

Student: _____
Date: _____
Time: _____

Instructor: John Blackburn
Course: Math 1121 A Fall 2011
Book: Triola: Elementary Statistics Using
the TI 83/84 Plus Calculator, 3e

Assignment: Test 2

1. If A denotes some event, what does \bar{A} denote? If $P(A) = 0.005$, what is the value of $P(\bar{A})$? If $P(A) = 0.005$, is \bar{A} unusual?

What does \bar{A} denote?

- A. Events A and \bar{A} share all outcomes.
- B. Event \bar{A} denotes the complement of event A , meaning that \bar{A} consists of all outcomes in which event A does not occur.
- C. Event \bar{A} denotes the complement of event A , meaning that \bar{A} and A share some but not all outcomes.
- D. Event \bar{A} is always unusual.

If $P(A) = 0.005$, what is the value of $P(\bar{A})$?

$P(\bar{A}) = \square$ (Type an integer or a decimal.)

If $P(A) = 0.005$, is \bar{A} unusual?

- No
- Yes

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2. To the right are the outcomes that are possible when a couple has three children. Refer to that list, and find the probability of each event.

- a. Among three children, there are exactly 0 boys.
- b. Among three children, there is exactly 1 boy.
- c. Among three children, there are exactly 3 girls.

1st	2nd	3rd		
boy	–	boy	–	boy
boy	–	boy	–	girl
boy	–	girl	–	boy
boy	–	girl	–	girl
girl	–	boy	–	boy
girl	–	boy	–	girl
girl	–	girl	–	boy
girl	–	girl	–	girl

a. What is the probability of exactly 0 boys out of three children?

(Type an integer or a simplified fraction.)

b. What is the probability of exactly 1 boy out of three children?

(Type an integer or a simplified fraction.)

c. What is the probability of exactly 3 girls out of three children?

(Type an integer or a simplified fraction.)


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3. Refer to the sample data below. Complete parts (a) through (d).

	Did the Subject Actually Lie? 	
	No (Did Not Lie)	Yes (Lied)
Positive test results	12	41
Negative test results	31	7

- a. How many responses are summarized in the table?

(Simplify your answer.)

- b. How many times did the polygraph provide a negative test result?

(Simplify your answer.)

- c. If one of the responses is randomly selected, find the probability that it is a negative test result?

$$P(\text{negative test result}) = \square$$

(Type an integer or a simplified fraction.)

- d. Express the answer from part (c) as a decimal.

$$P(\text{negative test result}) = \square$$

(Round to three decimal places as needed.)

ID: 4.2.17

4. In a test of a gender-selection technique, results consisted of 299 baby girls and 323 baby boys. Based on this result, what is the probability of a girl born to a couple using this technique? Does it appear that the technique is effective in increasing the likelihood that a baby will be a girl?

The probability that a girl will be born using this technique is approximately .

(Type an integer or decimal rounded to three decimal places as needed.)

Does the technique appear effective in improving the likelihood of having a girl baby?

- Yes
 No

ID: 4.2.24

5. A modified roulette wheel has 28 slots. One slot is 0, another is 00, and the others are numbered 1 through 26, respectively. You are placing a bet that the outcome is an odd number. (In roulette, 0 and 00 are neither odd nor even.)

a. What is your probability of winning?

The probability of winning is .
 (Type an integer or a simplified fraction.)

b. What are the actual odds against winning?

The actual odds against winning are :.

c. When you bet that the outcome is an odd number, the payoff odds are 1:1. How much profit do you make if you bet \$10 and win?

If you win, the payoff is \$.

d. How much profit should you make on the \$10 bet if you could somehow convince the casino to change its payoff odds so that they are the same as the actual odds against winning?

\$ (Round to the nearest cent as needed.)

ID: 4.2.38

6. The following data summarizes results from 1031 pedestrian deaths that were caused by accidents. If one of the pedestrian deaths is randomly selected, find the probability that the pedestrian was intoxicated or the driver was not intoxicated.

		Pedestrian Intoxicated? <input type="checkbox"/>	
		Yes	No
Driver intoxicated?	Yes	58	90
	No	300	583

$P(\text{pedestrian was intoxicated or driver was not intoxicated}) = \text{$
 (Do not round until the final answer. Then round to three decimal places as needed.)

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7. The data in the following table summarizes blood groups and Rh types for 100 typical people. If one person is randomly selected, find the probability of getting someone who is not group A.

		Group			
		O	A	B	AB
Type	Rh ⁺	33	30	14	3
	Rh ⁻	9	6	2	3

$P(\text{person selected is not group A}) = \square$

(Do not round until the final answer. Then round to three decimal places as needed.)

