Project

November 19, 2002

Name _____

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1. Mr. Moody has decided to invest at most \$100,000 in securities in the form of corporate stocks. He has classified his options into three groups of stocks: blue-chip stocks that he assumes will yield a 10 percent return (dividends and capital appreciation) within a year, growth stocks that he assumes will yield a 15 percent return within a year, and speculative stocks that he assumes will yield a 20 percent return (mainly due to capital appreciation) within a year. Because of the relative risks involved in his investment, Mr. Moody has further decided that no more than 30 percent of his investment should be in growth and speculative stocks and at least 50 percent of his investment should be in blue-chip and speculative stocks. Find the objective function and the system of constraints that Mr. Moody needs to use in order to decide how many stocks of each type he should buy if he wants to maximize his return.

2. In a manufacturing plant, three machines, A, B and C, produce 40 percent, 35 percent, and 25 percent, respectively, of the total production. The company's quality control department has determined that 1 percent of the items produced by machine A, 1.5 percent of the items produced by machine B, and 2 percent of the items produced by machine C are defective. If an item is selected at random and found to be defective what is the probability that it was produced by machine B and is defective? What is the probability that it is defective?

3. Let Z be the standard normal variable. Make a sketch of the appropriate region under the standard normal curve and find the given probability for the following two quantities.

   $P(-0.75 < Z < 0.5)$, $P(0.5 < Z < 0.80)$