

2002 Palm Harbor Invitational STATISTICS TEST

Mark the best answer on your scantron. Good luck!

1. It is Christmas bonus time at Acme Corporation. As a valued employee there is a probability of .3 that you will receive \$100, a probability of .4 that you will receive \$500, and a probability of .3 that you will receive \$25. Suppose X is the amount of money you will receive. Find the variance of X . Round to the nearest hundredth.
 - a) 237.50
 - b) 46781.25
 - c) 216.29
 - d) 45000.34
 - e) None of the Above
2. Suppose in a sock drawer you have 5 white socks, 7 blue socks, 6 brown socks, and 1 black sock. Now suppose you reach in and grab two socks. What is the probability that you grabbed matching socks? Round to the nearest thousandth.
 - a) .257
 - b) .002
 - c) .269
 - d) .003
 - e) None of the Above
3. Suppose we play a game. I have three boxes one of which has a twenty dollar bill in it. You then choose one of the boxes. After a suspenseful moment I show you the empty contents of one of the boxes that you did not choose. I then give you the option of switching boxes or keeping the box you have. Should you...
 - a) Switch boxes because you increase your probability of winning by $1/6$.
 - b) Keep the same box.
 - c) It doesn't matter which box you choose.
 - d) Switch boxes because you increase your probability of winning by $1/3$.
 - e) None of the above
4. Suppose you know that at a certain college, boy's weights are uniformly distributed between 196 pounds and 207 pounds. Find the probability that the boy weighs between 194 and 203 pounds. Round to the nearest thousandth.
 - a) .818
 - b) .725
 - c) .657
 - d) .636
 - e) None of the Above
5. Since I am what they classify as a nerd I have kept every book from every class I have taken in college. That means that I have 40 books which are all distinct. In my collection I have a Statistics book and I have a Calculus book. If I put all my books on a bookshelf what is the probability that the Statistics book and the Calculus book are next to one another?
 - a) .3
 - b) .02
 - c) .045
 - d) .05
 - e) None of the Above

6. I decide to randomly rearrange my collection of forty books on my shelf. What is the probability that the Statistics book is the furthest book on the left and the Calculus book is the furthest book on the right? Round to 3 significant digits.
- a) .000346
 - b) .000756
 - c) .000641
 - d) .000834
 - e) None of the Above
7. Suppose in a sock drawer you have 5 white socks, 7 blue socks, 6 brown socks, and 1 black sock. Now suppose you reach in and grab two socks. What is the probability that you grabbed non-matching socks? Round to the nearest thousandth.
- a) .787
 - b) .731
 - c) .654
 - d) .623
 - e) None of the Above
8. Just because they feel like it the NCAA has decided to just rank the top 25 football teams with a computer that randomly picks a school for each place in the rankings. Assume the computer is smart enough to not give any school more than one rank. Find the probability that UF is ranked first, UM is ranked second, and FSU is ranked in the top ten. Remember only the top twenty-five teams are ranked. Round to the nearest hundred-thousandth.
- a) .00058
 - b) .00045
 - c) .00030
 - d) .00016
 - e) None of the Above
9. Suppose I would like to be 95% sure that I have the mean SAT score for exiting high school seniors within a margin of error of 1 point. What is the minimum number of students that I need to sample? The standard deviation is known to be approximately 20.
- a) 1537
 - b) 1536
 - c) 1550
 - d) 1551
 - e) None of the Above
10. I have two jars. The first jar has 5 red Skittles and 6 purple Skittles. The second jar contains 14 red Skittles and an unknown amount of purple Skittles. One Skittle is drawn from each jar. The probability of them both being the same color is approximately .5128. How many purple Skittles are in the second jar?
- a) 20
 - b) 25
 - c) 30
 - d) 40
 - e) None of the Above
11. At a certain intersection there is a .6 probability that at least one accident will occur in a single month. Find the probability that exactly four months pass before the first accident occurs. Round to the nearest ten-thousandth.
- a) 0.0007
 - b) 0.1002
 - c) 0.0019
 - d) 0.0154
 - e) None of the Above

