INFO 7374 MACHINE LEARNING IN FINANCE

ASSIGNMENT I

1. What is the Kurtosis of the Standard Normal Distribution?
   A. 0
   B. 1
   C. 2
   D. 3

2. What is the Skewness of the Standard Normal Distribution?
   A. 0
   B. 1
   C. 2
   D. 3

3. If $f(x)$ is a density function defined from the negative infinity to positive infinity, what is the value of $\int_{-\infty}^{+\infty} f(x)dx$?
   A. 0
   B. 1
   C. 0.5
   D. 2

4. Which of the follows is the mean of a uniform random variable $x \sim U[a,\ b]$?
   A. $\frac{a+b}{2}$
   B. $b - a$
   C. $\frac{(b-a)^2}{6}$
   D. $\frac{(b-a)^2}{12}$

5. Given $x \sim U[0,\ 1]$, which of the following gives $y \sim U[a,\ b]$?
   A. $y = a + bx$
   B. $y = a - bx$
   C. $y = a + (b - a)x$
   D. $y = a + (b - a)^2 x$

6. Given $x \sim N(0,\ 1)$, which of the following gives $y \sim N(a,\ b)$?
   A. $y = a + bx$
   B. $y = a + b^2 x$
   C. $y = a + \sqrt{b}x$
   D. $y = a + (b - a)^2 x$

7. Which of the following distributions is appropriate to model the stock price?

A. Uniform
B. Normal
C. Log-normal
D. Students-t

8. Which of the following distributions is appropriate to model a parameter distributed within a certain interval, say $[0.2, 0.5]$?
   A. Exponential
   B. Beta
   C. Gamma
   D. Weibull

9. Let $Y = \rho X + \sqrt{1 - \rho^2} U$ where X and U are normally distributed $\sim N(0,1)$. What is the correlation between Y and X ?
   A. ρ
   B. $\sqrt{1 - \rho^2}$
   C. ρ^2
   D. $1 - \rho^2$

10. Given the following counter plot of a bivariate normal distribution, what could you infer from the graph about the correlation between the two variables?

BIVARIATE STANDARD NORMAL

BIVARIATE NORMAL
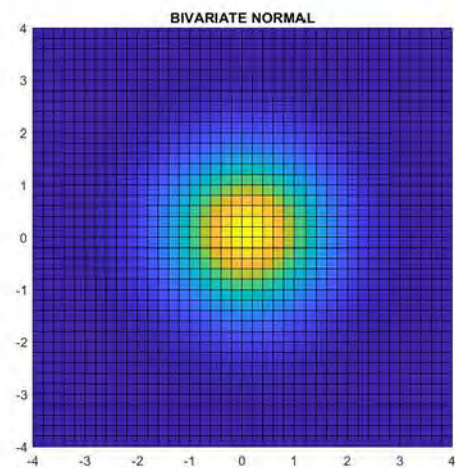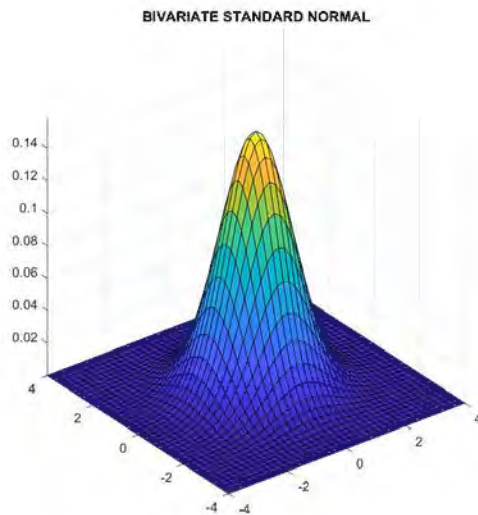
   A. $\rho > 0$
   B. $\rho < 0$
   C. $\rho = 0$
   D. No sufficient information