Problem 2 (15 points)

We assume that IEEE decided to add a new 8-bit representation with its main characteristics consistent with the 32/64-bit representations. Consider the following four 8-bit numbers:

A: `11100101`
B: `00111001`
C: `00001100`
D: `00011101`

The decimal values represented by the above numbers are as follows, *in no particular order*:

$$3\frac{1}{8},\ -21,\ \frac{29}{32},\ \frac{3}{8}$$

Part a (3 points): Represent decimal value $\frac{3}{8}$ in binary normalized form

1.1 x 2^-2

Part b (3 points): Which 8-bit floating point number represents -21 (choose from A, B, C, D)?

A

Part c (3 points): Which 8-bit floating point number represents $\frac{29}{32}$ (choose from A, B, C, D)?

D

Part d (6 points): Given the above information, figure out the following:
(2 points) Number of bits needed for exponent:

3

(2 points) Number of bits needed for fraction:

4

(2 points) Bias:

3