Binary Conversion Practice

Binary Places: 32, 16, 8, 4, 2, 1

Convert these binary numbers to decimal:

1

10

11

100

101

1000

1011

1100

10101

11111

Convert these decimal numbers to binary:

1

2

3

8

9

10

15

16

17

18

Answer Key

1	1
2	10
3	11
4	1000
5	1001
8	1010
11	1111
12	10000
21	10001
31	10010

Binary Addition Practice

Place-by-place rules

When carry from right is 0

	0	1	0	1
	+0	+0	+1	+1
Carry	0	0	0	1
Sum	0	1	1	0

When carry from right is 1

	0	1	0	1
	+0	+0	+1	+1
	0	1	1	1
	1	0	0	1

Add these binary numbers:

1	01	10	11	11	100
1	10	10	01	11	101

1001	1100	1000	10101
0111	0101	0011	01111

Answer Key

10
11
100
100
110
1001
10000
10001
1011
100100

Binary Subtraction Practice

Subtract these binary numbers (rewrite each problem, changing the subtrahend using two's complement and then do the addition):

1	11	10	11	11	110
-1	-01	-01	-10	-11	-101

1001	1100	1000	10101
-0111	-0101	-0011	-01111

Answer Key

0	10	1	1	0	1
10	111	101	110		

Two's Complement Practice

Convert these values to signed magnitude decimal. Each is 8 bits long, in two's complement form (complement negative values before conversion).

01001111

11100011

00111101

10001010

Hexadecimal Conversion Practice

Rewrite each of these 32-bit numbers in base 16 (group in 4-bit segments, convert each to hexadecimal)

0000 = 0
0001 = 1
0010 = 2
0011 = 3
0100 = 4
0101 = 5
0110 = 6
0111 = 7
1000 = 8
1001 = 9
1010 = A
1011 = B
1100 = C
1101 = D
1110 = E
1111 = F

00111010111101111101000001001110

10110110110001011001100000100001

Answer Key

1+2+4+8+64 = 79
00011101 = 1+4+8+16 = -29
1+4+8+16+32 = 61
01110110 = 2+4+16+32+64 = -118

3AF7D04E
B6C59821

Binary Multiplication Practice

Multiply these binary numbers:

1	11	10	11	110	110
x1	x10	x01	x11	x011	x101

1001	1100	1000	1111
x0111	x0101	x1011	x1111

Answer Key

1	110	10	1001	10010	11110
111111	111100	1011000	11100001		