ID: 4.3.21

8. Use the following results from a test for marijuana use, which is provided by a certain drug testing company. Among 145 subjects with positive test results, there are 29 false positive results. Among 155 negative results, there are 4 false negative results. Complete parts (a) through (c). (Hint: Construct a table.)

- a. How many subjects were included in the study?

The total number of subjects in the study was \square .

- b. How many subjects did not use marijuana?

A total of \square subjects did not use marijuana.

- c. What is the probability that a randomly selected subject did not use marijuana?

The probability that a randomly selected subject did not use marijuana is \square .

(Do not round until the final answer. Then round to three decimal places as needed.)

ID: 4.3.33

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9. The principle of redundancy is used when system reliability is improved through redundant or backup components. Assume that your alarm clock has a 0.922 probability of working on any given morning and answer the questions below.

a. What is the probability that your alarm clock will not work on the morning of an important final exam?

(Type an exact answer in simplified form.)

b. If you have two such alarm clocks, what is the probability that they both fail on the morning of an important final exam?

(Type an exact answer in simplified form.)

c. With one alarm clock, you have a 0.922 probability of being awakened. What is the probability of being awakened if you use two alarm clocks?

(Type an exact answer in simplified form.)

d. Does a second alarm clock result in greatly improved reliability?

- A. No, total malfunction would still not be unusual.
- B. No, the malfunction of both is equally or more likely than the malfunction of one.
- C. Yes, total malfunction would not be impossible, but it would be unusual.
- D. Yes, you can always be certain that at least one alarm clock will work.

ID: 4.4.27

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Assignment: Test 2

10. The probability of a randomly selected car crashing during a year in a certain country is 0.0494. If a family has three cars, find the probability that at least one of them has a car crash during a year. Is there any reason why the probability might be wrong?

The probability that at least one of them has a crash during the year is .
(Round to four decimal places as needed.)

Is there a reason why the probability might be wrong?

- A. No, one outcome does not have an effect on later trials.
 B. No, the three cars are representative of all cars in the country.
 C. Yes, the three cars are not randomly selected.
 D. Yes, one outcome has an effect on later trials.

ID: 4.5.15

11. The data represent the results for a test for a certain disease. Assume one individual from the group is randomly selected. Find the probability of getting someone who tests positive, given that he or she had the disease.

	The individual actually had the disease	
	Yes	No
Positive	134	12
Negative	15	139

The probability is approximately . (Round to three decimal places as needed.)

ID: 4.5.19

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Assignment: Test 2

12. The table below displays results from experiments with polygraph instruments. Find $P(\text{subject lied} \mid \text{negative test result})$. Compare this result with the probability of selecting a subject with a negative test result, given that the subject lied. Are $P(\text{subject lied} \mid \text{negative test result})$ and $P(\text{negative test result} \mid \text{subject lied})$ equal?

Did the Subject Actually Lie? 

	No (Did Not Lie)	Yes (Lied)
Positive test results	20	41
Negative test results	32	8

$P(\text{subject lied} \mid \text{negative test result}) = \square$ (Round to three decimal places as needed.)

Find the probability of selecting a subject with a negative test result, given that the subject lied.

$P(\text{negative test result} \mid \text{subject lied}) = \square$ (Round to three decimal places as needed.)

Compare the two values. Are they equal?

- No
 Yes

ID: 4.5.21

13. The data represent the membership of a group of politicians. If we randomly select one politician, what is the probability of getting a Republican given that a male was selected?

	Republican	Democrat	Independent
Male	8	8	0
Female	44	47	0

The probability is approximately \square . (Round to three decimal places as needed.)

ID: 4.5.25

14. Find the probability of winning a lottery with the following rule.

Select the four winning numbers from 1, 2, ..., 23. (In any order. No repeats.)

$P(\text{winning}) = \square$ (Type an integer or a simplified fraction.)

ID: 4.7.13

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Assignment: Test 2

15. There are 51 members on the board of directors for a certain non-profit institution.
- If they must elect a chairperson, first vice chairperson, second vice chairperson, and secretary, how many different slates of candidates are possible?
 - If they must form an ethics subcommittee of four members, how many different subcommittees are possible?

a. There are different slates of candidates possible.

b. There are different ethics subcommittees possible.

ID: 4.7.27

16. A basket contains 9 eggs, 3 of which are cracked. If we randomly select 4 of the eggs for hard boiling, what is the probability of the following events?
- All of the cracked eggs are selected.
 - None of the cracked eggs are selected.
 - Two of the cracked eggs are selected.

a. The probability that all of the cracked eggs are selected is .

(Round to four decimal places as needed.)

b. The probability that none of the cracked eggs are selected is .

(Round to four decimal places as needed.)

c. The probability that two of the cracked eggs are selected is .

(Round to four decimal places as needed.)

ID: 4.7.32

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Assignment: Test 2

17. Determine whether the random variable is discrete or continuous.
- a. The amount of snowfall.
 - b. The distance a baseball travels in the air after being hit.
 - c. The number of people with blood type A in a random sample of 37 people.
 - d. The square footage of a house.
 - e. The weight of a T-bone steak.
-
- a. Is the amount of snowfall discrete or continuous?
- A. The random variable is continuous.
 - B. The random variable is discrete.
- b. Is the distance a baseball travels in the air after being hit discrete or continuous?
- A. The random variable is discrete.
 - B. The random variable is continuous.
- c. Is the number of people with blood type A in a random sample of 37 people discrete or continuous?
- A. The random variable is discrete.
 - B. The random variable is continuous.
- d. Is the square footage of a house discrete or continuous?
- A. The random variable is continuous.
 - B. The random variable is discrete.
- e. Is the weight of a T-bone steak discrete or continuous?
- A. The random variable is discrete.
 - B. The random variable is continuous.

ID: 5.2.5

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Assignment: Test 2

18. Suppose a baseball player had 243 hits in a season. In the given probability distribution, the random variable X represents the number of hits the player obtained in a game.

x	0	1	2	3	4	5
P(x)	0.1822	0.4356	0.2315	0.0589	0.0849	0.0069

- (a) Compute and interpret the mean of the random variable X .

$\mu_x = \square$ (Round to one decimal place as needed.)

Which of the following interpretation of the mean is correct?

- A. The observed value of the random variable will almost always be equal to the mean of the random variable.
- B. As the number of trials n decreases, the mean of the observations will approach the mean of the random variable.
- C. The observed value of the random variable will almost always be less than the mean of the random variable.
- D. As the number of trials n increases, the mean of the observations will approach the mean of the random variable.

- (b) Compute the standard deviation of the random variable X .

$\sigma_x = \square$ (Round to one decimal place as needed.)

ID: 5.2.7

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Assignment: Test 2

19. Determine whether the distribution is a discrete probability distribution.

x	P(x)
0	0.09
1	0.21
2	0.40
3	0.21
4	0.09

Is the probability distribution a discrete distribution? Why? Choose the correct answer below.

- A. No, because the total probability is not equal to 1.
 B. Yes, because the distribution is symmetric.
 C. Yes, because the probabilities sum to 1 and are all between 0 and 1, inclusive.
 D. No, because some of the probabilities have values greater than 1 or less than 0.

ID: 5.2.9

20. Multiple-choice questions each have five possible answers (a, b, c, d, e), one of which is correct. Assume that you guess the answers to three such questions.

a. Use the multiplication rule to find $P(CWW)$, where C denotes a correct answer and W denotes a wrong answer.

$$P(CWW) = \square \text{ (Type an exact answer.)}$$

b. Beginning with CWW, make a complete list of the different possible arrangements of one correct answer and two wrong answers, then find the probability for each entry in the list.

$P(CWW)$ – see above

$$P(WWC) = \square$$

$$P(WCW) = \square$$

(Type exact answers.)

c. Based on the preceding results, what is the probability of getting exactly one correct answer when three guesses are made?

$$\square \text{ (Type an exact answer.)}$$

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21. Assume that a procedure yields a binomial distribution with a trial repeated n times. Use a binomial probabilities table to find the probability of x successes given the probability p of success on a given trial.

$$n = 8, x = 0, p = 0.05$$

$$P(0) = \boxed{} \text{ (Round to three decimal places as needed.)}$$

ID: 5.3.15

22. Refer to the Minitab display to the right. The probabilities were obtained by entering the values of $n = 5$ and $p = 0.139$. In a clinical test of a drug, 13.9% of the subjects treated with 10 mg of the drug experienced headaches. In each case, assume that 5 subjects are randomly selected and treated with 10 mg of the drug. Find the probability that at least four of the subjects experience headaches.

Binomial with $n = 5$ and $p = 0.139$

x	P(X = x)
0	0.4732
1	0.3819
2	0.1233
3	0.0199
4	0.0016
5	0.0001

The probability that at least four of the subjects experience headaches is $\boxed{}$.
(Round to four decimal places as needed.)

