Department of Mathematics and Statistics KFUPM
STAT 301-01 Quiz#3, Time: 40 mins

Student's Name: _____ ID: _____

Q.No.1:- The joint density function of X and Y is given as:

$$f(x,y) = \begin{cases} ke^{-2x}e^{-3y}, & \text{if } x > 0, y > 0 \\ 0 & \text{otherwise} \end{cases}$$

Compute

(a) k

(b) $P(X > 1, Y < 1)$.

(c) $P\left(\dfrac{X}{Y} < 1\right).$

(d) $P(X < 3).$

Q.No.2:- Let X_1 and X_2 are independent continuous uniform $(0,1)$ random variables. Suppose $Y_1 = X_1 + X_2$ and $Y_2 = X_1 - X_2$. Find the joint density of Y_1 and Y_2 and also write down the domain for the values of Y_1 and Y_2.