

Multiple Choice Section: 16 questions (3 points each) for a total of 48 points. Circle the correct answer on the test (for your reference later) and then enter it in the appropriate location on the Scantron form. Your answers on this portion of the test will be graded by Scantron only.

1. The contestants in a competition include 40 women and 20 men. If 5 winners are randomly selected, what is the probability that they are all men?

A. 0.02356
B. 0.00284
C. 0.13169
D. 0.03125

2. Find the probability of getting at least one 3 in 8 rolls of a fair die.

A. 0.7674
B. 0.0474
C. 0.2326
D. 0.9963

3. According to the U.S. Census Bureau, there were 33,421 deaths resulting from accidents in the 15 to 24 age group in 2004. What is the death rate per 100,000 resulting from accidents if the population of the 15 to 24 age group was estimated to be 90,000,000 in 2004? (Round to the nearest tenth.)

A. 371.3
B. 3.7
C. 37.1
D. .3

4. A study found that of 500 students, 89% of them receive less than 8 hours of sleep each night. Find the 95% confidence interval for the percentage of students that receive less than 8 hours of sleep each night (rounded to nearest percent).

A. From 88 % to 91%
B. From 85% to 91%
C. From 89% to 95%
D. From 85% to 93%

5. What is the probability of randomly selecting a red ball from a jar that contains 4 yellow balls, 3 green balls and 2 red balls?

A. 0
B. $\frac{2}{2}$
C. $\frac{7}{9}$
D. $\frac{2}{9}$

6. Consider the values 2, 3, 4, 5, 6 and 10. The mean and median (in order) are

A. 5 and 4.75
B. 5 and 4.5
C. 4.5 and 5
D. 4.75 and 5

7. How many six-player lineups can be formed from a 19-player volleyball roster, assuming every player can be assigned to any position? Note that a lineup of ABCDEF is not the same as FEDCBA.
- A. 19,535,040
 - B. 27,907,200
 - C. 38,760
 - D. 27,132
8. The standard deviation of a distribution is
- A. the sum of all values, divided by the number of values
 - B. the difference between the maximum value and the minimum value.
 - C. the most common value
 - D. a measure of how spread out the data is
9. A fair die is rolled twice. The following two events occur.
Event A: The sum of the two rolls is 8 Event B: The first roll comes up 3
- A. Events A and B are independent.
 - B. Events A and B are dependent.
 - C. Events A and B are overlapping.
 - D. It is impossible for both events to occur.
10. How many four place passwords can be constructed using 26 lower-case letters, 10 numerals and the symbols @, #, and & if repetition is permitted?
- A. 2,317,449
 - B. 1,974,024
 - C. 2,313,441
 - D. 2,143,732
11. An insurance company sells a life policy that pays \$50,000 to the beneficiary and charges \$480 a year for the policy. If the mortality rate is 8 per 1000, what is the expected value of one policy to the company and what would be the profit to the company if 10,000 policies are sold?
- A. Expected value \$80, expected profit \$8,000,000
 - B. Expected value \$800, expected profit \$8,000,000
 - C. Expected value \$80, expected profit \$800,000
 - D. Expected value, -\$80, expected loss -\$800,0009.
12. What is the probability that you can guess, in any order, the 3 top contestants of a spelling bee from a field of 14 contestants?
- A. 1 in 364
 - B. 1 in 365
 - C. 1 in 1092
 - D. 1 in 1093

13. Assuming that children are equally likely to be born on any day of the year, what is the probability of having a birthday in the month of December?
- A. $1/12$
 B. $31/365$
 C. $365/31$
 D. $12/365$
14. The probability that a particular region in Mexico will be hit by a hurricane in any given year is 0.03. Find the probability that the region will be hit by a hurricane in 2 consecutive years.
- A. 0.06
 B. 0.0009
 C. 0
 D. .03
15. Biology exam scores are normally distributed with mean 70 and standard deviation 5. Consider an exam score of 82.5. How many standard deviations above the mean is this observation?
- A. 1
 B. 2
 C. 2.5
 D. 1.5
16. Consider a family with 3 children. Select the answer that would correctly complete the following probability distribution table. Assume that boys and girls are born with equal probability.

