HW 2

Chapter 4 problems 20 (problem 80 in 5TH edition),

6, 10, 43, 49, 55).

7) $f(x) = \begin{cases} 3x^2 & 0 < x < 1 \\ 0 & elsewhere \end{cases}$ X has pdf, f.

Find: (i) $Cov(2X+7, X^2 + 3X - 12)$

(ii) $Pr\left(\left|X - \frac{1}{5}\right| > \frac{2}{5}\right)$

(iii) The number c such that $P(X^2 > c) = .95$

8) (X, Y) has joint pdf,

$$f(x, y) = \begin{cases} \dfrac{e^{-x}}{x}, & 0 < y < x < \infty \\ 0, & elsewhere \end{cases}$$

Find: (i) $Pr(X > 2)$

(ii) $Pr(X > 2Y)$

(iii) $Pr(X > 1)$

(iv) $Cov(X, Y)$

9) A fair die is rolled 12 times resulting in outcomes $(X_1, \cdots X_{12})$. For $j=2, \cdots 12,$ define,

$$Y_j = \begin{cases} 1 & \text{if } X_{j-1} = X_j \\ 0 & \text{otherwise} \end{cases}$$

and $N = \sum_{2}^{12} Y_j$

Find the mean and standard deviation of N.

10) Discretes random variables (X, Y) have joint pdf,

$$P(x, y) = \begin{cases} \frac{1}{6y}, & 1 \le x \le y \le 6, (x, y \text{ integers}) \\ 0, & \text{elsewhere} \end{cases}$$

For example, $P(3, 4) = \frac{1}{24}$, $P(1, 5) = \frac{1}{30}$.

(i) Find, $Pr(Y=2)$

(ii) Find, $Pr(X=3 \mid Y=4)$

(iii) Find, $P(Y=5 \mid X=3)$