MATH 323 - Tutorial 9 Questions

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1. Let

$$P(X = x) = \begin{cases} = .2, & x = 1 \\ = .5, & x = 2, \\ = .3, & x = 3 \end{cases}$$

a) Find $M_X(t)$

b) Using part a, find $E[X]$ and $Var(X)$

2. Let $X_1 \sim N(\mu_1, \sigma)$ and $X_2 \sim N(\mu_2, \sigma)$.

a) What is the Moment Generating function of $Y = aX_1 + X_2$.

b) Using part a, what is the distribution of Y.

3. Consider the following joint pmf, for the random variables X_1, X_2.

		X_1		
		0	1	2
X_2	0	0.1	0.05	0,2
	1	0	0.1	0.2
	2	0.3	0.05	0

a) Find the marginal support (values x_j for which $P(X_i = x_j) > 0$ for $i = 1, 2$) of each of the random variables X_1, X_2. Find the marginal distributions for X_1 and X_2.

b) Fjnd the marginal variance of X_1 and X_2.

c) Find the covariance between X_1 and X_2.

d) Using the information in the previous parts, find the correlation between X_1 and X_2.

e) Are X_1 and X_2 independent, justify your answer using information from the previous questions.

4. Let $f_{Y_1,Y_2}(y_1, y_2) = 3y_1 + cy_2, \quad 0 < y_1 < 1, 0 < y_2 < 1$

a) Find c

b) What is the covariance of Y_1 and Y_2