1) Convert the value 23.625\textsubscript{10} to its binary representation.

![Binary representation of 23.625]  

2) Normalize the above value so that the most significant 1 is immediately to the left of the radix point. Include the corresponding exponent value to indicate the motion of the radix point.

![Normalized value]  

3) Write the corresponding 32-bit IEEE 754 floating point representation for 23.625\textsubscript{10}. 

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4) Write the corresponding 64-bit IEEE 754 floating point representation for $23.625_{10}$.

5) What would be the smallest positive normalized 32-bit IEEE 754 floating point value?

6) The smallest positive denormalized 32-bit IEEE 754 floating point value has representation of

\[
\begin{array}{c|c|c}
\text{8-bit} & \text{23-bit Mantissa} \\
\text{Sign bit} & \text{(bias 127)} & \text{(for denormalized values, leading 0 not stored)} \\
\hline
0 \equiv + & 0 0 0 0 0 0 0 0 0 0 0 0 ... & 0 1 \\
1 \equiv - & & \\
\end{array}
\]

What value would it represent?

\[2 \quad \times \quad 2 \quad \]

7) What would be the representation for the largest positive denormalized 32-bit IEEE 754 floating point?

\[
\begin{array}{c|c|c}
\text{8-bit} & \text{23-bit Mantissa} \\
\text{Sign bit} & \text{(bias 127)} & \text{(for denormalized values, leading 0 not stored)} \\
\hline
0 \equiv + & 0 0 0 0 0 0 0 0 0 0 0 0 ... & \\
1 \equiv - & 0 0 0 0 0 0 0 0 0 \\
\end{array}
\]
8) How would you add two IEEE 754 floating point numbers?

9) How would you multiply two IEEE 754 floating point numbers?

10) Consider adding $1.011 \times 2^{40}$ and $1.01 \times 2^5$.
   a) How many places does the second number's mantissa get shifted?

   b) After we add these two numbers and store the results back into a 32-bit IEEE 754 value, what would be the result?