1.) Translate the following IEEE Single-Precision FP numbers to their decimal equivalent. (12 pts. = 4 pts. each)
   a. \( \text{0xc0700000} \)
      \[
      \begin{array}{llllll}
      1 & 100_0000_0 & 111_0000_0000_0000_0000_0000 \\
      \end{array}
      \]
      \(-1.111 \times 2^1 = -11.11 = -3.75 \)
   b. \( \text{0x41900000} \)
      \[
      \begin{array}{llllll}
      0 & 100_0001_1 & 001_0000_0000_0000_0000_0000 \\
      \end{array}
      \]
      \(+1.001 \times 2^4 = +10010 = +18 \)
   c. \( \text{0x7f800000} \)
      \[
      \begin{array}{llllll}
      0 & 111_1111_1 & 000_0000_0000_0000_0000_0000 \\
      \end{array}
      \]
      Exponent is all 1’s and Fraction is all 0’s => +inf

2.) Translate the following floating point numbers to decimal numbers. [6 pts. = 1 pt. for sign + 2 pts. for magnitude of each part a and b].
   a.) \( \text{0 10111 110101} \)
      \[
      A = +1.110101 \times 2^8 \\
      = +468 
      \]
   b.) \( \text{1 01110 101000} \)
      \[
      B = -1.101 \times 2^{-1} \\
      = -0.8125 
      \]

3.) Show the following decimal numbers as floating point numbers. When you normalize show the G, R, and S bits. Then, use the “round-to-nearest” method, if needed. [18 pts. = 2 pts. per field]
   a. +227 \( a = +1.11000011 \times 2^7; \ G=1, R=0, \ S=0 \)
      \[
      \begin{array}{llll}
      0 & 10110 & 110010 \\
      \end{array}
      \]
   b. -13.625 \( b = -1.101101 \times 2^3; \ G=0, R=0, \ S=0 \)
      \[
      \begin{array}{llll}
      1 & 10010 & 101101 \\
      \end{array}
      \]
   c. -80.75 \( c = -1.01000001 \times 2^6; \ G=1, R=1, \ S=0 \)
      \[
      \begin{array}{llll}
      1 & 10101 & 010001 \\
      \end{array}
      \]
4.) Review the Lecture notes regarding floating point exceptions and NaN’s. Then for each case a – d, list any exceptions that will arise as a result of the operation. The five possible exceptions are listed below. [ 4 pts. = 1 pt. each]

1. Invalid (NaN)
2. Divide by Zero
3. Overflow
4. Underflow
5. None

a. Max FP - Max FP = (5) None
b. Max FP / Min FP = (3) Overflow
c. Min FP / Max FP = (4) Underflow
d. (Max FP+1) / 0 = (1) Invalid (NaN)