Name: _____ **MAT 221**
Fall 2014 **Problem Set 5**

Problem 1: Suppose in a raffle, one can either win \$1, \$ 2, or \$5. Let X denote the amount of money you can get if you play the raffle. The probability distribution of X is given by

$\mathbf{X}$	0	1	2	5
$\mathbf{P(X)}$		0.30	0.10	0.05

(a) Find $P(X = 0)$ and fill it in on the table above.

(b) Find the mean, μ_X, of the random variable X.

(c) Find the variance and standard deviation for the random variable X.

(d) Now suppose you have to pay \$1 to play the raffle. Let Y be the random variable that represents your net profit. Find μ_Y, the mean of Y. What is the standard deviation of Y?

Problem 2: Suppose you roll two dice and take the sum of the numbers you see. Let X denote the sum and $P(X)$ denote the probability of getting the sum X.

(a) For $X = 1, 2, \ldots, 12, 13$, find $P(X)$.

(b) Find $P(X \geq 10)$. Find $P(X \leq 10)$. What about $P(X < 10)$?

Problem 3: Suppose you have independent random variables X, Y with $\mu_X = 25$, $\sigma_X = 5$, $\mu_Y = 10$, and $\sigma_Y = 1$. Find the mean and standard deviation for the random variable Z if...

(a) $Z = 5X - 3$

(b) $Z = 3Y - 2X$

(c) Suppose that X and Y were not independent. Instead, suppose they had correlation 0.20. Find the mean and standard deviation for the random variable Z for the two cases given in (b).