

# Chapter 4 - test review

Exam

Name Key

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

**Solve the problem.**

- 1) State whether the variable is discrete or continuous. 1) A  
 The height of a player on a basketball team  
 A) continuous B) discrete
- 2) State whether the variable is discrete or continuous. 2) A  
 The cost of a Statistics textbook  
 A) discrete B) continuous
- 3) State whether the variable is discrete or continuous. 3) B  
 The blood pressures of a group of students the day before their final exam  
 A) discrete B) continuous

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 4) Determine whether the distribution represents a probability distribution. If not, identify any requirements that are not satisfied. 4) Not

x	P(x)
3	-0.3
6	0.5
9	0.1
12	0.3
15	0.4

negative

- 5) A sports analyst records the winners of NASCAR Winston Cup races for a recent season. The random variable x represents the races won by a driver in one season. Use the frequency distribution to construct a probability distribution. 5) \_\_\_\_\_

Wins	1	2	3	4	5	6	7
Drivers	12	2	0	2	0	0	1

1	2	3	4	5	6	7
.71	.12	0	.12	0	0	.06

  
 $\frac{17}{70}$  or  $\frac{05}{05}$

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 6) Determine the probability distribution's missing value. 6) A  
 The probability that a tutor will see 0, 1, 2, 3, or 4 students

x	0	1	2	3	4
P(x)	$\frac{4}{27}$	$\frac{1}{27}$	$\frac{5}{9}$	?	$\frac{5}{27}$

- A)  $\frac{2}{27}$  B)  $\frac{1}{9}$  C)  $-\frac{10}{27}$  D)  $\frac{25}{27}$

- 7) The random variable  $x$  represents the number of boys in a family of three children. Assuming that boys and girls are equally likely, find the mean and standard deviation for the random variable  $x$ .
- A) mean: 1.50; standard deviation: 0.87      B) mean: 2.25; standard deviation: 0.87  
 C) mean: 2.25; standard deviation: 0.76      D) mean: 1.50; standard deviation: 0.76

7) A

- 8) The random variable  $x$  represents the number of tests that a patient entering a hospital will have along with the corresponding probabilities. Find the mean and standard deviation.

8) C

$x$	0	1	2	3	4
$P(x)$	$\frac{3}{17}$	$\frac{5}{17}$	$\frac{6}{17}$	$\frac{2}{17}$	$\frac{1}{17}$

- A) mean: 3.72; standard deviation: 2.52      B) mean: 1.59; standard deviation: 3.72  
 C) mean: 1.59; standard deviation: 1.09      D) mean: 2.52; standard deviation: 1.93

- 9) In a pizza takeout restaurant, the following probability distribution was obtained. The random variable  $x$  represents the number of toppings for a large pizza. Find the mean and standard deviation.

9) B

$x$	$P(x)$
0	0.30
1	0.40
2	0.20
3	0.06
4	0.04

- A) mean: 1.54; standard deviation: 1.30      B) mean: 1.14; standard deviation: 1.04  
 C) mean: 1.30; standard deviation: 2.38      D) mean: 1.30; standard deviation: 1.54

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 10) A twenty-five-year-old man decides to pay \$345 for a one-year insurance policy with coverage for \$1,000,000. The probability of him living through the year is 0.9993. What is his expected value for the insurance policy?

10) \$998,955.00

$999655 \times 0.9993 =$   
 $345 \times 0.0007 =$

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 11) One thousand tickets are sold at \$1 each. One ticket will be randomly selected and the winner will receive a color television valued at \$398. What is the expected value if a person buys one ticket?
- A) -\$0.60      B) \$1.00      C) -\$1.00      D) \$0.60

11) A

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 12) From the probability distribution, find the mean and standard deviation for the random variable  $x$ , which represents the number of cars per household in a town of 1000 households.

12) \_\_\_\_\_

$x$	$P(x)$
0	0.125
1	0.428
2	0.256
3	0.108
4	0.083

$\mu = 1.596$   
 $\sigma = 1.098$

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 13) The random variable  $x$  represents the number of cars per household in a town of 1000 households. Find the probability of randomly selecting a household that has at least one car. 13) C

Cars	Households
0	125
1	428
2	256
3	108
4	83

- A) 0.500                      B) 0.125                      C) 0.875                      D) 0.083

- 14) The random variable  $x$  represents the number of cars per household in a town of 1000 households. Find the probability of randomly selecting a household that has between one and three cars, inclusive. 14) D

Cars	Households
0	125
1	428
2	256
3	108
4	83

- A) 0.125                      B) 0.256                      C) 0.208                      D) 0.792

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 15) Decide whether the experiment is a binomial experiment. If it is not, explain why. You observe the gender of the next 150 babies born at a local hospital. The random variable represents the number of girls. 15) Bin.

- 16) Decide whether the experiment is a binomial experiment. If it is not, explain why. Surveying 100 prisoners to see how many crimes on which they were convicted. The random variable represents the number of crimes on which each prisoner was convicted. 16) NOT Bin.

- 17) You observe the gender of the next 100 babies born at a local hospital. You count the number of girls born. Identify the values of  $n$ ,  $p$ , and  $q$ , and list the possible values of the random variable  $x$ . 17) \_\_\_\_\_  
 $n=100, p=.5, q=.5, x=0, 1, \dots, 99, 100$

- 18) Twenty-six percent of people in the United States with Internet access go online to get news. A random sample of five Americans with Internet access is selected. Identify the values of  $n$ ,  $p$ , and  $q$ , and list the possible values of the random variable  $x$ . 18) \_\_\_\_\_  
 $n=5, p=.26, q=.74, x=0, 1, \dots, 5$

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 19) Assume that male and female births are equally likely and that the birth of any child does not affect the probability of the gender of any other children. Find the probability of exactly eight boys in ten births. 19) A  
 A) 0.044                      B) 0.8                      C) 0.08                      D) 0.176

Binom calc.

