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Lab 6: **Floating-Point Binary Representation**

1. For each of the following binary floating-point numbers, supply the equivalent value as a base 10 fraction, and then as a base 10 decimal. The first problem has been done for you:

Binary Floating-Point	**Base 10 Fraction**	**Base 10 Decimal**
1.101 *(sample)*	1 5/8	1.625
11.11	3 3/4	3.75
1.1	1 1/2	1.5
101.001	5 1/8	5.125
1101.0101	13 5/16	13.3125
1110.00111	14 7/32	14.21875
10000.101011	32 43/64	32.671875
111.0000011	7 3/128	7.0234375
11.000101	3 5/64	3.078125

2. For each of the following exponent values, shown here in decimal, supply the actual binary bits that would be used for an 8-bit exponent in the
IEEE Short Real format. The first answer has been supplied for you:

Exponent (E)	**Binary Representation**
2 *(sample)*	10000001
5	10000100
0	01111111
-10	01110101
128	11111111
-1	01111110

3. For each of the following floating-point binary numbers, supply the normalized value and the resulting exponent. The first answer has been
supplied for you:

Binary Value	**Normalized As**	**Exponent**

10000.11 *(sample)*	1.000011	4
1101.101	1.101101	3
.00101	1.01	-3
1.0001	1.0001	1
10000011.0	1.0000011	7
.0000011001	1.1001	-6

4. For each of the following floating-point binary examples, supply the complete binary representation of the number in IEEE Short Real format. The
first answer has been supplied for you:

Binary Value	**Sign, Exponent, Mantissa**
-1.11 *(sample)*	1 01111111 11000000000000000000000
+1101.101	0 10000010 10110100000000000000000
-.00101	1 01111100 01000000000000000000000
+100111.0	0 10000100 00111000000000000000000
+.0000001101011	0 01111000 10101100000000000000000