1. (10pt) Suppose \( x = [1:10] \). Execute the following commands and see what \( x \) looks like.

\[
\begin{align*}
x(1:2:9) &= \text{zeros}(1,5) \\
x(9:-2:1) &= [1:5] \\
x[1:4] &= 11 \\
x([2 3 10 2]) &= [x(2) \ x(3) \ x(10) \ x(2)] \\
x([2;3;10;2]) &= [x(2);x(3);x(10);x(2)]
\end{align*}
\]

2. (10pts) Write a MATLAB script that plots the functions \( x, x^2, \ldots, x^m \) across the interval \([0, 1]\). All the plots should appear in the same window where \( m \) is a positive integer.

3. (20pts) Write a MATLAB script to plot the functions \( \sin x, 2 \sin 2x, 4 \sin 4x, \) and \( 8 \sin 8x \) across the interval \([0, 2\pi]\). All the plots should appear in succession with appropriate pauses in between the plots.

4. (20pts) Use the functions \texttt{meshgrid} and \texttt{mesh} to obtain a three-dimensional plot of the function

\[
z = \frac{2xy}{x^2 + y^2}, \quad x = 1:0.1:3 \quad \text{and} \quad y = 1:0.1:3.
\]

Redraw the surface using the functions \texttt{surf}, \texttt{surfl} and \texttt{contour}.

5. (20pts) Assume that \( x \) is an initialized MATLAB array and that \( m \) is a positive integer. Using the \texttt{ones} function, the pointwise array multiplication operator \( \cdot \), and MATLAB’s ability to scale and add arrays, write a fragment that computes an array \( y \) with the property that the \( i \)th component of \( y \) has the following value:

\[
y_i = \sum_{k=0}^{n} \frac{x_i^k}{k!}
\]

6. (20pts) Suppose \( x=\text{linspace}(0,1,10) \). Construct another vector \( \hat{x} = x + 1e - 4 \). The error in \( \hat{x} \) is given by \( \epsilon = x - \hat{x} \). Compute \( \epsilon \) and its infinity norm and 2-norm. (Hint: Use \texttt{help norm} in MATLAB to find out how to compute the norms.)