Event	Probability
0 Girls, 3 Boys	
1 Girl, 2 Boys	
2 Girls, 1 Boy	
3 Girls, 0 Boys	

- A. $1/8, 3/8, 3/8, 1/8$
 B. $1/4, 1/4, 1/4, 1/4$
 C. $1/8, 1/8, 1/8, 1/8$
 D. $1/8, 1/4, 1/4, 1/8$

End of Multiple Choice Section. Check to make sure your Scantron:

- has **16** answers bubbled in;
- has Test **Version A** both *written at the top* and *bubbled in below your CUID*;
- and shows your correct CUID both *written* and *bubbled in*.

1. Compute selected statistics for the following data. Demonstrate how these values were computed (“from my calculator” is not an adequate answer) or explain how they were identified.

26 30 31 28 32

<p><i>Work space</i></p> $\text{mean} = \frac{\text{sum of all values}}{\text{total \# of values}} = \frac{147}{5} = 29.4$	<p>Mean = 29.4</p>																												
<p>26 28 30 31 32 choose the middle value</p>	<p>Median = 30</p>																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">x</th> <th style="text-align: left;">x - mean</th> <th style="text-align: left;">x-mean</th> <th style="text-align: left;">(x - mean)^2</th> </tr> </thead> <tbody> <tr> <td>26</td> <td>26 - 29.4</td> <td>-3.4</td> <td>11.56</td> </tr> <tr> <td>28</td> <td>28 - 29.4</td> <td>-1.4</td> <td>1.96</td> </tr> <tr> <td>30</td> <td>30 - 29.4</td> <td>0.6</td> <td>0.36</td> </tr> <tr> <td>31</td> <td>31 - 29.4</td> <td>1.6</td> <td>2.56</td> </tr> <tr> <td>32</td> <td>32 - 29.4</td> <td>2.6</td> <td>6.76</td> </tr> <tr> <td colspan="3" style="text-align: center;">sum of squared = deviations from the mean</td> <td style="text-align: center;">23.2</td> </tr> </tbody> </table>	x	x - mean	x-mean	(x - mean)^2	26	26 - 29.4	-3.4	11.56	28	28 - 29.4	-1.4	1.96	30	30 - 29.4	0.6	0.36	31	31 - 29.4	1.6	2.56	32	32 - 29.4	2.6	6.76	sum of squared = deviations from the mean			23.2	<p>(show four places past the decimal)</p> <p>Standard Deviation = 2.4083</p>
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$$\text{standard deviation} = \sqrt{\frac{\text{sum of (deviations from the mean)}^2}{\text{total \# of data values} - 1}} = \sqrt{\frac{23.2}{4}} = 2.4083$$

$$\text{Or: standard deviation} = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n - 1}} = \sqrt{\frac{4345 - \frac{(147)^2}{5}}{4}} = 2.4083$$

3 points for appropriate work to compute the standard deviation

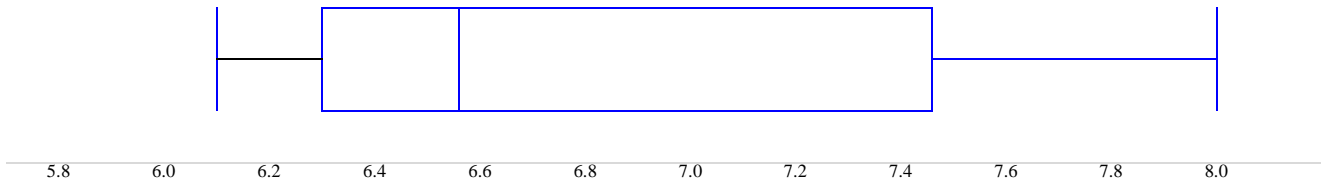
If variance given -2

3. For the following, compute the five-number summary.

	6.1	6.2	6.2	6.4	6.4	6.4	6.7	6.9	7.3	7.6	7.9	8.0
Label \Rightarrow	Min		Q1		M		Q3		Max			
Value \Rightarrow	6.1		6.3		6.55		7.45		8.0			

$\frac{1}{2}$ point for each of these 10 labels/values

Draw the box plot, using the scale shown.