12. After a long hard day of work I am walking home. Along the way I pass a guy playing a game in which he shuffles three cards one of which is a Queen. The object of the game is to pick the card which is the Queen. Suppose I play ten times what is the probability that I randomly picked the Queen more than 8 times. Use 3 significant digits.
- a) .000356
 - b) .0007
 - c) .000312
 - d) .000145
 - e) None of the Above
13. Suppose there are forty students in a fraternity. Miraculously all the members of the fraternity got at least a D in their biology class that they all took. Suppose that 80% of them got either a C or a B. Suppose 90% of them got at least a C. How many of the fraternity students got a D or an A?
- a) 12
 - b) 7
 - c) 9
 - d) 8
 - e) None of the Above
14. Find the standard deviation of the numbers 12, 14, 16, 18, 20. Round to the nearest hundredth.
- a) 16.00
 - b) 6.32
 - c) 3.00
 - d) 2.83
 - e) None of the Above
15. Find the least squares regression line for the following ordered pairs: (3,5), (4,7), (5,4). Round to the nearest hundredth.
- a) $y = -4.00x + 3.24$
 - b) $y = -.50x + 7.33$
 - c) $y = 2.45x - 3.24$
 - d) $y = .50x - 3.45$
 - e) None of the Above
16. Suppose you flip a quarter and a penny five times each. Find the probability that the quarter landed on heads at least 4 times and the penny landed on tails every time. Use 3 significant digits.
- a) .0656
 - b) .00656
 - c) .00586
 - d) .0586
 - e) None of the Above
17. Suppose the number of calories in a hamburger is normally distributed with a mean of 375 and a standard deviation of 10. Find the probability that a hamburger has more than 380 calories. Round to the nearest ten-thousandth.
- a) .6915
 - b) .4801
 - c) .3085
 - d) .9265
 - e) None of the Above

18. Suppose we would like to estimate the proportion of people who run stop signs. How many people do we need to sample to be 90% sure that the error of estimation is less than .05?
- a) 265
 - b) 271
 - c) 272
 - d) 269
 - e) None of the Above
19. Find the slope of the least squares regression line found from using the following ordered pairs: (4,-2), (5,7), (4,3), (6,4), (3,2). Round to the nearest hundredth.
- a) 1.24
 - b) 4.35
 - c) 0.34
 - d) -1.78
 - e) None of the Above
20. Suppose $B = \text{set of natural numbers less than } 101$. Choose two numbers from B with repetition not allowed. Find the probability that the product of these two numbers is even or prime. Round to the nearest hundredth.
- a) .80
 - b) .85
 - c) .65
 - d) .75
 - e) None of the Above
21. Suppose SAT scores are normally distributed with mean of 970 and standard deviation of 15. Find the score which would represent the 86th percentile. Round to the nearest integer.
- a) 990
 - b) 986
 - c) 974
 - d) 995
 - e) None of the Above
22. Suppose on your first four tests in a class you received scores of 88, 92, 84, and 79. What is the minimum average you can have on your next two tests in order to receive a grade of at least a 90 in the class?
- a. 98.5
 - b. 97.5
 - c. 99.5
 - d. 98
 - e. None of the Above.
23. Suppose you have two six sided dice. One die has the first six positive even numbers on it. The other has the first six positive odd numbers. You roll the dice once and find the product of the numbers on the dice. Find the probability that this product is a multiple of three. Round to the nearest thousandth.
- a) .455
 - b) .505
 - c) .556
 - d) .656
 - e) None of the Above

24. Suppose I wanted to estimate the percentage of college students who have blond hair. What is the minimum number of people I need to sample in order to be 95% sure that my error of estimation is less than .06? Suppose I know that the percentage is around .25.
- a) 204
 - b) 203
 - c) 195
 - d) 201
 - e) None of the Above
25. Find the sum of the mean and the variance of a binomial distribution with $n = 15$ and $p = .3$.
- a) 8.25
 - b) 7.25
 - c) 7.65
 - d) 6.95
 - e) None of the Above
26. Find the variance of a uniform distribution ranging from 1.7 to 4.3. Round to the nearest thousandth.
- a) .456
 - b) .563
 - c) .395
 - d) .489
 - e) None of the Above
27. Find the mean of a geometric distribution with $p = .2$.
- a) 3
 - b) 4.5
 - c) 7
 - d) 5
 - e) None of the Above
28. Suppose I am doing a sample to find out the percentage of people who are allergic to dogs. I sample 500 people and discover that 55 of them are allergic to dogs. Give a 90% confidence interval for the percentage of people who are allergic to dogs. Round to the nearest thousandth.
- a) (.102, 1.567)
 - b) (-0.245, 0.245)
 - c) (.085, 0.231)
 - d) (.097, 0.199)
 - e) None of the Above
29. Suppose we flip an unfair coin 8 times. This coin has a .6 percent chance of landing on heads. Find the probability that the coin lands on heads 6 times or less. Round to the nearest thousandth.
- a) .456
 - b) .723
 - c) .776
 - d) .875
 - e) None of the Above
30. Suppose someone taking this test decided to randomly pick answers for every problem. Find the probability that this person got the first problem right and the rest of the problems wrong. Remember five choices per question. Use 2 significant digits.
- a) .00022
 - b) .00031
 - c) .0035
 - d) .00076
 - e) None of the Above