Scientific Programming
Homework 4: Due 10/16

Practice problems (not to be turned in) Chapter 7 in the book: 2, 3, 6

Homework problems Do not just turn in the answers to the following problems, show the exact Matlab commands you used to find the answer.

1. A vector is given by: \( x = [15 -6 0 8 -2 5 4 -10 0.5 3] \). Using conditional statements and loops, write a program that determines the sum of the positive elements in the vector, and the sum of the negative elements in the vector.

2. Write a script file with if statements and loops which plots the function below in the domain \(-2 \leq x \leq 5\).

\[
f(x) = \begin{cases} 
15 & \text{for } x \leq -1 \\
-5x + 10 & \text{for } -1 \leq x \leq 1 \\
-10x^2 + 35x - 20 & \text{for } 1 \leq x \leq 3 \\
-5x + 10 & \text{for } 3 \leq x \leq 4 \\
-10 & \text{for } x \geq 4 
\end{cases}
\]

3. Write a script that finds the smallest even integer that is divisible by 7 and whose cube is greater than 40,000. The loop should start at 1 and stop when the number is found.

4. Suppose that \( x \) is some positive number and consider the sequence

\[
x_0 = x, x_1 = \sqrt{x}, x_2 = \sqrt{x_1} = \sqrt[4]{x}, \ldots
\]

In general, for \( i > 0, x_i = \sqrt{x_{i-1}} \). Suppose that \( x \) has already been entered into Matlab. Write a while loop that will find the first number \( n \) such that \( x_n < 10 \). For example, if \( x = 4096 \) then

\[
x_0 = 4096, x_1 = \sqrt{4096} = 64, x_2 = \sqrt{64} = 8, x_3 = \sqrt{8}, \ldots
\]

and \( x_3 \) is the first term less than 10 so \( n = 3 \).