MATH 284 Mathematical Programming
Homework 2: Due Wednesday February 14 at 1:00pm

Exercises:

1. Use the plot command to plot the function $f(x) = x^2 - 10\sqrt{x} + 2$ for $0 \leq x \leq 5$.

2. Plot the function $f(x) = x^2 e^{-x}$ and its derivative for $0 \leq x \leq 10$ in one figure. Plot the function with a solid line, and the derivative with a dashed line. Add a legend and label the axes.

3. A parametric equation is given by

$$x = 0.7\sin(10t), \quad y = 1.2\sin(8t), \quad \text{for } \leq t \leq \pi.$$

   Plot the curve and format it such that both axes will range from -1.5 to 1.5.

4. Plot the function $f(x) = \frac{x^2-6x+7}{x^3-8}$ in the domain $0 \leq x \leq 4$. Notice that the function has a vertical asymptote at $x = 2$. Plot the function by creating two vectors for the domain of x. The first vector (name it x1) includes elements from 0 to 1.9, and the second vector (name it x2) includes elements from 2.1 to 4. For each vector x1 and x2 create corresponding vectors y1 and y2 respectively. To plot the function, make two curves in the same plot.

5. Run the following MATLAB code:

```
yr = [1988:1994];
sle = [8 12 20 22 18 24 27];
bar(yr,sle,'r')
xlabel('Year')
ylabel('Sales (Millions)')
```

   Explain what each line of the code does. What is represented by the figure output by this code?

6. Run the following MATLAB code:

```
yr = [1988:1994];
sle = [8 12 20 22 18 24 27];
stem(yr,sle)
xlabel('Year')
ylabel('Sales (Millions)')
```

   What is the difference between this code and the code in the previous problem? What is represented by the figure output by this code? Give reasons why one may prefer a stem plot as produced by this code over the bar plot produced by the code in the previous problem.

7. In this problem you are asked to explore the MATLAB function `hist`.Use the MATLAB help function, the online help page, and google to determine the purpose and usage of the `hist` function. Write code to provide an example of using `hist`. Make sure that any plots you produce have relevant figure titles and axis labels.