Name: _____ Business Data Analysis
Date: 201-316-VA

In Class Exercise #7: Regression & Basic Probability

1. **Crime Rate**

   Let x be a random variable representing percentage change in neighborhood population in the past few years, and let y be a random variable representing crime rate (crimes per 1000 population). A random sample of 6 Denver neighborhoods gave the following information

x	29	2	11	17	7	6
y	173	35	132	127	69	53

   (a) Construct a table to compute $\Sigma x, \Sigma y, \Sigma x^2, \Sigma y^2, \Sigma xy$

   (b) Find the equation of the least-squares line

   (c) Find the sample correlation coefficient r. What does it tell us in this case?

   (d) What percentage of variation in y is explained by the least-squares model?

   (e) For a neighborhood with a 12% increase in population in the past few years, predict the change in the crime rate.

2. **Customer Purchases**

John runs a computer software store. Yesterday, 58 people entered the store, and 25 of them bought at least one item.

(a) Estimate the probability that a person who walks into the store today buys something.

(b) Estimate the probability that a person who walks into the store today does not buy anything.

3. **Marbles**

A bag contains 12 red marbles, 5 blue marbles and 3 green marbles. Without looking into the bag, you draw one at random.

(a) What is the probability that the marble you picked is red? Blue? Green?

(b) You draw a marble from the bag, then place it back into the bag before drawing a new marble. Are the probabilities of drawing marbles of the different colors the same as in part a)? Explain.

(c) You draw a marble from the bag, then draw a new marble without replacing the first one into the bag. Are the probabilities of drawing marbles of the different colors the same as in part a)? Explain.