Chapter 9 - Random Variables

37. An investor buys the stock of two companies, investing $10,000 in each. The stock of each company either goes up by 80% after a month (rising to $18,000) with probability 1/2 or drops by 60% (falling to $4,000) with probability 1/2. Assume that the changes in each are independent. Let the random variable *X* denote the value of the amount invested after one month.

- (a) Find the probability distribution of *X*.
- (b) Find the mean value of *X*.
- (c) Does the mean value represent the experience of the typical investor?

45. A manufacturer of inexpensive printers offers a model that retails for $150. Each sale of one of these models earns the manufacturer $60 in profits. The manufacturer is considering offering a $30 mail-in rebate. Assume that a randomly selected customer has probability *p* of purchasing this model of printer.

- (a) Assume that the availability of a rebate increases the probability of purchase from *p* to p∗. How much does the chance of purchase need to increase in order for the expected net profits to increase? (Assume that the manufacturer has plenty of printers to sell and that the cost to the manufacturer for the rebate is the stated $30.)
- (b) Not all rebates that are offered are used, with the chance of the rebate being used hovering around 40%. If this is so, how much does the chance of purchase need to increase in order for the expected net profits to increase? Identify any assumptions you make.

47. An insurance salesman visits up to three clients each day, hoping to sell a new policy. He stops for the day once he makes a sale. Each client independently decides whether to buy a policy; 10% of clients purchase the policy.

- (a) Create a probability model for the number of clients the salesman visits each day.
- (b) Find the expected number of clients.
- (c) If the salesman spends about 5/2 hours with each client, then how many hours should he expect to be busy each day?
- (d) If the salesman earns $3,000 per policy sold, how much can he expect to make per day?