1.- Use three-digit rounding arithmetic to perform the following calculations. Compute the absolute and relative error with the exact value determined to at least five digits.(10 points)

a) \( \left( \frac{1}{3} - \frac{3}{11} \right) + \frac{3}{20} \)

b) \( \frac{13}{15} - \frac{6}{2e - 5.4} \)

2.- Repeat exercise 1 using three-digit chopping arithmetic.(10 points)

3.- Why do the following functions not possess Taylor series expansions.(10 points)

a) \( f(x) = \sqrt{x} \)

b) \( f(x) = \arcsin(x - 1) \)

4.- Let \( f(x) = \cos(x) \) and \( x_0 = 0 \). Determine the second polynomial, \( P_2(x) \) and \( R_2(x) \) when \( x = 0.01 \), and give a bound for \( \cos(x = 0.01) \)(20 points)

5.- Assuming \( e^8 = 2980.957987 \). Compute \( e^8 \) using the \( e^x \) series. Develop up to eleven terms and draw out your conclusion.(20 points)

6. Let \( f(x) = 2x \cos(2x) - (x - 2)^2 \) and \( x_0 = 0 \)

a) Find the third Taylor polynomial \( P_3(x) \), and use it to approximate \( f(0.4) \).

b) Use the error formula in Taylor’s Theorem to find an upper bound for the error \( |f(0.4) - P_3(0.4)| \). Compute the actual error.(20 points)
7. The following binary floating-point numbers consist of a sign bit, an excess 64 exponent, and a 16 bit fraction. Normalize them. (10 points)

a) 110000010001010100000001
b) 001110000000001111111111