

MATH 23 STATISTICS AND PROBABILITY EXTRA CREDIT. FALL 2012

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	55	70	70	98	78	98
Final	27	22	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. 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 $P(A \cup B)$.
3. 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.
4. 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.
5. Calculate the following binomial coefficients:
- (a) (5 points) $C_{1000,2}$

- (b) (5 points) $C_{88,86}$
6. (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?
7. Consider the following probability distribution:

x	1	2	3	4	5
P(x)	.21	.12	.18	.25	

- (a) (3 points) Sketch the graph of the distribution.
- (b) (5 points) Calculate the expected value.
- (c) (5 points) Calculate standard deviation.
8. A baseball player hits the ball 40% of the times. What is the probability of getting:
- (a) (3 points) Exactly four hits in 12 opportunities.
- (b) (3 points) At most four hits in 12 opportunities.
- (c) (5 points) If the random variable X represents the amount of hits in 12 opportunities, what kind of distribution of probability is represented in this experiment? what is the expected value μ and standard deviation σ ?