

Name _____

1. (12 pts) Suppose you have two dice, each with its six faces marked as follows:

0, 0, 0, 1, 2, 3.

The experiment is to roll the two dice one time and record the sum of the two numbers that turn up.

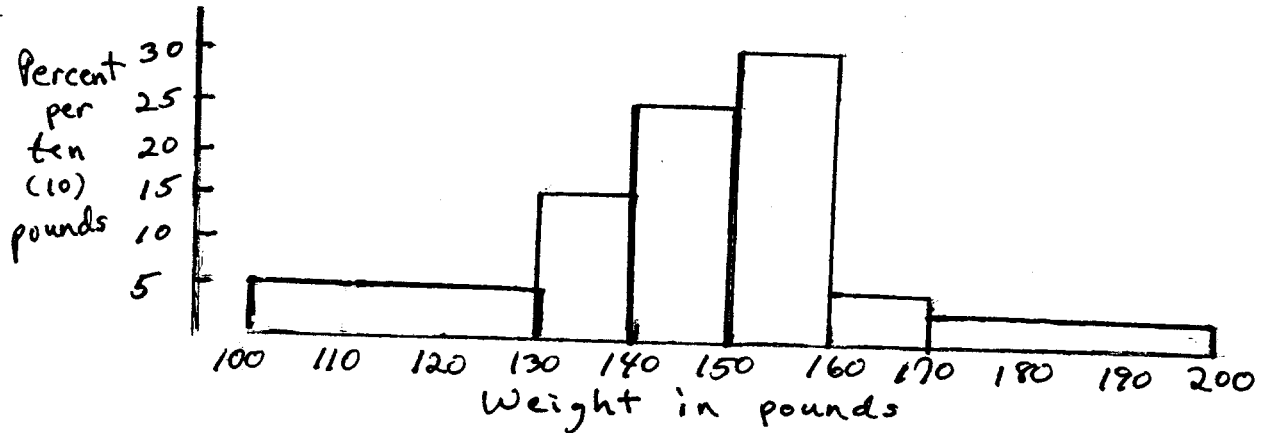
- A. What is the sample space? In other words, what are the possible numbers you can get as a sum?
- B. For each of the numbers you might get as a sum, give the probability of getting it. In other words, give the probability distribution for this experiment.
- C. What is the Expected Value for this experiment?

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2. (12 pts) In order to be hired for a certain job, an applicant must test negative for a particular drug. It is known that this drug is used by 1% of the population. The test has the following reliability: in known users of the drug, the test is positive 98% of the time. It has a false positive rate of 2%; i.e., in people who do not use the drug, 2% of them still test positive. If an applicant does test positive for this drug, what is the probability he or she is actually a user of the drug?

If an applicant tests positive twice, what is the probability he or she is actually a user of the drug?

3. (12 pts) At a spa the weights of the participants are distributed according to the histogram below.



- A. What percent of the participants weigh between 100 and 130 pounds?
- B. What percent of the participants weigh between 130 and 140 pounds?
- C. Estimate the mean weight, showing how you calculate it.
- D. The spa allows its participants 15 calories per pound per day, for food. It estimates the cost of meals at about 12 cents per calorie. If the spa has 300 participants, what is the approximate amount of money it spends on meals each day?

4. (14 pts) Suppose a particular intelligence test results in IQ scores which are normally distributed with a mean of 105 and a SD of 20.

(a) What percent of people have scores over 130?

(b) What percent of the scores are between 72 and 138?

(c) If three scores are chosen at random, what is the probability that at least one of them is below 72?

(d) Suppose to belong to an organization called SMART, you have to have a score on this test that is in the top 2%. How high a score do you need?

5. (10 pts) Suppose there is a three-person relay race. Each person runs the same distance, but they run at different rates. Trevon runs at 9.5 miles per hour, Brent at 8 miles per hour, and Larry at 6 miles per hour. They know that the team they must beat will average 7.75 miles per hour over the entire distance. What is their average rate over the entire distance? Will they beat the other team?

6. (12 pts) A certain company has decided that its net worth, W , over the next few months will fit this formula:

$W = 25 - 3n^2 + 5n$, where n represents the number of months from now, and W represents the worth in millions of dollars.

A. What are the values of W for $n = 1?$ $n = 2?$ $n = 3?$

(Problem 6 continued next page.)

6. (Continued)

B. On a graph with n being the independent variable (on the horizontal axis) and the worth, W , being the dependent variable, sketch in the three points that would represent the the data you got in A.

C. Decide if these three data points are concave up, concave down, or neither, and say how you know.

7. (12 pts) A. You have an isosceles triangle, whose base is 10 cm, and whose isosceles sides are each 9 cm. Find the area of this triangle.

(Problem 7 continued on next page.)

7. (Continued)

B. Suppose you have an isosceles triangle, whose base is B in length, and whose isosceles sides are each S in length. Find the area of this triangle, in terms of B and S .

8. (14 pts) A. A particular stock increases by 30% every week for 4 weeks. Suppose at the beginning of the 4 weeks it was worth \$200 per share. What is it worth per share at the end of 4 weeks?

B. At the end of the 4 weeks described above, the stock begins a slide, and for the next 4 weeks it loses 30% of its value per week. What is it worth at the end of these second 4 weeks?

C. If we graphed the stock price as a function of time in weeks, would the graph for the first 4 weeks be increasing or decreasing? Concave up or concave down? What about the second 4 weeks? You don't have to explain your answer.