

PROB STAT HONORS

Name _____

UNIT 7 REVIEW

A producer plans an outdoor regatta for May 3. The cost of the regatta is \$8000. This includes advertising, security, printing tickets, entertainment, etc. The producer plans to make \$15,000 profit if all goes well. However, if it rains, the regatta will have to be canceled. According to the weather report, the probability of rain is 0.3.

1. Construct a probability distribution for the producer's profit.
2. What is the producer's expected profit?

A game is set up as follows: All the diamonds are removed from a deck of cards, and these 13 cards are placed in a bag. The cards are mixed up, and then one card is chosen at random (and then replaced). The player wins according to the following rules.

- If the ace is drawn, the player loses \$20.
- If a face card is drawn, the player wins \$10.
- If any other card (2–10) is drawn, the player wins \$2.

3. Construct a probability distribution for the amount that the player wins.
4. Find the mean and standard deviation of the amount that the player wins.
5. How much should be charged to play this game in order to make it a fair game?

$X = \# \text{ of red}$	0	1	2	3	4	5
$P(X \leq x)$	0.05	0.30	0.65	0.80	0.95	1.00

6. A commuter must pass through five traffic lights on her way to work and will have to stop at each one that is red. She estimates the cumulative probability distribution for the number of red lights she hits, as shown above.

What shape would the non-cumulative probability distribution have?

7. A college student on a seven-day meal plan reports that the amount of money he spends daily on food varies with a mean of \$13.50 and a standard deviation of \$7. Assume the amount that he spends is independent from day to day. Estimate his mean weekly food costs, and the standard deviation of the week's costs.

Two stores sell watermelons. At the first store the melons weigh an average of 22 pounds, with a standard deviation of 2.5 pounds. At the second store the melons are smaller, with a mean of 18 pounds and a standard deviation of 2 pounds. You select a melon at random at each store.

8. What's the mean difference in weights of the melons?
9. What's the standard deviation of the difference in weights?

10. Three out of four American adults under age 35 have eaten pizza for breakfast. If a random sample of twenty adults under age 35 is selected, find the probability that exactly sixteen have eaten pizza for breakfast.

11. The chance that a U.S. police chief believes the death penalty "significantly reduces the number of homicides" is one in four. If a random sample of eight police chiefs is selected, find the probability that at most three believe that the death penalty significantly reduces the number of homicides.

12. *American Energy Review* reported that 27% of American households burn wood. If a random sample of 500 American households is selected, find the mean and standard deviation of the number of households that burn wood.

13. Since the stock market began in 1872, stock prices have risen in about 73% of the years. Assuming that market performance is independent from year to year, what's the probability that the market will rise for four years before finally falling?

14. The 2000 Census revealed that 26% of all firms in the United States are owned by women. You call some firms doing business locally, assuming that the national percentage is true in your area. What's the probability that you have to make six calls in order to find one that is owned by a woman?

15. Suppose that, as reported by the Centers for Disease Control, about 30% of high school students smoke tobacco. Needing high school students that smoke for a survey, you begin contacting high school students. Let X be the number of contacts required to find one high school student that smokes. What are the mean and standard deviation of X ?

16. A consumer organization estimates that 29% of new cars have a cosmetic defect, such as a scratch or a dent, when they are delivered to car dealers. How many cars should you expect to inspect in order to find the first one with a cosmetic defect?