

Practice for Chapter 5 Name _____

Statistics (triola 10) created 12/14/04 ptch05_stat_triola10.tst

DO NOT EXPECT THE TESTS TO BE THE SAME. TESTS MAY BE TOTALLY DIFFERENT.

You need to attend class, pay attention and do your homework to learn statistics and prepare for the tests.

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

Identify the given random variable as being discrete or continuous.

- 1) The braking time of a car
A) Continuous B) Discrete
- 2) The number of field goals kicked in a football game
A) Discrete B) Continuous

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

Determine whether the following is a probability distribution. If not, identify the requirement that is not satisfied.

- 3) In a certain town, 70% of adults have a college degree. The accompanying table describes the probability distribution for the number of adults (among 4 randomly selected adults) who have a college degree.

x	P(x)
0	0.0081
1	0.0756
2	0.2646
3	0.4116
4	0.2401

Find the mean of the given probability distribution.

- 4) The number of golf balls ordered by customers of a pro shop has the following probability distribution.

x	3	6	9	12	15
p(x)	0.14	0.37	0.36	0.03	0.10

Solve the problem.

- 5) In a certain town, 30% of adults have a college degree. The accompanying table describes the probability distribution for the number of adults (among 4 randomly selected adults) who have a college degree. Find the standard deviation for the probability distribution.

x	P(x)
0	0.2401
1	0.4116
2	0.2646
3	0.0756
4	0.0081

- 6) Suppose you buy 1 ticket for \$1 out of a lottery of 1,000 tickets where the prize for the one winning ticket is to be \$500. What is your expected value?

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

Assume that a researcher randomly selects 14 newborn babies and counts the number of girls selected, x . The probabilities corresponding to the 14 possible values of x are summarized in the given table. Answer the question using the table.

$x(\text{girls})$	$P(x)$	$x(\text{girls})$	$P(x)$	$x(\text{girls})$	$P(x)$
0	0.000	5	0.122	10	0.061
1	0.001	6	0.183	11	0.022
2	0.006	7	0.209	12	0.006
3	0.022	8	0.183	13	0.001
4	0.061	9	0.122	14	0.000

7) Find the probability of selecting exactly 4 girls.

- A) 0.061 B) 0.001 C) 0.022 D) 0.122

8) Find the probability of selecting 9 or more girls.

- A) 0.212 B) 0.001 C) 0.122 D) 0.061

Determine whether the given procedure results in a binomial distribution. If not, state the reason why.

9) Choosing 5 people (without replacement) from a group of 43 people, of which 15 are women, keeping track of the number of men chosen.

- A) Procedure results in a binomial distribution.
B) Not binomial: there are more than two outcomes for each trial.
C) Not binomial: there are too many trials.
D) Not binomial: the trials are not independent.

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.

10) $n=12$, $x=5$, $p=0.25$

- A) 0.091 B) 0.027 C) 0.082 D) 0.103

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

Find the indicated probability.

11) Find the probability of at least 2 girls in 10 births. Assume that male and female births are equally likely and that the births are independent events.

12) An airline estimates that 95% of people booked on their flights actually show up. If the airline books 75 people on a flight for which the maximum number is 73, what is the probability that the number of people who show up will exceed the capacity of the plane?

Find the mean, μ , for the binomial distribution which has the stated values of n and p . Round answer to the nearest tenth.

13) $n=2562$; $p=.63$

Find the standard deviation, σ , for the binomial distribution which has the stated values of n and p . Round your answer to the nearest hundredth.

14) $n=1581$; $p=.57$ Also find the variance.

Use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$.

15) $n = 1017$, $p = 0.81$

Solve the problem.

16) On a multiple choice test with 12 questions, each question has four possible answers, one of which is correct. For students who guess at all answers, find the mean for the number of correct answers.

17) A company manufactures batteries in batches of 28 and there is a 3% rate of defects. Find the standard deviation for the number of defects per batch.

Determine if the outcome is unusual. Consider as unusual any result that differs from the mean by more than 2 standard deviations. That is, unusual values are either less than $\mu - 2\sigma$ or greater than $\mu + 2\sigma$.

18) It is claimed that 1 passenger out of 10 is selected to be searched when boarding a plane ($p = .10$). A certain passenger was selected more than 2 times out of 4 trips. Would it be unusual to get checked more than 2 times in four trips? What is your conclusion?

Use the Poisson Distribution to find the indicated probability.

19) The Columbia Power Company experiences power failures with a mean of $\mu = 0.210$ per day. Find the probability that there are exactly two power failures in a particular day. Optional for Nova.

Answer Key

Testname: PTCH05_STAT_TRIOLA10

- 1) A
- 2) A
- 3) Probability distribution
- 4) $\sum(xP(x)) = 7.74$
- 5) $\sum(\sqrt{x^2P(x)} - \text{mean}) = 0.92$
- 6) $-1(999/1000) + 499(1/1000) = -\0.50
- 7) A
- 8) A
- 9) D
- 10) D
- 11) $1 - P(0 \text{ or } 1) = 1 - P(0) - P(1) = 1 - 10C0 * .5^0 * .5^{10} - 10C1 * .5^1 * .5^9 = 0.989$
- 12) $P(x > 73) = P(74 \text{ or } 75) = P(74) + P(75) = 75C74 * .95^{74} * .05^1 + 75C75 * .95^{75} * .05^0 = 0.1056$
- 13) $\mu = np = 2562(.63) = 1614.1$
- 14) $\sigma = \sqrt{npq} = \sqrt{1581*.57*.43} = 19.69$. Variance = $\sigma^2 = npq = 1581*.57*.43 = 387.5031$
- 15) $\mu = np = 1017*.81 = 823.77$; $\sigma = \sqrt{npq} = \sqrt{1017*.81*.19} = 12.511$; (min, max) = $(\mu - 2 * \sigma, \mu + 2 * \sigma) = (823.77 - 2 * 12.511, 823.77 + 2 * 12.511) = (798.75, 848.79)$ or Minimum: 798.75; maximum: 848.79
- 16) $\mu = np = 12 * 1/4 = 3$
- 17) $\sigma = \sqrt{npq} = \sqrt{28 * .03 * .97} = 0.903$
- 18) Yes. $\mu = 4 * .10 = .4$ and $\sigma = \sqrt{4 * .10 * .90} = .6$. The usual number of times selected should be $(\mu - 2 * \sigma, \mu + 2 * \sigma) = (.4 - 2 * .6, .4 + 2 * .6) = (-.8, 1.6)$ or (0, 1.6) times. Conclusion: Since the person was selected 3 or four times, he/she was not randomly selected but selected an unusual number of times. The person was most likely singled out for some reason.
- 19) $P(2) = .210^2 * e^{(-.210)/2!} = 0.018$