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floatingpoint.pdf
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Floating Point Conversion

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Your magic (32 bit) floating point number is 77
This is the number that needs to be converted to
(little endian) binary, and expressed in hexadecimal.
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1. Divide 77 by the highest power of 2 that is less than 77 (in this case it's 64).
$$\frac{77}{2^6} = \frac{77}{64}$$
2. Exponent is 6+127=133 (10000101)
3. For mantissa, first subtract 1 from $\frac{77}{64}$
$$\frac{77}{64} - 1 = \frac{13}{64}$$

   Then encode it using powers of ½

$$\frac{13}{64} - \frac{1}{8} = \frac{5}{64}$$
$$\frac{5}{64} - \frac{1}{16} = \frac{1}{64}$$
$$\frac{1}{64} - \frac{1}{64} = 0$$

   So the parts of the mantissa are $\frac{1}{8} + \frac{1}{16} + \frac{1}{64}$
   Encode with big endian: 0011 0100 0000 0000 0000 000
4. So the number encoded with big endian is:
   0100 0010 1001 1010 0000 0000 0000 0000
5. Convert to little endian:
   00000000 00000000 10100110 10000001
6. Convert to hexadecimal (from big endian)
   0x0000a681

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Your other magic floating point number is, in hex,
0x00009ec3
This is the number that needs to be converted to a (32
bit) floating point number.
Note that the hexadecimal printed above is in little-
endian format!
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1. The little endian from the hex is:
   0000 0000 0000 0000 1001 1110 1100 0011
2. The big endian:
   1100 0011 1011 0110 0000 0000 0000 0000
3. The sign bit is 1, which is negative.
4. The exponent is 10000111 in binary, which is 135. Subtract the exponent offset 127 from 135 yields 8, which means multiply the mantissa by 2^8=256
5. Mantissa = 011 0110 0000 0000 0000 0000 (b) = $\frac{1}{4}+\frac{1}{8}+\frac{1}{32}+\frac{1}{64}=0.421875$
6. So the final answer should be $-256 * (1 + 0.421875) = -364$