

128 64 32 16 8 4 2 1 = 2 5 5
 15 14 13 12 11 10 9 8 128 64 32 16 8 4 2 1

① 1 0 1 1 1 1 0 1
 BD

② 1 0 1 1 1 1 0 1 0 0 0 0 0 0 0 1

$$2^{15} + 2^{13} + 2^{12} + 2^{11} + 2^{10} + 2^9 + 2^0$$

$$32768 + 8192 + 4096 + 2048 + 1024 + 512 + 1 = 48385$$

③ 1 0 1 1 1 1 0 1 0 0 0 0 0 0 0 1

one's comp.

negative

1. invert

2. add 1 LSB

0 1 0 0 0 0 1 0 1 1 1 1 1 1 1 0

+ 1

0 1 0 0 0 0 1 0 1 1 1 1 1 1 1 1

$2^{14} +$

$$2^9 + 255 = 17151 \Rightarrow -17151$$

④

16 8 0 0 0

1 5 0 0 0

3 1 4

1 15 ↑ 1 F 4 0

0 1

⑤ 8 0 0 0 = 0 x 1 F 4 0

pos

⑥ - 1 1 = 1 0 1 1 → hex → invert

neg

1 1 1 1 1 1 1 1 1 1 0 1 0 0

+

1 1 1 1 1 1 1 1 1 1 0 1 0 1

F

F

F

5

= F F F 5

⑦ - 3 2 7 1 7

neg

2 3 2 7 1 7

1 6 3 5 8 1

1 8 1 7 9 0

4 0 8 9 1

1 2 0 4 4 1

1 0 2 2 0

1 5 1 1 0

1 2 5 5 1

1 2 7 1

1 6 3 1

3 1 1

1 5 1

7 1

3 1

1 1

0 1

$$\begin{array}{r}
 01111111001101 \\
 1000000000110010 \\
 + \\
 \hline
 1000000000110011 \\
 \hline
 8033
 \end{array}$$

⑧ FAC3

1111 1010 1100 0011

⑨ FAC3 =

$15^3 10^2 12^1 3^0$

$$(15 \cdot 16^3) + (10 \cdot 16^2) + (12 \cdot 16^1) + (3 \cdot 16^0)$$

$$(15 \cdot 4096) + (10 \cdot 256) + (12 \cdot 16) + (3 \cdot 1)$$

$$61440 + 2560 + 192 + 3 = 64195$$

⑩

$$\begin{array}{r}
 1111101011000011 \\
 \text{neg} \rightarrow 0000010100111100 \\
 + \\
 \hline
 0000010100111101 = 1341 \\
 \hline
 = -1341
 \end{array}$$

⑪

0064

0000 0000 0110 0100

⑫

0064

$$0 + 0 + (6 \cdot 16^1) + (4 \cdot 16^0) = 96 + 4 = 100$$

⑬

0064 = 100

⑭

8000

1000 0000 0000 0000

⑮

$$(8 \times 16^3) = 32768$$

⑯

1000

neg $\rightarrow 01111111111111$

$$\begin{array}{r}
 1000 \\
 \text{neg} \rightarrow 01111111111111 \\
 + \\
 \hline
 10000000000001 \\
 \hline
 2^{15} = 32768 \Rightarrow -32768
 \end{array}$$

$$\textcircled{17} - 2^{19} = -524,288$$

⑩ $2^{19} = 524,288$

(19)
$$\begin{array}{r} 3511 \\ + 4FFC \\ \hline 850B \end{array} = \begin{array}{r} F = 15 \\ C = 12 \\ 850D \end{array}$$

$$15 + 1 = 16$$
$$16 + 0$$

$$\begin{array}{r} 15 + 6 = 21 \\ - 16 \\ \hline 5 \end{array}$$

$16 + 5$

(37)	B	0	0	F																
↙	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
↘	0	1	0	0			1	1	1	1		1	1	1	1		0	0	0	0
+																				1
	0	1	0	0			1	1	1	1		1	1	1	1		0	0	0	1

0x4FF1

20	8	5	0	D
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21	N	5	1	
22	N	1	0	0
	Q	1		

23) $\begin{array}{r} 6159 \\ + F702 \\ \hline 585B \end{array}$ $\begin{array}{r} 1101111 \\ \hline 0xD7CE \end{array}$

6+	15
16+	5

$$\begin{array}{cccc|cccc|cccc|cccc} \textcircled{32} & 2 & 2 & 3 & 2 & & & & & & & & & & & \\ & 0 & 0 & 1 & 0 & & 0 & 0 & 1 & 0 & & 0 & 0 & 1 & 1 & & 0 & 0 & 1 & 0 \\ & 1 & 1 & 0 & 1 & & 1 & 1 & 0 & 1 & & 1 & 1 & 0 & 0 & & 1 & 1 & 0 & 1 \\ + & & & & & & & & & & & & & & & & & & & \\ \hline & 1 & 1 & 0 & 1 & & 1 & 1 & 0 & 1 & & 1 & 1 & 0 & 0 & & 1 & 1 & 1 & 0 \end{array}$$

[illegible]

[illegible]

(15) 4 1 0 0 0 0 0 6 0 0 0 0 0 0 0 0

(26)	y											Ox	8	0	0	0
------	---	--	--	--	--	--	--	--	--	--	--	----	---	---	---	---

(27) ' E E E E E = 14 A E F A

10	E	15	$14 + 12 = 26 - 16 = 10$		
			$16 + 10$		

10

$14 + 1$

(7) F F F F

29 y

(30) y

34) F F F 3 2 9 B A = 0x000CD646

1111	1111	1111	0011	0010	1001	1011	1010
0000	0000	0000	1100	1101	0110	0100	0101
0000	0000	0000	1100	1101	0110	0100	0101
0x	0	0	0	C	D	6	4

35) 43700000

0100 0011 0111 0000 0000 0000 0000 0000

$$\begin{array}{r} 128 \\ + 6 \\ \hline 134 \\ - 127 \\ \hline 007 \end{array}$$

$$\begin{array}{r} 1.111 \\ .5 \\ + .25 \\ \hline 1.875 \end{array}$$

$$1.875 \times 2^7 = 240$$

36) C0F#0000

1100 0000 1111 1111 0000 0000 0000 0000

$$\begin{array}{r} 129 \\ - 127 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 1.1111111 \\ .5 \\ .25 \\ .125 \\ \hline .875 \\ .0625 \\ + .03125 \\ \hline .96875 \end{array}$$