List of Questions for Final Review

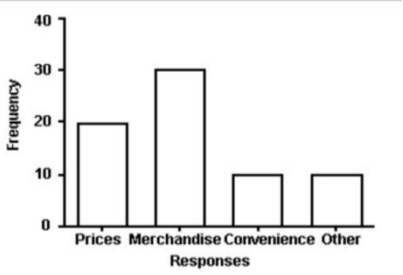
1. (Type of Measurement) A statistics instructor wants to graph the letter grades (A, B, C, D, and F) from Exam 1 for their introductory statistics class. Which type of data should be used?

   Ordinal

2. (Mean, Median, and Mode) The salaries of 7 doctors at a private practice are:
   $123,000, $114,000, $110,000, $158,000, $180,000, $140,000, $162,000
   What is the median of these salaries?

   $140,000

3. (Frequency Table and Histogram) Target surveys a sample of shoppers and asks each person why they chose to shop at this store. The responses were categorized by prices, merchandise, convenience, and other. The results of the survey are shown in the bar chart below. What proportion of customers responded that convenience was the reason they shopped at Target? Round final answer to two decimal places.



   0.14

4. (Percentile) In the year 2018, it was estimated that approximately 28,000 Floridians were homeless. A social worker estimates that 80 % of these people were aged 18 and up. In the distribution of ages of homeless Floridians, an 18-year-old would be considered what percentile?

   20% Percentile

5. (Empirical Rule and Chevyshev's Inequality) The average length of adult male American alligators is 3.0 meters. Suppose the distribution of lengths is mound/bell shaped, and the standard deviation is 0.5 meters. What percent of adult male American alligators are between 2.5 and 3.5 meters long?

   About 68%

6. (Z-score) An airline claims that its average taxi time is 20 minutes, and the standard deviation is 3 minutes. The taxi time has a bell/mound shape distribution. On a flight with this airline, you observe that the taxi time is 18.5 minutes. Calculate the z score for your flight's taxi time. Round the final answer to 2 decimal places.

   -0.5

7. (Empirical Probability and Conditional Probability) The average price of insulin in the US almost tripled between the years 2002 and 2013, and prices continue to rise. In one study, 287 Americans with diabetes were categorized by age: (Under 55, 55 or older) and whether or not they can regularly afford to buy insulin. Find the probability that a randomly selected person from this study can regularly afford insulin, given that the randomly selected person is 55 or older. Type your answer as a decimal rounded to the third decimal place (thousandths place).

	Under 55	55 or older	Total
Can't regularly afford insulin	66	83	149
Can regularly afford insulin	76	62	138
Total	142	145	287

0.428

8. (Multiplication and Addition Rule) Suppose that 20% of students have their own Amazon account, 15% have their own Disney+ account, and 3% have both their own Amazon and Disney+ accounts. Let event A={a student has their own Amazon account} Let event D={a student has their own Disney+ account} Find P(AUD).

0.32

9. (Independence and Mutually Exclusive) Are A and D in problem 8 independent?

Yes. $P(A \cap B) = P(A) \times P(B)$

10. (Discrete Probability Distribution) A marine conservationist works to prevent dolphin deaths from entanglement in fishing nets. From past data, the conservationist calculates the following probability distribution where x= the number of dolphins saved from fishing nets in a month. Calculate the mean number of dolphins saved from fishing nets in a month. Round final answer to two decimal places (hundredths place).

x	0	1	2	3	4
P(x)	0.34	0.46	0.15	0.04	0.01

0.92

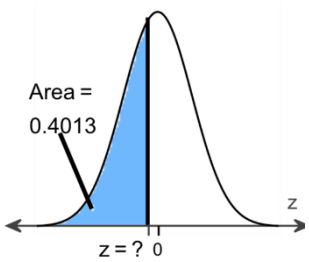
11. (Probability in Binomial Distribution) You flip a fair coin four times. What is the probability that you observe two tails, and two heads on three flips?