4 points for correctly drawing the box plot

4. Biology exam scores are normally distributed with mean 70 and standard deviation 5. Use the 68-95-99.7 rule to fill in the following blanks (do not round your answers):

- a. To be in the highest 2.5%, you need to score approximately a 80 or higher.
- b. To be in the lowest 16%, you need to score approximately a 65 or lower.
- c. Approximately 99.85% of scores are 55 or higher.

2 points each

5. You select three cards from a deck of 52 without replacement. What is the probability of getting exactly two Hearts?

$$\frac{{}^{13}C_2 \times {}^{39}C_1}{{}^{52}C_3} = .1376 \quad \text{or} \quad \frac{13}{52} \times \frac{12}{51} \times \frac{39}{50} = .0459 \times 3 = .1376$$

(2)

work

(2)

answer

(2)

work

(2)

answer

If a student does this, award (2) points total $\frac{13}{52} \times \frac{12}{51} \times \frac{39}{50} = .0459$

6. Consider the experiment of rolling two standard six-sided dice. After the dice are thrown, the values from the two dice are summed. Show appropriate work and express your answers either as reduced fractions (i.e., $\frac{18}{36} = \frac{1}{2}$).

- a. The probability of getting a sum of 5 = 1/9. (1)

1 + 4 2 + 3 3 + 2 4 + 1

- b. The probability of getting a sum that is even and less than 9 = 7/18. (1)

1 + 1	1 + 3	1 + 5	2 + 6
	2 + 2	2 + 4	3 + 5
	3 + 1	3 + 3	4 + 4
		4 + 2	5 + 3
		5 + 1	6 + 2

- c. The probability getting a sum of 13 = 0. (1)

- d. The probability that the dice end up with the same number (i.e., doubles) = 1/6. (1)

1 + 1 2 + 2 3 + 3 4 + 4 5 + 5 6 + 6

- e. The odds against rolling a sum of 5 = 8 to 1. (1) if order is reversed (-1/2) point

For each unreduced fraction (-1/2) point

7. Clemson student identification numbers (CUIDs) currently contain nine digits (places) and use the ten numerals 0 1 2 3 4 5 6 7 8 and 9.

If we modified the system to one that contained only 5 places, and if we eliminated the use of zero in the CUIDs, how many students could be uniquely identified with the new CUID?

$$n^r = 9^5 = 59,049$$

2

work

2

answer

8. A local non-profit organization is conducting a raffle in which each ticket costs \$2.00. The prizes and their associated probabilities are as follows:

Prize	Probability	
\$400	$\frac{1}{1000}$	1 .4
\$75	$\frac{1}{500}$.15
\$25	$\frac{1}{250}$.1
		.65

- a. What would be the expected value of a single ticket purchased in this raffle? - \$1.35 1

$$1 - \$2.00 + .65 = - \$1.35$$

if not negative, - 1/2 point

If it is obvious that the student assumed that the ticket cost was \$1.00 award half the credit anyway.

- b. If you bought 50 tickets, you would expect a gain / loss (circle one) of -\$67.50 1/2

$$1 - \$1.35 \times 50 = - \$67.50$$

9. For 2004, the U.S. Census Bureau reported that the total death rate in South Carolina was 887.9 per 100,000 for an estimated population of 3.595 million.

a. How many deaths were recorded in the state that year?

$$\frac{887.9}{100,000} : \frac{x}{3,595,000} \quad (1) \quad x = 31,920.005$$

(1)
Answer: 31,920 deaths
nearest whole number

b. If 8344 of those deaths resulted from cancer, what was the cancer death rate per 100,000 in 2004?

$$\frac{8,344}{3,595,000} : \frac{x}{100,000} \quad (1) \quad x = 232.100$$

(1)
Answer: 232.1 deaths/100,000 people
nearest tenth