

## MATH 23 STATISTICS AND PROBABILITY SECOND TEST. FALL 2011

1. The following table represents the results of the first quiz and the final exam on a sample of seven students of a Math Class at a college:

I quiz	50	50	70	70	98	78	98
Final	30	20	53	56	93	56	86

- (a) (5 points) Draw the scattered plot of the set of data. Using only the scatter diagram would you estimate the correlation coefficient to be positive, negative, or zero? Explain your answer.
- (b) (5 points) Compute the correlation coefficient is  $r$  and interpret your result.
- (c) (10 points) Find and plot the least square line, make sure to include the point  $(\bar{x}, \bar{y})$  and the  $y$ -intercept.
- (d) (5 points) If a student obtains 60 in the first quiz, what will be the predicted grade for the final?
2. Two dice are rolled. Find the probability of the following events:
- (a) (5 points) The sum is less than 4.
- (b) (5 points) One of them is even and the other is odd.
- (c) (5 points) The sum is less than 20.
- (d) (5 points) The sum is 15.
3. A number is selected randomly from the list  $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ . Consider the following events:  
A= The number selected is less or equal to 7. B= The number selected is more than 2.
- (a) (5 points) Compute  $P(A)$  and  $P(B)$ .
- (b) (5 points) Explain the meaning in this situation of the event  $A \cap B$ . Find  $P(A \cap B)$ .
- (c) (5 points) Explain the meaning in this situation of the event  $A \cup B$ . Find  $P(A \cup B)$ .
4. Three cards are randomly selected from a standard 52 card deck **without replacement**. Find the probabilities of the following events:
- (a) (5 points) The first two cards are Kings and the third is an Ace. Give an example of two events that are dependent.
- (b) (5 points) Either the first two are Kings and the third card is an Ace or the first two are Aces and the third one is a King. Give an example of two events that are mutually exclusive.
- (c) (5 points) Suppose that the problem is changed to do it **with replacement**. What would be the probability of selecting two Kings and an Ace in that order. Identify two independent events in this case.
5. In a statistics class there are 18 juniors and 10 seniors; 6 of the seniors are female, and 12 of the juniors are males. If a student is selected at random, find the probability of selecting the following:

- (a) (3 points) A junior or a female.
  - (b) (3 points) A senior or a female.
  - (c) (3 points) A junior or a senior.
6. Calculate the following binomial coefficients:
- (a) (5 points)  $C_{1000,2}$
  - (b) (5 points)  $C_{88,86}$
7. (6 points) How many different groups of three symbols can be formed using the set  $\{1, 2, 3, 4, \%, \$\}$ ?  
How many different passwords with three symbols can we made using the same set?