$\frac{6}{16}$

12. (Mean and Standard Deviation in Binomial Distribution) Suppose that 40 % of political science majors want to go to law school. The binomial random variable x equals the number of political science majors in a sample of 200 who want to go to law school. What is the mean (μ) and standard deviation (σ) of this binomial random variable x?

$\mu = 80, \sigma = 6.928$

13. (Probability and Z-score in Standard Normal Distribution) Find the indicated z score on the graph. Your answer should have two decimal places as needed.



-0.25

14. (Probability and Z-score in Normal Distribution) The salaries of pharmacy techs are normally distributed with a mean of $20,000 and a standard deviation of $3,000. If a pharmacy tech is selected at random, what is the probability they will make more than $24,000?

0.02275

15. (Central Limit Theorem and Sampling Distribution) Is it true or false? A sampling distribution is normal if either $n \geq 30$ or the population distribution is normal.

True

16. (Confidence Interval for Mean known std. dev.) A random sample of 40 UCF students has a mean electricity bill of $100. Assume the population standard deviation is $12. Construct a 90% confidence interval for the mean electricity bill of all UCF students. Round final answer to two decimal places. (Please write the number only.)

[96.88, 103.12]

17. (Confidence Interval for Mean unknown std. dev.) From a random sample of 20 people in a jail, the number of days remaining in each of their sentences was noted. The 20 people have a mean remaining sentence of 600 days with a sample standard deviation of 30 days. Assume the population of remaining sentences is normally distributed. Construct a 95% confidence interval for the mean remaining sentence of all people in jail. Round final answer to one decimal place.

[586.0, 614.0]

18. (Confidence Interval for Proportion) A political researcher takes a survey of 300 randomly selected registered voters in Orlando, and each person was asked who they plan on voting for in the 2023 mayoral election. 120 said they plan on voting for Candidate A, 160 said they plan on voting for Candidate B, and 20 were unsure or plan to vote for another candidate. Construct a 99% confidence interval for the proportion of all registered voters in Orlando who plan to vote for Candidate A. Round final answer to 3 decimal places.

[0.327, 0.473]

19. (Build Hypothesis) A beverage bottling company labels a product as having a mean volume of 10 oz. It is important to the company and consumers that the volume of each beverage is as close to 10 oz as possible. A quality control analyst randomly selects 50 beverages and finds that the mean volume is 10.2 oz. The population standard deviation is known as 0.75 oz. The company will need to adjust the bottling procedures if evidence exists that the mean volume of all beverages differs from 10 oz. Is this enough evidence at $\alpha = 0.05$ to conclude that the mean volume of all beverages differs from 10 oz? What are the hypotheses of the test?

$H_0: \mu = 10, \quad vs. \quad H_a: \mu \neq 10$

20. (P-value and Rejection Region) What is the p-value of the test above? And what is the rejection region?

P-value = 0.05934
Rejection Region = {z < -1.96} or {z > 1.96}

21. (Conclusion in Hypothesis Testing) What is the conclusion of the test above?

Fail to Reject the null hypothesis.

22. (Hypothesis Testing for the Mean) A statistics instructor wants to conduct a hypothesis test to determine if the mean number of credit hours taken by all UCF students is more than 10 hours. The instructor takes a sample of 25 UCF students and finds that they have a mean of 10.3 hours and a sample standard deviation of 3.0 hours. Assume the population distribution of credit hours taken is approximately normal. What is the conclusion of the test if the level of significance is 0.01?

Fail to reject the null hypothesis because the p-value is 0.31042 > 0.01.

23. (Hypothesis Testing for the Proportion) A political scientist investigated the effect of political advertisements on the way that people voted in the presidential election. They want to do a hypothesis test to determine if political advertisements influenced the votes of less than 25% of all voters. The political scientist randomly surveyed 2500 voters and asked if political advertisements influenced the way they voted. 575 said the advertisements did influence their vote. What is the conclusion of the test if the level of significance is 0.1?

Reject the null hypothesis because the p-value is 0.01046 < 0.1.

24. (Correlation Coefficients and Regression) The correlation between X and Y is 0.8. Describe the relationship between X and Y.

The higher X is, the higher Y tends to be.