

## Midterm #2

Econ 70  
Fall 2003

Prof. Wm. Parke

1. Harold takes four courses and his probability of passing each course is 80%. If the outcomes are independent, what is Harold's probability of passing at least 3 courses?
2. Jeff draws two cards without replacement from a standard fifty-two card deck, what is the probability that they are both aces?
3. If the number of Xerox copies made per working day in a certain office averages 500 with a standard deviation of 40. It costs the firm five cents per copy. During a period of 100 working days, what is the probability that the average cost per day is more than \$24.80?
4.  $X$  is normally distributed with a mean of 100 and a standard deviation of 20. What is the probability that  $X$  is between 90 and 120?
5. In a survey of 10,000 college graduates, 80% wish they had studied harder. Give a 95% confidence interval for the percentage of all college graduates who feel this way.
6. The year-end per share value of a major company's stock is known to be normally distributed with an expected value of 20 and a variance of 2. If you buy ten shares of this stock, what is the probability that your total investment is worth at least 199 at the end of the year?
7. Otis Elevator designs an elevator to hold 25 people. People's weights are normally distributed with a mean of 150 pounds and a standard deviation of 20. The probability a full load of people will not exceed the elevator's posted weight limit should be 99%. What should the posted weight limit be?
8. Under your null hypothesis, a new employee is satisfactory and 80% of his output will pass inspection. Under your alternative hypothesis, he is not satisfactory and only 50% of his output will pass inspection. You sample ten units of his output and reject your null hypothesis if seven or fewer units pass inspection. What is your probability of committing a Type I error?
9. Given the info in the above problem, what is your probability of committing a Type II error?
10. The correlation between the prices of Ford and GM common stock prices is 60%. If Ford's stock price is  $N(10,16)$  and GM's stock price is  $N(20,36)$ , what is the distribution of a portfolio containing 4 shares of Ford and 2 shares of GM?
11. There is an independent 0.0001 probability that any given student will become gloriously rich and send vast wealth back to his alma mater. What is probability that a group of 20,000 graduates contains at least two such individuals?
12. In a sample of 100 males and 100 females, the average income for the males is 29,000 and the average income for the females is 30,000. If the standard deviation of income is 1,000 for both groups, construct a 95% confidence interval for the difference in the expected values of incomes for females and males.