

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

1. It is known that the average American woman is 5' 4" tall and weighs 142 pounds. In a group of 30 women, it was found that the average height was 5' 6" and the average weight was 156 pounds. Does 156 pounds represent a statistic or a parameter? Please explain. (See page 121)
2. Suppose you are the president of the student government association. You wish to conduct a survey to determine the student body's opinion regarding student services. The administration provides you with a list of the names and phone numbers of the 19,935 registered students. Discuss the procedure you would follow to obtain a simple random sample of 25 students. (See section 1.2)
3. a. A large calculus class consists of 87 women and 46 men. If a student is randomly selected, what is the probability that the student is a man? (See page 478)

b. USAirways sampled 50 of its flights to see if the flights arrived on time. If 5 flights of the 50 flights arrived late, what could be considered to be the probability of a late arrival for one of its flights?
(See page 478)

c. In 3b above, is it considered unusual for a flight to arrive late?
Please explain. (See bottom of page 253 for an unusual event definition)
4. Air America has a policy of routinely overbooking flights because past experience shows that some passengers fail to show. The random variable X representing the number of passengers who cannot be boarded because there are more passengers than seats (overbooking) is shown below:

x	$P(X=x)$
0	0.804
1	0.123
2	0.057
3	0.009
4	0.006

Does this data describe a probability distribution? If so, calculate the mean of the distribution. If not, explain why it is not a probability distribution. (See page 253)

5. Determine the mean and standard deviation of the following probability distribution: (See page 319)

x	$P(X=x)$
1	0.2
2	0.4
5	0.4

6. The table below shows the soft-drink preferences of people in three age groups:

years of age (x)	cola	rootbeer	lemon-lime
$x < 21$	40	25	20
$21 \leq x \leq 40$	35	20	30
$x > 40$	20	30	35

If a person is selected at random, calculate the following probabilities using the table: (See page 284)

- The probability that a person prefers rootbeer.
- The probability that a person prefers rootbeer given that the person was greater than 40 years of age.
- The probability of selecting a person under 21 years of age.
- The probability that the person prefers cola or lemon-lime.

7. A psychology professor gives a surprise quiz consisting of 4 true/false questions, and he states that passing requires at least 3 correct responses. assume that an unprepared student adopts the questionable strategy of guessing for each answer.

- Find the probability that the first responses is incorrect and the other three are correct.
- Is there any other arrangement of 3 correct and 1 incorrect responses whereby the student will pass the quiz? If so, give an example and calculate its probability of occurrence.

(See page 333, example 4 and on page 330, example 2)

8. Calculate the following numbers:

- $4!$
- ${}_8P_5$
- ${}_9C_2$
- $\frac{999!}{1000!}$

(See pages 296 and 299)

9. Only 1000 tickets numbered 1 to 1000 are sold for a lottery with the first prize being a trip to Las Vegas. The second prize is \$2000. A winning ticket is not put back into the drawing. A person does not have to be present to win. The first ticket drawn is for the first prize and the second ticket drawn is for the second prize. You have two tickets numbered 680 and 681.

- What is the probability that you win the first prize?
- What is the probability that you win both prizes?
- What is the probability that you win the second prize given that you didn't win the first prize?
- What is the probability that you do not win a prize?

(See section 5.4)

10. Eight basketball players are to be selected to play in a special game. The players will be selected from a list of 15 eligible players. If the players are selected randomly, what is the probability that the 8 tallest players will be selected? (See section 5.5)