Floating-Point Practice

Fill in the following table showing how the floating point numbers would be represented in binary, or the decimal value of the binary floating point numbers. Don't forget the exponent bias!

	Number	s	e	f
1	2			
2	1.5			
3	3			
4	-6			
5	-97.8125			
6	-1.333			
7	0.1			
8		1	01100	1000000000
9		0	10010	0100000000
A		1	10010	0110000000
B		0	01111	0000000000
C		1	10110	1111111000
D	-0			
E	NaN			
F	∞			

Normalized IEEE 754

$$(-1)^s \times 2^{(e\text{ - Bias})} \times \left(1+\frac{f}{2^m}\right)$$

s 0 if number is positive, 1 if number is negative

e Between 0 and 2^n-1 where n is the number of bits used to store the exponent

Bias $2^{n-1}-1$ where n is the number of bits used to store the exponent
Not Stored

f Integer numerator of the significand
$0 \le f < 2^m$

m Number of bits used to store f
Not stored

	f Bits	e Bits	Exponent Bias
binary16	10	5	$2^4-1=15$
binary32	23	8	$2^7-1=127$
binary64	52	11	$2^{10}-1=1023$
binary128	112	15	$2^{14}-1=16383$
x87 80-bit	64*	15	$2^{14}-1=16383$