VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA

First Year College
NEF1104 Problem Solving for Engineers
Revision Sheet 2

1. Define a Matlab function that calculates the area of a circle.

2. Define a Matlab function that displays a student's final result:
   If the result is higher than or equal to 80, he/ she has a "HD";
   If the result is higher than or equal to 70, he/ she has a "D";
   If the result is higher than or equal to 60, he/ she has a "C";
   If the result is higher than or equal to 50, he/ she has a "P";
   If the result is less than 50, he/ she has an "F".

3. Program in Matlab to check if a number is odd or even (use switch-case).

4. Program in Matlab to check if a number is in the range of 10-20 (use if-else).

5. Create a 1 x 20 matrix A with random integers (round toward negative infinity) ranged from 0 to 100.
   1) Find the smallest number is A by using the for loop.
   2) Find the largest number is A by using the while loop.

6. Create a row vector B with integers (round to nearest integer) starting from 5 and finishing at 80 with 25 numbers in between by using the appropriate command.
   1) Find the first occurrence of 39 by using the for loop.
   2) Find the first occurrence of 52 by using the while loop.

   (if there is no such number in B, display a message "the number xx can not be found".)

7. Display the multiple of 9 from 1 through 100.

8. The numbers of car accidents in Victoria per year are written in the table below. The first row is the year and the second row is the number of car crashes on the Victorian roads.

1	2	3	4	5	6
2010	2011	2012	2013	2014	2015
470	469	455	451	442	441

   Create a 4 x 1 figure matrix and plot the following:
   1) Plot Year vs. No. of crashes in a bar chart;
   2) Plot Year vs. No. of crashes in a 2D line plot;
   3) Plot Year vs. No. of crashes using scatters;
   4) Produce a pie chart showing the proportion of the number of car crashes in each year.

9. Write MATLAB for loop to calculate $n! = 1 \times 2 \times 3 \times 4 \times \cdots \times n$ for a user input n value. (i.e. if a user inputs 5, calculate 1x2x3x4x5.)

10. Download the file: **Daily Rainfall Data.txt** from VUC.
    1) Write a Matlab program to load the text file to Matlab workspace;
    2) Plot daily rainfall data in a bar graph;
    3) Allow users to input a significant level threshold;
    4) Count number of days with significant rainfall using a **for** loop;
    5) Calculate total and average daily rainfall data.
    6) Display total rainfall, average rainfall, and number of significant days on figure title.