Derek Trinh

1. 5.75

1. Convert whole number

5	1	101
2	0	
1	1	
0		

2. Convert decimal

.75 ×2	1.5	1	11
.5	1.0	1	
0			

3. Combine

$\boxed{101_{\wedge}11}$

63/64

1. 1/64 is 2^{-6}

2^{-6} as binary is $0_{\wedge}000001$

2. $1 - 0_{\wedge}000001 = \boxed{0_{\wedge}111111}$

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9.8125

1. Convert whole number

9	1	1001
4	0	
2	0	
1	1	
0		

2. Convert decimal

.8125 ×2	1.625	1	1101
.625	1.25	1	
.25	0.5	0	
.5	1.0	1	
0			

3. Combine

$\boxed{1001.1101}$

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2. 34.890625

1. Convert whole part

34	0	100010
17	1	
8	0	
4	0	
2	0	
1	1	
0		

2. Convert decimal

.890625	1.78125	1	111001
.78125	1.5625	1	
.5625	1.125	1	
.125	0.25	0	
.25	0.5	0	
.5	1.0	1	
0			

3. 100010.111001

mantissa = 00010111001

exponent = 5

bias exp = 5 + 127 = 132

132	0
66	0
33	1
16	0
8	0
4	0
2	0
1	1
0	

4. Sign is positive

0 10000100 00010111001 00000000000

3. 0 01111011 000...000

1. Sign is positive

2. Biased exp = 123

exp = 123 - 127 = -4

3. Mantissa = 1.000...000

4. After exp

0.0001 = 2^{-4} = **0.0625**

01111011
0 1 3 7 15 30 61 123

4. A normalized floating point has an implied '1' bit at the beginning of the mantissa.
A denormalized floating point does not have an implied '1'. It is recognized by all '0' exponent

Smallest normalized = 0 11110 0000000000

Greatest denormalized = 0 00000 0000000000