1. Write a MATLAB code for the following function, which takes an input, *x* and returns the result.

$$f(x)=\frac{1}{x}-0.5$$

2. Write a MATLAB code that calculates n^{th} derivative of the *f(x)*, which takes two arguments: *n* and *x*.

3. Write a MATLAB code that uses Taylor series expansion to approximate *f(x)* from $x_i=3$ with $h=0.5$. Calculate the value of the function at $x_{i+1}=3.5$ with relative true error less than 0.0005 where;

$$x_{i+1}=x_i+h$$

$$f(x_{i+1})=f(x_i)+f'(x_i).h+\frac{f''(x_i)}{2!}.h^2+\frac{f'''(x_i)}{3!}.h^3+\ldots+\frac{f^{(n)}(x_i)}{n!}.h^n+R_n$$

$$\varepsilon_{RT}=\left|\frac{f_{exact}-f_{approximate}}{f_{exact}}\right|\leq 0.0005$$