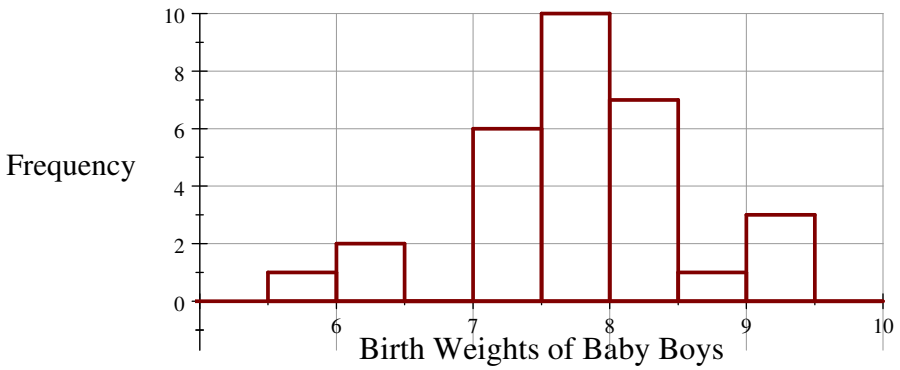
TMATYC - Statistics Test - 2013

1. A survey of 800 high school students found that 60% of them admitted to cheating at one point during high school. Of those in the survey who admitted to cheating, 45% said that it was not wrong to cheat in order to get a good grade. How many of the students in the survey who admitted to cheating did not think it was wrong to cheat in order to get a good grade?

A. 216 B. 296 C. 360 D. 480 E. 705

Use the following histogram showing the birth weights (in pounds) of a sample of 30 baby boys to answer Questions 2 and 3 below.



2. Based on the histogram above, how many baby boys weighed more than 6.8 pounds?

A. 2 B. 3 C. 6 D. 11 E. 27

3. Based upon the above histogram, which of the weights below (in pounds) could possibly be the median weight for the 30 baby boys?

A. 5.0 B. 6.8 C. 7.2 D. 7.7 E. 8.3

4. If all the values in set of 100 quantitative data values are equal, then the standard deviation for the sample must be

A. 0 B. 1 C. 10 D. 50 E. undefined

5. A set of 4 positive numbers has a mean of 10, a mode of 3, and a range of 21. The median of this set of numbers must be

A. 3 B. 6 C. 6.5 D. 7 E. 17

6. The quadratic mean of a set of n values is defined as

$$\text{quadratic mean} = \sqrt{\frac{\sum x^2}{n}}$$

Use this formula to find the quadratic mean for the values $-10,\ 0,\ 12,\ 15$. Round to the nearest tenth.

A. 2.5 B. 4.3 C. 9.3 D. 10.8 E. 11.5

7. Excluding people born in leap years, what is the probability two randomly selected people have the same birthday?

A. $\frac{1}{365}$ B. $\left(\frac{1}{365}\right)^2$ C. $\left(\frac{1}{2}\right)^{365}$ D. $\left(\frac{1}{365}\right)\left(\frac{1}{364}\right)$ E. $\frac{2}{365}$

8. A random sample of 200 filed income tax returns found that 24 of them were audited by the IRS. What is the probability that one of these randomly-selected tax returns was **not** audited by the IRS?

A. 0.12 B. 0.24 C. 0.48 D. 0.76 E. 0.88

9. A robotic arrow-shooting machine has a 20% chance of missing a target. If it fires 5 arrows at the target, what is the probability that it hits the target at least once? Round to the nearest hundredth of a percent.

A. 99.97% B. 82.00% C. 40.96% D. 8.19% E. 0.13%

10. A license plate must have 3 letters followed by 3 digits (0 through 9). If the last digit must be positive and even, how many different license plates are possible?

A. 7,030,400 B. 8,788,000 C. 10,612,000 D. 17,576,000 E. 241,860,000

11. Sixty-four percent of adult Americans use Facebook. If 10 adult Americans are randomly selected, what is the probability that 6 of them use Facebook? Round your answer to three significant digits.

A. 0.00115 B. 0.242 C. 0.360 D. 0.600 E. 0.687

12. Luigi's Pizza Parlor just opened. Due to a lack of employee training, there is only a 0.8 probability that a pizza will be edible. An order for five pizzas has just been placed. What is the minimum number of pizzas that must be made in order to be at least 99% sure that there will be five that are edible?

A. 9 B. 10 C. 11 D. 12 E. 13

13. Assume that the random variable z has a standard normal distribution. If $P(z > a) = 0.8925,$ then find a accurate to the second decimal place.

A. -2.36 B. -1.24 C. -0.11 D. 0.11 E. 1.24

14. The scores on a test are normally distributed with a mean of 100 and standard deviation of 20. What percent of the tests had scores more than 110? Round answer to one-tenth of one percent.

