A1 Q2

Monday, September 20, 2021 11:28 PM

2.

a. $2^4/2 - 1 = 7$

b. $\epsilon = 2^{-5}$

c. $0 \cdot 2^{-6} \cdot 1.00000_2 = 0.000001_2$
$0 \cdot 2^{7} \cdot 1.111111_2 = 11111100_2$

d. No, take for example 230_{10}. In base$_2$, this is 11100110. Before multiplying by the exponent, this would require a normalized fraction of 1.1100110, which is impossible given our limitation of 5 bits in the fraction field. We would require at least 6 bits.

e. $0 \cdot 2^{-7} \cdot 0.00001 = 0.000000000001_2$
$0 \cdot 2^{-7} \cdot 0.11111 = 0.000001111l_2$

f. $0 \cdot 2^{1} \cdot 1.11111_2 = 11.1111_2$

g. Round Down: $-10.1110_2 = -2.875_{10}$
Round Up: $-10.1101_2 = -2.8125_{10}$
Round Towards Zero: -10.1101_2
Round Towards Nearest: -10.1101_2