011010

Signature: *[Signature]*

Date: *[Date]*

Team Members:

Witness:

Date:

(E)

$$00011011_{(2)} = 27_{(10)}$$

(3)

$$\begin{array}{r} 53 \\ + 22 \\ \hline 75 \end{array}$$

$$\begin{array}{r} 00011011 \\ + 00110101 \\ \hline 01001011 \end{array}$$

$$\begin{array}{r} 1010100 \\ 1010101 \\ \hline 1010101 \\ - 85 \\ \hline 31 \end{array}$$

(C)

$$\begin{array}{r} 111111 \\ 10011110 \\ + 00101011 \\ \hline 11001001 \end{array}$$

(D)

$$\begin{array}{r} 11111111 \\ 11011101 \\ + 11100011 \\ \hline 11000000 \end{array}$$

$$\begin{array}{r} 1100001 \\ 1100010 \\ \hline 1100011 \\ - 48 \\ \hline 43 \end{array}$$

$$\begin{array}{r} 1 \\ 2 \\ 8 \\ \hline 32 \end{array}$$

(4)

$$\begin{array}{r} 23 \\ + 14 \\ \hline 37 \end{array}$$

(B)

$$\begin{array}{r} 216 \\ - 28 \\ \hline 188 \end{array}$$

(G)

$$\begin{array}{r} 01000000 \\ - 47 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 00100100 \\ + 11100100 \\ \hline 00001000 \end{array}$$

$$\begin{array}{r} 11100111 \\ 11100100 \\ \hline 11100111 \end{array}$$

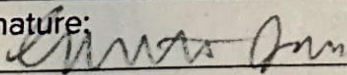
Conclusion

① The largest positive decimal number in 8-bit 2's complement is 127 (01111111). The smallest negative decimal number is -127 (10000000). This range exists since the left-most bit represents the sign.

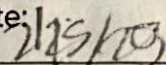
②

Left most sign determining the sign. B is the only negative option here.

Signature:



Date:



Team Members:

Witness:

Date: