

TMATYC - Statistics Test - 2014

- Modern Managed Hospitals is a national for-profit chain of hospitals. Management wants to survey patients discharged this past year to obtain patient satisfaction profiles. They wish to use a sample of such patients. Obtain a list of patients discharged from all MMH facilities as follows: Divide the patients according to length of hospitals stay (2 days or less, 3-7 days, 8-14 days, more than 14 days) and draw simple random samples from each group. This technique of sampling can best be categorized as a
 A. simple random sample B. stratified sample C. systematic sample
 D. cluster sample E. convenience sample
- A national survey asked 1261 U.S. adult fast-food customers which meal (breakfast, lunch, dinner, snack) they ordered. Identify the variable
 A. 1261 B. meal type C. U.S. Adult D. Fast Food Customers E. cost of meal
- A recent study looked at the effects of wind shear on airplanes during which both landing and takeoff were studied by using complex computer programs that mimic actual flight. Which technique for gathering data do you think was used in the study
 A. sampling B. experiment C. simulation D. census E. survey
- A frequency table with equal class width is constructed for a data set of whole numbers so that the first class is 20-27. What is the class width for this frequency table?
 A. 3.5 B. 7 C. 8 D. 23.5 E. cannot be determined
- The harmonic mean of the positive numbers x_1, x_2, \dots, x_n is defined to be the reciprocal of the arithmetic mean of the reciprocals $\frac{1}{x_1}, \frac{1}{x_2}, \dots, \frac{1}{x_n}$.
 Suppose you drive 60 miles per hour for 100 miles, then 75 miles per hour for 100 miles. Use the harmonic mean to find the average speed (round to the nearest tenth of a mile per hour if needed).
 A. 67.5 B. 62.4 C. 60 D. 72 E. 66.7
- A random sample of 895 incidents of shoplifting gave the following distribution. Estimate the mean age for the shoplifters.

Age (in years)	21-30	31-40	41-50
Number of shoplifters	260	348	287

- A. 7.8 B. 23.0 C. 34.4 D. 35.8 E. 298.3
- Which of the following five number summaries most likely comes from a set of quantitative data that has a normal distribution?
 A. Min = 0, $Q_1 = 5$, $Q_2 = 10$, $Q_3 = 15$, Max = 20 B. Min = 0, $Q_1 = 2$, $Q_2 = 3$, $Q_3 = 4$, Max = 20
 C. Min = 0, $Q_1 = 16$, $Q_2 = 17$, $Q_3 = 18$, Max = 20 D. Min = 0, $Q_1 = 1$, $Q_2 = 10$, $Q_3 = 19$, Max = 20
 E. Min = 0, $Q_1 = 8$, $Q_2 = 10$, $Q_3 = 12$, Max = 20
 - The mean of four whole numbers is 5. If the mode of the numbers is 6 and the median is 5.5, what is the minimum of the four numbers?
 A. 0 B. 1 C. 2 D. 3 E. 4

9. A random sample of pharmaceutical companies found the number of research programs (x) each company had as well as the mean number of patients per program (y). The results are presented below.

x	10	12	14	16	18	20
y	1.8	1.7	1.5	1.4	1.0	0.7

Suppose a pharmaceutical company similar to those in the sample has 11 different research programs. What does the least-squares regression equation forecast for the mean number of patients per program?

- A. 1.35 B. 1.45 C. 1.75 D. 1.79 E. 15.0
10. Consider a randomly selected family of 3 children. What is the probability that all three children are boys?
- A. $\frac{1}{8}$ B. $\frac{1}{6}$ C. $\frac{1}{3}$ D. $\frac{3}{8}$ E. $\frac{1}{2}$
11. A random sample of 230 patients, some of whom have a particular medical condition and some of whom do not, are given a diagnostic test. A positive result (+) means the test indicated the patient had the condition, while a negative result (–) means the test indicated the patient did not have the condition. The results are shown in the table below.

	Condition Present	Condition Absent
Test Result +	110	30
Test Result –	20	70

If one of these patients are randomly selected, find the probability they test positive given that the condition was present in the patient.

