1. Write a MatLab function exp1 to approximate e^x by summing the series

$$1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots$$

   from left to right until the accumulated sum stops changing.

   Test your program by computing exp1(x) for $x = -25, -24, -23, \ldots, 25$.

   For each value of x, compute the relative error

$$\frac{\text{exp1}(x) - \exp(x)}{\exp(x)}$$

   where $\exp(x)$ is the MatLab function that approximates e^x.

   For the purpose of this question, assume $\exp(x) = e^x$.

   Format your output neatly.

2. For what values of x does your function produce accurate approximations to e^x and for what values of x does your function produce poor approximations to e^x?

   Explain why your function works well in the cases where it produces accurate approximations to e^x and also explain why your function works poorly in the cases where it produces poor approximations to e^x.

   Don't just say that it works poorly because there is rounding error. There is rounding error in your computations for all values of x (except possibly $x = 0$). However, in some cases the rounding errors are insignificant and you obtain a good approximation to e^x, while in other cases the rounding errors are significant and you obtain a poor approximation to e^x. Explain why.

3. Make a small change to your function exp1 so that it produces accurate approximations to e^x for all $x = -25, -24, -23, \ldots, 25$. Call your new function exp2.

   Call your new function exp2.

   For each value of x, compute the relative error

$$\frac{\text{exp2}(x) - \exp(x)}{\exp(x)}$$

   where $\exp(x)$ is the MatLab function that approximates e^x.

   Format your output neatly.

   Hint: note $e^x = 1/e^{-x}$.