MA395 Takehome Quiz 5

## Name:

1) (Problem 3.8.6) Let $Y$ be a random variable with

$$
f_{Y}(y)=6 y(1-y), \quad 0 \leq y \leq 1
$$

Show that the pdf of $W=Y^{2}$ is

$$
f_{W}(w)=3(1-\sqrt{w})
$$

2) (Problem 3.8.2) Find the pdf of $X+Y$ if $X$ and $Y$ are independent random variables with

$$
f_{X}(x)=x e^{-x}, \quad x \geq 0 \quad \text { and } \quad f_{Y}(y)=e^{-y}, \quad y \geq 0
$$

3) (Problem 3.9.2) Suppose

$$
f_{X Y}(x, y)=\lambda^{2} \cdot e^{-\lambda(x+y)}
$$

Find $E(X+Y)$.
4) (Problem 3.8.7) Given that $X$ and $Y$ are independent random variables, find the pdf of $X Y$ for the following two sets of marginal pdfs:
(a) $\quad f_{X}(x)=1, \quad 0 \leq x \leq 1 \quad$ and $\quad f_{Y}(y)=1, \quad 0 \leq y \leq 1$
(b) $\quad f_{X}(x)=2 x, \quad 0 \leq x \leq 1 \quad$ and $\quad f_{Y}(y)=2 y, \quad 0 \leq y \leq 1$
5) (Problem 3.9.13) Suppose

$$
f_{X Y}(x, y)=\lambda^{2} \cdot e^{-\lambda(x+y)}
$$

Find $\operatorname{Var}(X+Y)$.

