Uniform Distribution

Question 1)

Perhaps one of the most important distribution is the uniform distribution for continuos random variable. The uniform *(0, 1)* distribution is used as the basis for simulating most random variables.

A random variable that is uniformly distributed over the interval *(a, b)* follows the probability density function (pdf) given by:

$$f(x; a, b) = \frac{1}{b-a}; \quad a < x < b \qquad (1)$$

The cumulative distribution function (cdf) for a uniform random variable is:

$$F(x) = \begin{cases} 0 & x \leq a \\ \frac{x-a}{b-a} & a < x < b \\ 1 & x \geq b \end{cases} \qquad (2)$$

The uniform probability density function and cumulative distribution function over interval *(a, b)* can be defined using function **stats.uniform.pdf** and **stats.uniform.cdf** in Python (Scipy package), respectively.

a) Now with *(a, b) = (1, 10)*, write a Python code to compute *pdf* and cdf using equation (1) & (2), then plot them using **subplot** function.
b) Repeat question (a) using **stats.uniform.pdf** and **stats.uniform.cdf** functions. Then compare plots from (a) and (b).

(Defining the domain *x* over which you will evaluate the function by yourself)

Question 2)

Three points #1, #2, and #3 are selected at random from the circumference of a circle (see figure). Write Python code to find the probability that the three points lie on the same semicircle.
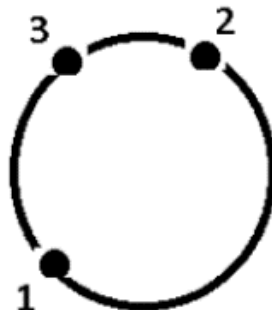
Notice: The solution for each answer should be the Python code, followed by the plots. Answer which has no Python code will not get any credit.