

Graded Homework Set 1 -- Statistics Math 135 (Reference pages in red)

1. A certain type of concrete mix is designed to withstand 3000 pounds per square inch (psi) of pressure. The strength of concrete is measured by pouring the mix into casting cylinders 6 inches in diameter and 12 inches tall. The cylinder is allowed to "set up" for 28 days. The cylinders are then stacked on one another until the cylinders are crushed. The following data represent the strength of nine randomly selected casts (in psi):

3960, 4090, 3200, 3100, 2940, 3830, 4090, 4040, 3780

The mean of the data set is 3670. The median of the data set is 3830. The mode of the data set is 4090. Of the following numbers associated with the data set and the population, 3000, 3670, 3830, and 4090. Which are parameters and which are statistics? (See page 121)

2. A small community college employs 87 faculty members. To gain the faculty's opinions about the upcoming building project, the college president wishes to obtain a simple random sample that will consist of 9 faculty members. How can the president do this? Discuss a procedure she could use to obtain the sample. (See page 18 in section 1.2)

3. a. Suppose you toss a coin 100 times and get 95 heads and 5 tails. Based on these results, what is the probability that the next flip will result in a head?

b. If there are 50 tickets sold for a raffle and one person buys 2 tickets, what is the probability of that person winning this raffle which has a single prize? (See page 255 for both a. and b.)

c. If the person above with the 2 raffle tickets won, would that be an unusual or rare event? (See the bottom of page 253)

4. a. Three patients are given a headache relief tablet. The probabilities for 0, 1, 2, or 3 successes in headache relief are 0.18, 0.52, 0.21, and 0.09 respectively. Does this data describe a probability distribution? Why or why not?

b. The probability that a customer will purchase 0, 1, 2, or 3 books are 0.44, 0.30, 0.15, and 0.10 respectively. Does this data describe a probability distribution? Why or why not? (See top of page 253)

5. According to the weather channel, the probability that we will get 0 inches of rain tomorrow is $\frac{1}{3}$; that we will get 1 inch of rain is also $\frac{1}{3}$; and that we will get 2 inches of rain is also $\frac{1}{3}$.

a. Calculate the mean (average) amount of rain expected tomorrow. (See page 319)

b. Calculate the variance and standard deviation of the amount of rain expected tomorrow. (See pages 322 and 323)

6. a. A furniture store decides to select a month for its annual sale. Find the probability that it will be April or May. Assume that all months have an equal probability of being selected. (See page 266 and section 5.2)

b. If the probability that a person will watch CNN tonight is 0.03, what is the probability that the person will not watch CNN tonight? (See page 272)

c. In the game of roulette, a wheel consists of 38 slots numbered 0, 00, 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36. The odd-numbered slots are red and the even-numbered slots are black. The numbers 0 and 00 are green. To play the game, a metal ball is spun around the wheel and is allowed to fall into one of the numbered slots. What is the probability that the metal ball lands on green or red?

(See page 266)

7. At a large factory, the employees were surveyed and classified according to their level of education and whether or not they smoked. The data is shown below:

		Educational Level		
Smoking Habit	Not H.S. Graduate	H.S. Graduate	College Graduate	
Smoke	7	14	19	
Do not smoke	18	7	25	

If an employee is selected at random, find these probabilities:

a. That the selected employee smoked.

(See page 266)

b. That the selected employee was a college graduate or did not smoke.

(See page 269 and 270)

c. That the selected employee smoked given that he or she was a H.S. graduate.

(See page 283, 284, 285)

8. a. There are 8 different statistics books, 6 different geometry books, and 3 different trigonometry books. A student must select 1 book of each type. How many different ways can this be done? (See page 295)

b. How many different ID cards can be made if there are 6 digits on a card and no digit can be used more than once? For example 823509 is a valid ID card while 141617 is not. (See page 295)

9. a. How many different ways can a chairperson and an assistant chairperson be selected for a research project if there are seven scientists available and each is capable of serving in either capacity? (See page 297)

b. A bicycle shop owner has 12 mountain bicycles in the showroom. The owner wishes to select 5 of them to display at a bicycle show. How many different ways can a group of 5 be selected? (See page 299)

10. A family has 6 children. If this family has exactly two boys, how many different birth and gender orders are possible? (See page 302)