$n \leq 3$

- 20) Assume that male and female births are equally likely and that the birth of any child does not affect the probability of the gender of any other children. Find the probability of at most three boys in ten births. 20) A  
 A) 0.172                      B) 0.333                      C) 0.300                      D) 0.003
- 21) A test consists of 10 true or false questions. To pass the test a student must answer at least eight questions correctly. If the student guesses on each question, what is the probability that the student will pass the test? 21) A  
 A) 0.055                      B) 0.08                      C) 0.8                      D) 0.20  
 $n \geq 8$                        $n \leq 1 (-1)$
- 22) A test consists of 10 multiple choice questions, each with five possible answers, one of which is correct. To pass the test a student must get 60% or better on the test. If a student randomly guesses, what is the probability that the student will pass the test? 22) A  
 A) 0.006                      B) 0.205                      C) 0.377                      D) 0.060  
 $p = .2$                        $n \geq 6$                        $n \leq 5 (-1)$
- 23) The probability that an individual is left-handed is 0.11. In a class of 40 students, what is the probability of finding five left-handers? 23) C  
 A) 0.000                      B) 0.11                      C) 0.179                      D) 0.125
- 24) The probability that a tennis set will go to a tie-breaker is 20%. What is the probability that two of three sets will go to tie-breakers? 24) B  
 A) 0.384                      B) 0.096                      C) 0.04                      D) 0.2
- 25) Fifty percent of the people that get mail-order catalogs order something. Find the probability that only six of 10 people getting these catalogs will order something. 25) C  
 A) 0.600                      B) 0.001                      C) 0.205                      D) 3.281

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 26) An airline has a policy of booking as many as 150 persons on a plane that seats 140. Past studies indicate that only 85% of booked passengers show up for their flight. Find the probability that if the airline books 150 persons for a 140-seat plane, not enough seats will be available. 26) .0005

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

$\sqrt{npq}$

- 27) A test consists of 670 true or false questions. If the student guesses on each question, what is the mean number of correct answers? 27) D  
 A) 0                      B) 670                      C) 134                      D) 335  
 $.5(670)$
- 28) A test consists of 510 true or false questions. If the student guesses on each question, what is the standard deviation of the number of correct answers? 28) A  
 A) 11.2915898                      B) 0.70710678                      C) 2                      D) 0
- 29) A test consists of 80 multiple choice questions, each with five possible answers, only one of which is correct. Find the mean and the standard deviation of the number of correct answers. 29) C  
 A) mean: 16; standard deviation: 4                      B) mean: 40; standard deviation: 3.57770876  
 C) mean: 16; standard deviation: 3.57770876                      D) mean: 40; standard deviation: 6.32455532

- 30) The probability that an individual is left-handed is 0.18. In a class of 40 students, what is the mean and standard deviation of the number of left-handers in the class? 30) A
- A) mean: 7.2; standard deviation: 2.42981481      B) mean: 40; standard deviation: 2.68328157  
 C) mean: 7.2; standard deviation: 2.68328157      D) mean: 40; standard deviation: 2.42981481

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 31) A company ships computer components in boxes that contain 20 items. Assume that the probability of a defective computer component is 0.2. Find the probability that the first defect is found in the seventh component tested. Round your answer to four decimal places. 31) .0524  
*.2(0.8)^6*

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 32) Basketball player Chauncey Billups of the Detroit Pistons makes free throw shots 88% of the time. Find the probability that he misses his first shot and makes the second. 32) C  
*(.88)(.12)*
- A) 0.7744      B) 0.0144      C) 0.1056      D) 0.50

- 33) A statistics professor finds that when he schedules an office hour at the 10:30 a.m. time slot, an average of three students arrive. Use the Poisson distribution to find the probability that in a randomly selected office hour in the 10:30 a.m. time slot exactly five students will arrive. 33) A
- A) 0.1008      B) 0.0070      C) 0.0519      D) 0.0137  
 *$\mu = 3$   
 $x = 5$*

- 34) A statistics professor finds that when he schedules an office hour at the 10:30 a.m. time slot, an average of three students arrives. Use the Poisson distribution to find the probability that in a randomly selected office hour no students will arrive. 34) A
- A) 0.0498      B) 0.0743      C) 0.1108      D) 0.1225  
 *$\frac{3^0 e^{-3}}{0!}$*

- 35) A local fire station receives an average of 0.55 rescue calls per day. Use the Poisson distribution to find the probability that on a randomly selected day, the fire station will receive fewer than two calls. 35) B
- A) 0.087      B) 0.894      C) 0.317      D) 0.106  
*.5769 + .3173*

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 36) A company ships computer components in boxes that contain 60 items. Assume that the probability of a defective computer component is 0.1. Use the geometric mean to find the mean number of defective parts. Interpret the results. 36) on average find a defect part 1/n=10  
 *$\frac{1}{p} = \text{geo. mean} = 10$*

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 37) Given: The probability that a federal income tax return is filled out incorrectly with an error in favor of the taxpayer is 20%. Question: What is the probability that of the ten tax returns randomly selected for an audit, three returns will contain only errors favoring the taxpayer? Determine which distribution best describes the situation. 37) A
- A) binomial      B) Poisson      C) geometric