Dyson School of Design Engineering
DE1-Computing -1, Assessment-2
This assignment carries 25% of the final mark.

This is a Python coding assignment. Please submit your answers as one jupyter notebook file with code cells or a zip file of separate Python codes for each question. Note that you will get marks for your correct attempts even if the code gives errors for some lines.

2.1 Generate an array of values for angle variable θ between 0 and 2π.
Write a function called "Coordinates" that takes the θ array and gives out arrays for x,y coordinates of points given by $x = sin\theta, y = cos\theta$.
Hence plot y against x

[30 marks]

2.2 You can generate an integer random number between a and b (including a and b) using the following code:
import random as r
x = r.randint(a,b)

Write a Python code to generate 10 lists, each of length 6, by placing characters and numbers – A, B, C, 1, 2, 3 – in random order in each list. You can use the same character or number more than once in one list. (Hint: You can use a for loop that iterates a set of commands for 10 times).

Display the 10 lists using "print" command. **[30 marks]**

2.3 Write a Python code using symbolic math to get the differentiated function df of the function $f = x^3 - 12x^2 + 44x - 48$ with respect to x. Find the solutions for the differentiated function $df = 0$ with respect to x. Plot the function f for x from 1 to 6 sampled in steps of 0.1. Comment on what the solutions for the differentiated function $df = 0$ mean with respect to the above plot. **[40 marks]**