STA2023
Statistics
Broward College
Review for final exam

*instructor: c.s*
*imathesis.com*

Find the mean for the given sample data. Unless indicated otherwise, round your answer to one more decimal place than is present in the original data values.

1) Listed below are the amounts of time (in months) that the employees of a restaurant have been working at the restaurant. Find the mean, the standard deviation, the midrange, mode (if exists), range, median and variance of the sample data.

8 13 14 19 24 51 60

mean_____ sd______ midrange________ mode________ range_____median______ variance_______

Find the mean of the data summarized in the given frequency distribution.

2) The test scores of 40 students are summarized in the frequency distribution below. Find the mean score. 2) ________

| Score | Students |
|---|---|
| 50-59 | 6 |
| 60-69 | 5 |
| 70-79 | 6 |
| 80-89 | 11 |
| 90-99 | 12 |

A) 79.0 B) 74.5 C) 71.1 D) 75.1

Find the indicated probability.

3) A bag contains 2 red marbles, 3 blue marbles, and 7 green marbles. If a marble is randomly selected from the bag, what is the probability that it is blue? 3) ________

A) $\frac{1}{4}$ B) $\frac{1}{9}$ C) $\frac{1}{7}$ D) $\frac{1}{3}$

4) Two 6-sided dice are rolled. What is the probability that the sum of the two numbers on the dice will be 3? 4) ________

A) $\frac{17}{18}$ B) $\frac{1}{18}$ C) $\frac{1}{2}$ D) 2

Answer the question, considering an event to be "unusual" if its probability is less than or equal to 0.05.

5) A multiple choice question has 12 possible answers, only one of which is correct. Is it "unusual" to answer a question correctly if a random guess is made? 5) ________

A) Yes B) No

6) Assume that one student in your class of 31 students is randomly selected to win a prize. Would it be "unusual" for you to win? 6) ________

A) Yes B) No

Answer the question.

7) Find the odds against correctly guessing the answer to a multiple choice question with 3 possible answers. 7) ________

A) 3 : 1 B) 2 : 1 C) 2 : 3 D) 3 : 2

Find the indicated complement.

8) The probability that Luis will pass his statistics test is 0.67. Find the probability that he will fail his statistics test. 8) ________

A) 0.34 B) 2.03 C) 1.49 D) 0.33

Find the indicated probability.

9) If you pick a card at random from a well shuffled deck, what is the probability that you get a face card or a spade? 9) ________

A) $\frac{1}{22}$ B) $\frac{25}{52}$ C) $\frac{9}{26}$ D) $\frac{11}{26}$

10) The table below describes the smoking habits of a group of asthma sufferers. 10) ________

| | Nonsmoker | Occasional smoker | Regular smoker | Heavy smoker | Total |
|---|---|---|---|---|---|
| Men | 380 | 48 | 63 | 42 | 533 |
| Women | 360 | 34 | 90 | 47 | 531 |
| Total | 740 | 82 | 153 | 89 | 1064 |

If one of the 1064 people is randomly selected, find the probability that the person is a man or a heavy smoker.

A) 0.506 B) 0.545 C) 0.585 D) 0.472

11) A card is drawn from a well-shuffled deck of 52 cards. Find P(drawing a face card or a 4). 11) ________

A) $\frac{4}{13}$ B) 16 C) $\frac{2}{13}$ D) $\frac{12}{13}$

12) Find the probability of correctly answering the first 5 questions on a multiple choice test if random guesses are made and each question has 4 possible answers. 12) ________

A) $\frac{1}{625}$ B) $\frac{4}{5}$ C) $\frac{5}{4}$ D) $\frac{1}{1024}$

13) A manufacturing process has a 70% yield, meaning that 70% of the products are acceptable and 30% are defective. If three of the products are randomly selected, find the probability that all of them are acceptable. 13) ________

A) 0.429 B) 0.343 C) 2.1 D) 0.027

14) A bin contains 72 light bulbs of which 10 are defective. If 5 light bulbs are randomly selected from the bin with replacement, find the probability that all the bulbs selected are good ones. Round to the nearest thousandth if necessary. 14) ________

A) 0.861 B) 0.473 C) 0 D) 0.522

15) Among the contestants in a competition are 46 women and 20 men. If 5 winners are randomly selected, what is the probability that they are all men? Round to five decimal places. 15) ________

A) 0.01554 B) 0.16446 C) 0.01131 D) 0.00173

Assume that a procedure yields a binomial distribution with a trial repeated n times. Use the binomial probability formula to find the probability of x successes given the probability p of success on a single trial. Round to three decimal places.

16) $n = 5$, $x = 2$, $p = 0.70$ 16) ______

A) 0.700 B) 0.132 C) 0.464 D) 0.198

17) $n = 30$, $x = 5$, $p = \frac{1}{5}$ 17) ______

A) 0.172 B) 0.067 C) 0.421 D) 0.198

Find the indicated probability.

