

A-Level

2 > Largest finite IEEE-754 single precision float in hex is:

$$\begin{array}{cccccccc} 0 & 111 & 111 & 0 & 111 & 111 & 111 & 111 & 111 & 111 \\ \hline 7 & F & 7 & F & F & F & F & F & & \\ = & \boxed{7F7FFFFFFF} \end{array}$$

3 > Smallest finite IEEE-754 single precision float in hex is:

$$\begin{array}{cccccccc} 1 & 111 & 111 & 0 & 111 & 111 & 111 & 111 & 111 & 111 \\ \hline F & F & 7 & F & F & F & F & F & & \\ = & \boxed{FF7FFFFF} \end{array}$$

4 > Largest non-zero negative IEEE-754 single precision float in hex is:

$$\begin{array}{cccccccc} 1 & 000 & 0000 & 0 & 000 & 0000 & 0000 & 0000 & 0000 & 0000 \\ \hline 8 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & \\ = & \boxed{80000001} \end{array}$$

5 > Smallest non-zero positive IEEE-754 single precision float in hex is:

$$\begin{array}{cccccccc} 0 & 000 & 0000 & 0 & 000 & 0000 & 0000 & 0000 & 0000 & 0000 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & \\ = & \boxed{00000001} \end{array}$$

6 > -5.125×2^{90} as a 32-bit float in hex is:

$$\begin{array}{l} -5.125 \times 2^{90} = -101.001 \times 2^{92} \\ \downarrow \frac{1}{8} \end{array}$$

$$\begin{array}{r} 2 \overline{) 92} \\ 2 \overline{) 96} 0 \\ 2 \overline{) 23} 0 \quad 92 = 1011100 \\ 2 \overline{) 11} 1 \\ 2 \overline{) 8} 1 \\ 2 \overline{) 2} 1 \\ 2 \overline{) 0} \end{array}$$

$$\begin{array}{r} 1111 \\ 01011100 \\ + 01111111 \\ \hline 11011011 \end{array}$$

$$\begin{array}{cccccccc} 1 & 110 & 1101 & 1010 & 0100 & 0000 & 0000 & 0000 \\ \hline 001 & 000 & = & \boxed{EDA40000} \end{array}$$

7 > 2^{-138} as a 32-bit float, in hex is:

$$\begin{array}{cccccccc} 0 & 000 & 0000 & 0 & 000 & 0000 & 0000 & 1000 & 0000 & 0000 \\ \hline \text{denormalized} & & & & & & & & & \\ = & \boxed{00000800} \end{array}$$

8 > 1.5×2^{-143} as a 32-bit float in hex is:

$$\begin{array}{cccccccc} 0 & 001 & 0000 & 0 & 000 & 0000 & 0000 & 0110 & 0000 & 0000 \\ \hline \text{denormalized} & & & & & & & & & \\ = & \boxed{00000060} \end{array}$$

9▷ COS 90000 0000 0000

$$e^{120-127} = 1$$

- 1, 10/1001 $\times 2$

$$-1.6953125 \times 2^1 = -3.390625$$

-1	-2	-3	-4	-5	-6	-7
2	2	2	2	2	2	2

1 0 1 1 0 0

$$\frac{1}{2} + 0 + \frac{1}{8} + \frac{1}{16} + 0 + 0 + \frac{1}{128} = \frac{64 + 16 + 8 + 1}{128} = \frac{89}{128}$$