$$375_{10}$$

$$= 3 \times 100 + 7 \times 10 + 5 \times 1$$

$$= 3 \times 10^2 + 7 \times 10^1 + 5 \times 10^0$$

value, radix, weight (position)

$$6\,5\,4\,3\,2\,1\,0$$
$$0\,1\,0\,1\,1\,1\,0_2$$

radix point

Base 2
$r = 2$

$$1 \times 2^5 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1$$

$$32 + 8 + 4 + 2 = 46$$

135 r=10

i	3^i
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	128
8	256

$$\begin{array}{r} 135 \\ -128 \\ \hline 007 \\ \quad\; 4 \\ \hline \quad\; 3 \\ -\;2 \\ \hline \quad\; 1 \\ \quad\; 1 \\ \hline \quad\; 0 \end{array}$$

2^7 ✓

2^2 ✓

2^1 ✓

2^0 ✓

7	6	5	4	3	2	1	0
1	0	0	0	0	1	1	1

37_{10} → binary

1	2^1
0	1
1	2
2	4
3	8
4	16
5	32

37
-32
5
-4
1
-1
0

2^5
2^2
2^0

6	5	4	3	2	1	0
0	1	0	0	1	0	1

0 1 0 - 0 1 0 1

2 5

0x25

$2 \times 16^1 + 5 \times 16^0$

$32 + 5 = 3$

125 decimal

i	2^i
0	1
1	2
2	4
3	8
4	16
5	32
6	64
7	128

125
64
+ 8 11
32
29
16
13
8
5
4
1
1
0

125
64
61
9

2^6
2^5
2^4
2^3
2^2
2^0

7	6	5	4	3	2	1	0
0	1	1	1	1	0	1	

0111 1101 → 0

7 D → F

3	2	1	0
0	1	1	1

$2^2+2^1+2^0$

$4+2+1$

7

0x7D

A = 1010 (binary)

= 10 (decimal)

F = 1111

= 15

3 2 1 0 : -1 -2 -3 -4

0 1 1 1 : 1 1 1 1

$2^2 + 2^1 + 2^0 + 2^{-1} + 2^{-2}$

$+ 2^{-3} + 2^{-4}$

$7 + 0.5 + 0.25 + 0.125$

$+ .062$

7.875

MSB

11001 = -7 two's complement

+ or −

MSB = 1 (−)

MSB = 0 (+)

Binary

11001

? → MSB = 0

Convert as normal

yes → MSB = 1

#1 00 11 0

#2

0011

4 3 2 1 0

0 0 1 1 1

$2^2 + 2^1 + 2^0$

bits

binary digit (r=2)

0011

two's comp

MSB=0

3	2	1	0
0	0	1	1

$= 2^0 + 2^1$

$= 1 + 2 = 3$

1001 = -7

MSB=1

#1 0110

#2 1

0111 = 7