

Math 1110-01: Practice Midterm 1 (T)

Early Summer 2024
N.S.

Questions	1	2	3	4	5	Bonus	Total
Points							

(1) (20 points) Solve the following problem:

(a) (5 points) Identify each variable as quantitative or qualitative:

- Amount of time it takes to assemble a simple puzzle.
- Number of students in a first-grade classroom.
- Rating of a newly elected politician (excellent, good, fair, poor).
- State in which a person lives.

(b) (5 points) Identify each variable as continuous or discrete:

- Population in a particular area of the United States.
- Weight of newspapers recovered for recycling on a single day.
- Time to complete a sociology exam.
- Number of consumers in a poll of 1000 who consider nutritional labeling on food products to be important.

(c) (10 points) Consider this set of data:

4.5	3.2	3.5	3.9	3.5	3.9	4.3	4.8	3.6	3.3
4.3	4.2	3.9	3.7	4.4	4.0	3.6	5.1	5.2	5.7

Construct a stem and leaf plot to describe the data. Discuss the characteristics of the data distribution (Is it left-skewed, right-skewed, or symmetrical).

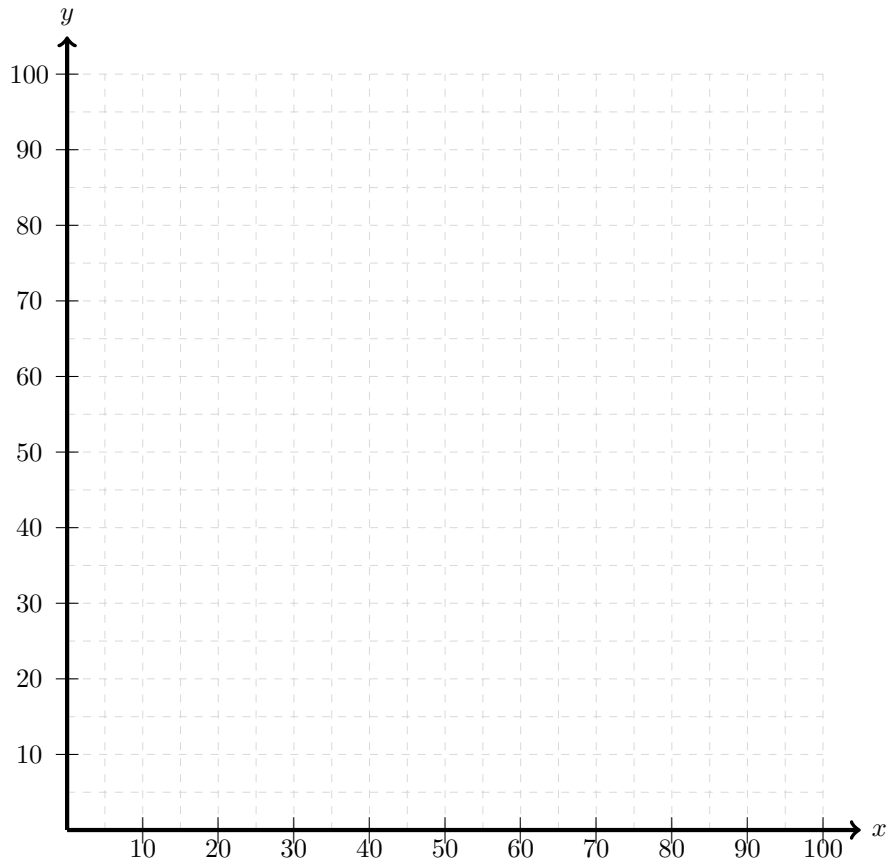
- (2) (20 points) The prices of a 6-ounce can or a 7.06-ounce pouch for 14 different brands of water-packed light tuna, based on prices paid nationally in supermarkets, are reproduced here.

0.9	1.9	1.2	0.8
0.6	0.5	1.4	1.1
0.6	0.6	0.7	0.6

- (a) (5 points) Find the mean, median, and mode of the data.
- (b) (5 points) Find the variance and standard deviation of the data.
- (c) (5 points) Find the range, quartiles and the Inter-Quartile Range (IQR) of the data.
- (d) (5 points) Draw a boxplot of the data.

- (3) (20 points) Of two personnel evaluation techniques available, the first requires a two-hour test-interview while the second can be completed in less than an hour. The scores for each of the eight individuals who took both tests are given in the next table.

Test 1	75	89	60	71	92	98	55	87	47	98
Test 2	38	56	35	45	59	97	50	85	52	2



- (a) (12 points) Construct a scatter plot of the data taking rainfall on x -axis and snowfall on y -axis.

- (b) (2 points) Write down any outliers in the data.

- (c) (3 points) Circle the correlation coefficient that describes the data.

$$r = 0.8 \qquad r = -0.8 \qquad r = 0.18 \qquad r = -0.18$$

- (d) (3 points) If you remove the outlier from the data, how would it affect the value of the r -coefficient?

- (4) (20 points) Is your chance of getting a cold influenced by the number of social contacts you have? A study by Sheldon Cohen, a psychology professor at Carnegie Mellon University, seems to show that the more social relationships you have, the less susceptible you are to colds. A group of 276 healthy men and women were grouped according to their number of relationships (such as parent, friend, church member, neighbor). They were then exposed to a virus that causes colds. An adaptation of the results is shown in the table:

	Number of relationships		
	Three or Fewer	Four or Five	Six or More
Cold	49	43	34
No Cold	31	57	62
Total	80	100	96

- (a) (5 points) If one person is selected at random from the 276 people in the study, what is the probability that the person got a cold?
- (b) (5 points) If two people are randomly selected, what is the probability that one has four or five relationships and the other has six or more relationships?
- (c) (5 points) If a single person is randomly selected and has a cold, what is the probability that he or she has three or fewer relationships?
- (d) (5 points) If one person is selected at random from the 276 people in the study, what is the probability that the person got a cold given that he was exposed to four or five people.?

(5) Solve the following:

(a) (8 points) A USA Today Snapshot reports that among people 35 to 65 years old, nearly two-thirds say they are not concerned about being forced into retirement. Suppose that we randomly select $n = 15$ individuals that in this age category and approximate the value of p as $p = 0.7$. Let x be the number that say they are not concerned with forced retirement.

(i) (4 points) Find the probability that x exceeds 8?

(ii) (4 points) What is the largest value of c for which $P(x \leq c) = 0.7$.

(b) (12 points) A candy dish contains five blue and three red candies. A child reaches up and selects three candies without looking.

(i) (4 points) What is the probability that there are two blue and one red candies in the selection?

(ii) (4 points) What is the probability that the candies are all red?

(iii) (4 points) What is the probability that the candies are all blue?

Bonus (12 points) Solve the following problems.

- (a) (3 points) A candy dish contains seven brown and three red balls. A child selects four balls without checking the colors. What is the probability that there are three brown and one red ball in the selection?
- (b) Parents who are concerned that their children are “accident prone” can be reassured, according to a study conducted by the Department of Pediatrics at the University of California, San Francisco. Children who are injured two or more times tend to sustain these injuries during a relatively limited time, usually 1 year or less. If the average number of injuries per year for school-age children is two, what are the probabilities of these events?
- (i) (3 points) A child will sustain two injuries during the year.
- (ii) (3 points) A child will sustain two or more injuries during the year.
- (iii) (3 points) A child will sustain at most one injury during the year.