18) An archer is able to hit the bull's-eye 55% of the time. If she shoots 8 arrows, what is the probability that she gets exactly 4 bull's-eyes? Assume each shot is independent of the others. 18) ______

A) 0.0915 B) 0.00375 C) 0.172 D) 0.263

19) A tennis player makes a successful first serve 46% of the time. If she serves 8 times, what is the probability that she gets exactly 3 first serves in? Assume that each serve is independent of the others. 19) ______

A) 0.147 B) 0.00447 C) 0.250 D) 0.0973

20) A multiple choice test has 7 questions each of which has 5 possible answers, only one of which is correct. If Judy, who forgot to study for the test, guesses on all questions, what is the probability that she will answer exactly 3 questions correctly? 20) ______

A) 0.275 B) 0.00800 C) 0.115 D) 0.885

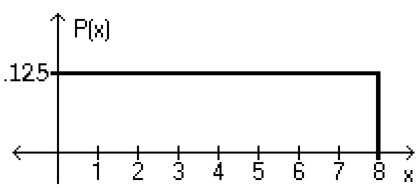
Use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$. Round your answer to the nearest hundredth unless otherwise noted.

21) $n = 103$, $p = 0.26$ 21) ______

A) Minimum: 17.88; maximum: 35.68 B) Minimum: 35.68; maximum: 17.88

C) Minimum: -12.85; maximum: 66.41 D) Minimum: 22.33; maximum: 31.23

Using the following uniform density curve, answer the question.




22) What is the probability that the random variable has a value between 2.3 and 5? 22) ______

A) 0.5875 B) 0.2125 C) 0.4625 D) 0.3375

If z is a standard normal variable, find the probability.

23) The probability that z lies between -0.55 and 0.55 23) ______

A) -0.4176 B) 0.9000 C) -0.9000 D) 0.4176

24) The probability that z is greater than -1.82 24) ______

A) 0.4656 B) 0.9656 C) -0.0344 D) 0.0344

25) $P(z > 0.59)$ 25) ______

A) 0.2190 B) 0.2224 C) 0.2776 D) 0.7224

26) $P(z < 0.97)$ 26) _______

A) 0.8315 B) 0.1660 C) 0.8078 D) 0.8340

Assume that X has a normal distribution, and find the indicated probability.

27) The mean is $\mu = 15.2$ and the standard deviation is $\sigma = 0.9$. 27) _______
Find the probability that X is greater than 17.

A) 0.0228 B) 0.9821 C) 0.9713 D) 0.9772

28) The mean is $\mu = 15.2$ and the standard deviation is $\sigma = 0.9$. 28) _______
Find the probability that X is between 14.3 and 16.1.

A) 0.6826 B) 0.3413 C) 0.1587 D) 0.8413

29) The mean is $\mu = 137.0$ and the standard deviation is $\sigma = 5.3$. 29) _______
Find the probability that X is between 134.4 and 140.1.

A) 0.4069 B) 0.6242 C) 0.8138 D) 1.0311

Find the indicated probability.

30) The diameters of bolts produced by a certain machine are normally distributed with a mean of 0.30 inches and a standard deviation of 0.01 inches. What percentage of bolts will have a diameter greater than 0.32 inches? 30) _______

A) 47.72% B) 2.28% C) 97.72% D) 37.45%

31) The incomes of trainees at a local mill are normally distributed with a mean of $1100 and a standard deviation of $150. What percentage of trainees earn less than $900 a month? 31) _______

A) 9.18% B) 90.82% C) 40.82% D) 35.31%

32) The weekly salaries of teachers in one state are normally distributed with a mean of $490 and a standard deviation of $45. What is the probability that a randomly selected teacher earns more than $525 a week? 32) _______

A) 0.2823 B) 0.1003 C) 0.7823 D) 0.2177

33) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. If an applicant is randomly selected, find the probability of a rating that is between 200 and 275. 33) _______

A) 0.5 B) 0.0668 C) 0.9332 D) 0.4332

34) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. If an applicant is randomly selected, find the probability of a rating that is between 170 and 220. 34) _______

A) 0.0703 B) 0.3811 C) 0.2257 D) 0.1554

35) Assume that the weights of quarters are normally distributed with a mean of 5.67 g and a standard deviation 0.070 g. A vending machine will only accept coins weighing between 5.48 g and 5.82 g. What percentage of legal quarters will be rejected? 35) _______

A) 2.48% B) 0.0196% C) 1.62% D) 1.96%

Solve the problem.

