

MTH 20

Practice Final Exam

1. Consider the following random sample:

2.4 3.5 1.2
1.1 6.0

- a. Find the median.
 - b. Find the sample mean.
 - c. Find the sample standard deviation. Round your answer to two decimal places.
2. At a meeting of the International Astronomical Society, 45% of the attendees are females and 30% are teachers. Given that an attendee is a teacher, 55% are females. What is the probability that a randomly selected attendee is both a teacher *and* a female?
3. A MTH 23 class consists of 52% males, 65% liberal arts majors, and 41% who are both males and liberal arts majors. Find the probability that a randomly selected student in the class is either a male *or* a liberal arts major.
4. The following is a summary of the data from a survey:

	Blue	Red	Green	Row Totals
Private	52	45	21	118
Public	63	31	12	106
Student	24	47	29	100
Column Totals	139	123	62	324

If a respondent is randomly selected, find the probabilities of the following events:

- a. Green
 - b. Public *and* Blue
 - c. Public
 - d. Student, *given* Red
 - e. Student *or* Red
5. Twenty-five percent of independents are senior citizens. A random sample of 10 independents is selected.
- a. Find the probability that at most 3 are senior citizens.
 - b. Find the expected value.
 - c. Find the standard deviation (rounded to 2 decimal places)

6. The time (in hours) to complete a project is normally distributed with mean $\mu = 25$ and standard deviation $\sigma = 9.6$.
- What is the probability that a randomly selected project will be completed in no more than 44 hours?
 - What is the probability that a random sample of 20 projects has a mean completion time of at least 19 hours?
7. The price of a MacBook Air varies depending on the online store. A random sample of 6 online stores had a sample mean price (in thousands of dollars) for a MacBook Air of $\bar{x} = 1.1$ with a sample standard deviation of $s = 0.2$. Find a 95% confidence interval for the population mean price (in thousands of dollars) μ of MacBook Airs sold online. You may assume that the online price of a MacBook Air is normally distributed.
- Find the critical value t .
 - Find the maximal margin of error.
 - Find the lower endpoint of the confidence interval.
 - Find the upper endpoint of the confidence interval.
8. It is generally believed that the average annual income (in thousands of dollars) of workers in a certain region is 45. In a recent study, a random sample of 15 workers from that region had a sample mean annual income in thousands of dollars of $\bar{x} = 39$. Let x be a random variable representing the annual income in thousands of dollars of a worker in that region. You may assume that x has an approximately normal distribution with $\sigma = 13.2$.
- What is the value of the sample test statistic z ?
 - What is the P-value?
 - At a significance level of 0.05, what can we conclude about the annual income of workers in the region? Choose one of the following responses:
 - The annual income of workers is lower than 45.
 - The annual income of workers is not lower than 45.
 - The annual income of workers is higher than 45.

9. Consider the following sample data:

x	2.4	9.8	6.1	8.0	1.4
y	35	5	10	20	50

- Draw a scatter diagram.
- Based on the scatter diagram, estimate the correlation coefficient as positive, zero, or negative.