A. 45.5% B. 30.9% C. 23.4% D. 18.4% E. 2.3%

15. Boxes of Wheaties cereal have a mean weight of 15.6 ounces with a standard deviation of 0.07 ounces. If 49 boxes of wheaties are randomly selected, what is the probability their mean weight is less than 15.59 ounces? Round answer to three significant digits.

A. 0.077 B. 0.143 C. 0.159 D. 0.443 E. 0.7

16. Which of the following statements is false?

A. As the sample size increases the margin of error decreases
B. As the confidence level increases the margin of error decreases
C. The limits of a confidence interval are two margin of errors apart
D. The confidence level is the probability the confidence interval contains the population parameter
E. The margin of error is the maximum likely distance from the observed statistic to the population parameter

17. A sample is used to construct the following confidence interval for a population proportion: $0.355 < p < 0.395$. What is the margin of error, E, for this confidence interval and what was the sample proportion, $\hat{p}$?

A. $E = 0.04$, $\hat{p} = 0.360$ B. $E = 0.04$, $\hat{p} = 0.375$ C. $E = 0.038$, $\hat{p} = 0.383$

D. $E = 0.02$, $\hat{p} = 0.360$ E. $E = 0.02$, $\hat{p} = 0.375$

Use the probability distribution for the discrete random variable shown below to answer Questions 18 and 19

x	0	1	2	3	4	5	6
$P(x)$	0.25	0.05	0.10	0.25	0.15	0.05	0.15

18. Using the probability distribution above, what is the probability x is at most 3?

A. 0.25 B. 0.60 C. 0.40 D. 0.65 E. 0.35

19. What is the mean for the probability distribution shown above?

A. 3.5 B. 3 C. 2.5 D. 2.75 E. 0.14

Use the paired (x, y) data given in the table below to answer Question 20

x	18	22	25	30	33	34	35	39
y	19	12	13	16	11	9	10	6

20. Based upon the paired data (x, y) from the table above, which of the following statements is true? (Assume a 0.05 significance level is used in each case.)

A. There is positive linear correlation between x and y and the regression equation is $y = 25.7 - 0.464x$.
B. There is negative linear correlation between x and y and the regression equation is $y = 25.7 - 0.464x$.
C. There is positive linear correlation between x and y and the regression equation is $y = 25.7x - 0.464$.
D. There is negative linear correlation between x and y and the regression equation is $y = 25.7x - 0.464$.
E. There is no linear correlation between x and y.

21. A sociologist claims that a majority of Americans favor legalizing marijuana for medicinal purposes. Using a sample of 500 randomly selected Americans, the sociologist obtains a P-value of 0.071. Using a 0.05 significance level, which of the following conclusions is correct?

A. Reject the null hypothesis, the sample data support the sociologist's claim.
B. Reject the null hypothesis, there is not enough sample data to support the sociologist's claim.
C. Failure to reject the null hypothesis, the sample data support the sociologist's claim.
D. Failure to reject the null hypothesis, there is not enough sample data to support the sociologist's claim.
E. There is not enough information about the sample to make a decision.

22. Shaq made 40% of his shots in the first half of a basketball game and 75% of his shots in the second half. Kobe made 25% of his shots in the first half and 70% in the second half. Which of the following statements must be true?

A. Shaq attempted more shots than Kobe.
B. Kobe attempted more shots than Shaq.
C. Shaq had a higher shooting percentage for the entire game than Kobe.
D. Kobe had a higher shooting percentage for the entire game than Shaq.
E. There is not enough information to determine who had the better shooting percentage for the entire game.

23. A deck of 52 cards is shuffled and one card is drawn. What is the probability that the card is an ace or a spade?

A. $\frac{1}{52}$ B. $\frac{4}{52}$ C. $\frac{13}{52}$ D. $\frac{16}{52}$ E. $\frac{17}{52}$

24. The z-score (or standard score) for the data value x is -1.5. If the standard deviation for the population is 3, then the population mean, μ, can be expressed in terms of the data value x as

A. $\mu = x + 4.5$ B. $\mu = 4.5 - x$ C. $\mu = 3x - 1.5$ D. $\mu = 1.5 - 3x$ E. $\mu = 3x + 4.5$

25. A polygraph test is 90% accurate (it will correctly detect 90% of people who are lying and it will correctly detect 90% of people who are telling the truth). The 2,000 employees of a company are given a polygraph test during which they are asked whether they use drugs. All of them deny drug use, when, in fact, 1% of the employees actually use drugs. Assume that anyone whom the polygraph operator finds untruthful is accused of lying. What percentage of those accused of lying will be falsely accused? (Round answer to the nearest tenth of a percent.)

A. 81.0% B. 90.0% C. 91.7% D. 93.5% E. 99.9%