ID: 5.3.25

23. Refer to the Minitab display to the right. The probabilities were obtained by entering the values of $n = 5$ and $p = 0.187$. In a clinical test of a drug, 18.7% of the subjects treated with 10 mg of the drug experienced headaches. In each case, assume that 5 subjects are randomly selected and treated with 10 mg of the drug. Find the probability that more than one subject experiences headaches.

Binomial with $n = 5$ and $p = 0.187$

x	P(X = x)
0	0.3552
1	0.4085
2	0.1879
3	0.0432
4	0.0050
5	0.0002

The probability that more than one subject experiences headaches is $\boxed{}$.
(Round to four decimal places as needed.)

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24. A pharmaceutical company receives large shipments of aspirin tablets. The acceptance sampling plan is to randomly select and test 17 tablets, then accept the whole batch if there is only one or none that doesn't meet the required specifications. If a particular shipment of thousands of aspirin tablets actually has a 5% rate of defects, what is the probability that this whole shipment will be accepted?

The probability that this whole shipment will be accepted is .
(Round to three decimal places as needed.)

ID: 5.3.41

25. An airline has a policy of booking as many as 23 persons on an airplane that can seat only 22. (Past studies have revealed that only 83% of the booked passengers actually arrive for the flight.) Find the probability that if the airline books 23 persons, not enough seats will be available.

Find the probability that not enough seats will be available.

(Round to four decimal places as needed.)

ID: 5.3.42

26. A candy company claims that 23% of its plain candies are orange, and a sample of 200 such candies is randomly selected.

a. Find the mean and standard deviation for the number of orange candies in such groups of 200.

$\mu =$

$\sigma =$ (Round to one decimal place as needed.)

b. A random sample of 200 candies contains 67 orange candies. Is this result unusual? Does it seem that the claimed rate of 23% is wrong?

- A. Yes, because 67 is within the range of usual values. Thus, the claimed rate of 23% is probably wrong.
- B. Yes, because 67 is greater than the maximum usual value. Thus, the claimed rate of 23% is probably wrong.
- C. Yes, because 67 is below the minimum usual value. Thus, the claimed rate of 23% is probably wrong.
- D. No, because 67 is within the range of usual values. Thus, the claimed rate of 23% is not necessarily wrong.

ID: 5.4.11

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Assignment: Test 2

27. Given that x has a Poisson distribution with $\mu = 6$, what is the probability that $x = 5$?

$P(5) \approx \square$ (Round to four decimal places as needed.)

ID: 5.5.5

28. Dandelions are studied for their effects on crop production and lawn growth. In one region, the mean number of dandelions per square meter was found to be 10.0. Use the Poisson distribution to find the indicated probabilities.

- Find the probability of 5 dandelions in an area of 1 m^2 .
- Find the probability of at least 5 dandelions in an area of 1 m^2 .
- Find the probability of at most 6 dandelions in an area of 1 m^2 .

a. The probability of 5 dandelions is \square .
(Round to four decimal places as needed.)

b. The probability of at least 5 dandelions is \square .
(Round to four decimal places as needed.)

c. The probability of at most 6 dandelions is \square .
(Round to four decimal places as needed.)

ID: 5.5.11

29. A contractor is considering a sale that promises a profit of \$26,000 with a probability of 0.7 or a loss (due to bad weather, strikes, and such) of \$6,000 with a probability of 0.3. What is the expected profit?

- A. \$16,400
 B. \$20,000
 C. \$22,400
 D. \$18,200

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30. Use the Poisson Distribution to find the indicated probability.

In one town, the number of burglaries in a week has a Poisson distribution with a mean of 2.5. Find the probability that in a randomly selected week the number of burglaries is at least three. Round to four decimal places.

- A. 0.2424
- B. 0.4562
- C. 0.7862
- D. 0.5438
- E. 0.2138

ID: 5.5-4

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1. B
0.995
the first choice

2. $\frac{1}{8}$
 $\frac{3}{8}$
 $\frac{1}{8}$

3. 91
38
38
91
0.418

4. 0.481
the second choice

5. 13 / 28
15
13
10
11.54

6. 0.913

7. 0.640

8. 300
180
0.600

9. 0.078
0.006084
0.993916
C

10. 0.1410
C

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11. 0.899

12. 0.200
0.163
the first choice

13. 0.5

14. $\frac{1}{8,855}$

15. 5,997,600
249,900

16. 0.0476
0.119
0.3571

17. A
B
A
A
B

18. 1.4
D
1.1

19. C

20. 0.128
0.128
0.128
0.384

21. 0.663

22. 0.0017

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23. 0.2363

24. 0.792

25. 0.0138

26. 46
6.0
B

27. 0.1606

28. 0.0378
0.9707
0.1302

29. A

30. B