36) The scores on a certain test are normally distributed with a mean score of 53 and a standard deviation of 5. What is the probability that a sample of 90 students will have a mean score of at least 53.527? 36) _______

A) 0.3174 B) 0.8413 C) 0.1587 D) 0.3413

37) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. If 40 different applicants are randomly selected, find the probability that their mean is above 215. 37) _______

A) 0.1179 B) 0.4713 C) 0.3821 D) 0.0287

38) Assume that women's heights are normally distributed with a mean of 63.6 inches and a standard deviation of 2.5 inches. If 90 women are randomly selected, find the probability that they have a mean height between 62.9 inches and 64.0 inches. 38) _______

A) 0.9318 B) 0.7248 C) 0.0424 D) 0.1739

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

39) $n = 150$, $x = 54$; 90% confidence 39) _______

A) $0.294 < p < 0.426$ B) $0.298 < p < 0.422$
C) $0.296 < p < 0.424$ D) $0.299 < p < 0.421$

40) $n = 171$, $x = 124$; 95% confidence 40) _______

A) $0.672 < p < 0.778$ B) $0.658 < p < 0.792$
C) $0.671 < p < 0.779$ D) $0.657 < p < 0.793$

Use the given data to find the minimum sample size required to estimate the population proportion.

41) Margin of error: 0.008; confidence level: 99%; $\hat{p}$ and $\hat{q}$ unknown 41) _______

A) 25,894 B) 25,901 C) 26,024 D) 15,900

42) Margin of error: 0.03; confidence level: 95%; from a prior study, $\hat{p}$ is estimated by the decimal equivalent of 66%. 42) _______

A) 1654 B) 958 C) 862 D) 2817

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

43) A survey of 865 voters in one state reveals that 408 favor approval of an issue before the legislature. Construct the 95% confidence interval for the true proportion of all voters in the state who favor approval. 43) _______

A) $0.471 < p < 0.472$ B) $0.444 < p < 0.500$
C) $0.435 < p < 0.508$ D) $0.438 < p < 0.505$

44) Of 346 items tested, 12 are found to be defective. Construct the 98% confidence interval for the proportion of all such items that are defective. 44) _______

A) $0.0345 < p < 0.0349$ B) $0.0118 < p < 0.0576$
C) $0.0154 < p < 0.0540$ D) $0.0110 < p < 0.0584$

45) A survey of 300 union members in New York State reveals that 112 favor the Republican candidate for governor. Construct the 98% confidence interval for the true population proportion of all New York State union members who favor the Republican candidate. 45) _______

A) $0.308 < p < 0.438$ B) $0.301 < p < 0.445$
C) $0.316 < p < 0.430$ D) $0.304 < p < 0.442$

Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ. Assume that the population has a normal distribution.

46) $n = 10$, $\bar{x} = 12.7$, $s = 3.7$, 95% confidence 46) ______

A) $10.09 < \mu < 15.31$  B) $10.56 < \mu < 14.84$
C) $10.05 < \mu < 15.35$  D) $10.07 < \mu < 15.33$

47) $n = 12$, $\bar{x} = 21.9$, $s = 4.0$, 99% confidence 47) ______

A) $18.31 < \mu < 25.49$  B) $18.33 < \mu < 25.47$
C) $18.76 < \mu < 25.04$  D) $18.24 < \mu < 25.56$

48) Thirty randomly selected students took the calculus final. If the sample mean was 75 and the standard deviation was 13.2, construct a 99% confidence interval for the mean score of all students. 48) ______

A) $70.91 < \mu < 79.09$  B) $69.07 < \mu < 80.93$
C) $68.38 < \mu < 81.62$  D) $68.36 < \mu < 81.64$

49) Thirty randomly selected students took the calculus final. If the sample mean was 89 and the standard deviation was 13.0, construct a 99% confidence interval for the mean score of all students. 49) ______

A) $83.16 < \mu < 94.84$  B) $82.46 < \mu < 95.54$
C) $82.48 < \mu < 95.52$  D) $84.97 < \mu < 93.03$

Identify the null hypothesis, alternative hypothesis, test statistic, P-value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

50) In a sample of 167 children selected randomly from one town, it is found that 37 of them suffer from asthma. At the 0.05 significance level, test the claim that the proportion of all children in the town who suffer from asthma is 11%. 50) ______________

51) In a clinical study of an allergy drug, 108 of the 202 subjects reported experiencing significant relief from their symptoms. At the 0.01 significance level, test the claim that more than half of all those using the drug experience relief. 51) ______________

Assume that a simple random sample has been selected from a normally distributed population and test the given claim. Use either the traditional method or P-value method as indicated. Identify the null and alternative hypotheses, test statistic, critical value(s) or P-value (or range of P-values) as appropriate, and state the final conclusion that addresses the original claim.

52) Use a significance level of $\alpha = 0.05$ to test the claim that $\mu = 33.5$ The sample data consist of 15 scores for which $\bar{x} = 36.1$ and $s = 4.2$. 52) ______________

53) A cereal company claims that the mean weight of the cereal in its packets is 14 oz. The weights (in ounces) of the cereal in a random sample of 8 of its cereal packets are listed below. 53) ______________

12.6 13.8 14.1 13.7 14.0 11.4 13.6 12.2

Test the claim at the 0.01 significance level.