- A. $\frac{30}{110}$ B. $\frac{1}{110}$ C. $\frac{110}{230}$ D. $\frac{110}{140}$ E. $\frac{110}{130}$
12. The qualified applicant pool for six management trainee positions consists of seven women and five men. If the applicants are equally qualified and the trainee positions are selected by drawing the names at random so that all groups of six are equally likely, what is the probability that the trainee class will consist entirely of women?
- A. $\frac{1}{6}$ B. $\frac{1}{123}$ C. $\frac{1}{132}$ D. $\frac{1}{7}$ E. $\frac{6}{7}$
13. Let x be the sum of two four-sided dice. Find all possible values of x .
- A. $x = 0, 1, 2, 3, 4$ B. $x = 1, 2, 3, 4, 5, 6, 7, 8$ C. $x = 2, 3, 4$
D. $x = 2, 3, 4, 5, 6, 7, 8$ E. $x = 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12$
14. The probability that a fisherman catches x fish in a 6-hour period follows the distribution below.

x	0	1	2	3	4 or more
$P(x)$	0.44	0.36	0.15	0.04	0.01

Find the probability that a fisherman catches at least 2 fish in a 6-hour period.

- A. 0.95 B. 0.8 C. 0.2 D. 0.15 E. 0.05

15. Seventy-five percent of all marketing personnel are extroverts. At a meeting of 15 marketing personnel, what is the probability that less than 10 are extroverts? (Round to 3 significant digits.)
 A. 0.165 B. 0.148 C. 0.314 D. 0.852 E. 0.0917
16. One-fourth of all people called to jury duty will find an excuse (work, poor health, travel out of town, etc.) to avoid jury duty. If 12 people are called to jury duty, what is the probability all 12 will be available to serve?
 A. 0.317 B. 0.254 C. 0.750 D. 0.986 E. 5.96×10^{-8}
17. Find the area under the standard normal curve between $z = -1.98$ and $z = -0.03$.
 A. 0.0239 B. 0.358 C. 0.464 D. 0.488 E. 0.512
18. The ages of replacement for a certain brand of refrigerator are approximately normally distributed with a mean of 14 years and 95% of such refrigerators last between 9 and 19 years. Which of the following is the best approximation for the standard deviation for these ages?
 A. 2 B. 2.5 C. 3.5 D. 4.25 E. 5
19. Based on past experience, an airline has found that about 6% of people making reservations on a flight from Miami to Denver do not show up for the flight. Suppose the airline overbooks this flight by selling 267 ticket reservations for an airplane with only 255 seats. What is the probability that not enough seats will be available for this flight?
 A. 0.118 B. 0.0573 C. 0.187 D. 0.0652 E. 0.94
20. A The weights (in pounds) of a random selection of 6 wild mountain lions in New Mexico are given below.

68 104 128 122 60 64

Use this information to find a 95% confidence interval for the mean weight (in pounds) of all adult mountain lions in New Mexico. Assume the weights of adult mountain lions are normally distributed.

- A. (58.7, 123.2) B. (66.4, 115.6) C. (86.45, 95.55)
 D. (90.05, 91.95) E. (60, 128)
21. In a survey of 1000 large corporations, 250 said that, given a choice between a job candidate who smokes and an equally qualified non-smoker, the non-smoker would get the job. Based upon this data, find a 0.95 confidence interval for the proportion, p , of all corporations preferring a nonsmoking candidate.
 A. $21.4\% < p < 28.6\%$ B. $25.0\% < p < 34.5\%$ C. $23.8\% < p < 26.2\%$
 D. $20.2\% < p < 29.8\%$ E. $22.3\% < p < 27.7\%$

22. A random sample of 10 large U.S. banks gave the following price-to-earning (P/E) ratios. Assuming that these ratios have a normal distribution and that $\sigma = 4.5$, do the data indicate that the P/E ratios for all large U.S. banks are less than 19? Find the p -value and use a significance level of $\alpha = 0.05$.

24 16 22 14 12
22 15 19 11 13

- A. p -value $> \alpha$ so data support that the P/E ratios are less than 19
B. p -value $> \alpha$ so data do not support that the P/E ratios are less than 19
C. p -value $< \alpha$ so data support that the P/E ratios are less than 19
D. p -value $< \alpha$ so data do not support that the P/E ratios are less than 19
E. There is not enough information to determine the p value.
23. Suppose the p -value in a two-tailed test for a population proportion is 0.0134. Based upon the same population, sample, and null hypothesis, and assuming the test statistic is negative, what is the p -value for a corresponding left-tailed test?
- A. 0.0134 B. 0.0067 C. 0.0268 D. 0.9866 E. 0.9933
24. A good way to get a small standard error is to use
- A. a large sample B. repeated sampling C. a large population D. a small significance level
E. None of these
25. What would happen (other things equal) to a confidence interval if you calculated a 99% confidence interval rather than a 95% confidence interval?
- A. It will be narrower B. It will not change C. The sample size will increase D. It will be wider
E. None of the above