STATS 2D03 Assignment 2

Name:

Student Number:

1. Find the pdf of Y if $Y=X^2$ and the pdf of X is given by $f(x)=1$, $0<x<1$. (1%)

2. A device runs until either of two components fails, at which point the device stops running. The joint density function of the lifetimes of the two components, both measured in hours, is

   $f(x,y)=(x+y)/8$, for $0<x<2$ and $0<y<2$.

   Calculate the probability that the device fails during its first hour of operation. (1%)

3. Let (X,Y) be a bivariate random vector with joint pdf $f(x,y)$. Let $U=aX+b$ and $V=cY+d$, where a, b, c and d are fixed constants with $a>0$ and $c>0$. Derive the joint pdf of (U,V). (1%)

4. Derive the moment generating function (mgf) of binomial distribution with success probability p. (1%)

   Find the variance of binomial distribution using mgf. (1%)