Chapter 4 & 5 practice set. The actual exam is not multiple choice nor does it contain like questions.

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

Express the indicated degree of likelihood as a probability value.

1) "There is a 40% chance of rain tomorrow."
A) 0.40 B) 0.60
C) 40 D) 4

2) "It will definitely turn dark tonight."
A) 1 B) 0.5
C) 0.30 D) 0.67

Answer the question.

3) Which of the following cannot be a probability?
A) $\frac{5}{3}$ B) $\frac{2}{3}$ C) $\frac{1}{2}$ D) $\frac{3}{5}$

4) What is the probability of an event that is certain to occur?
A) 1 B) 0.95
C) 0.99 D) 0.5

5) On a multiple choice test with four possible answers for each question, what is the probability of answering a question correctly if you make a random guess?
A) $\frac{1}{4}$ B) $\frac{3}{4}$ C) $\frac{1}{2}$ D) 1

Answer the question, considering an event to be "unusual" if its probability is less than or equal to 0.05.

6) Is it "unusual" to get 4 when a pair of dice is rolled?
A) Yes B) No

Find the indicated probability.

7) Refer to the table which summarizes the results of testing for a certain disease.

	Positive Test
Subject has the disease	89
Subject does not have the disease	26

If one of the results is randomly selected, what is the probability that it is a false positive (test indicates the person has the disease when in fact they don't)? What does this probability suggest about the accuracy of the test?
A) 0.0952; The probability of this error is high so the test is not very accurate.
B) 0.0220; The probability of this error is low so the test is fairly accurate.
C) 0.146; The probability of this error is high so the test is not very accurate.
D) 0.421; The probability of this error is high so the test is not very accurate.

8) Two 6–sided dice are rolled. What is the probability that the sum of the two numbers on the dice will be 4?
A) $\frac{1}{12}$ B) $\frac{2}{3}$
C) $\frac{11}{12}$ D) 3

Answer the question, considering an event to be "unusual" if its probability is less than or equal to 0.05.

9) If you drew one card from a standard deck, would it be "unusual" to draw an eight of clubs?
A) Yes B) No

10) Assume that a study of 500 randomly selected school bus routes showed that 477 arrived on time. Is it "unusual" for a school bus to arrive late?
A) Yes B) No

Find the indicated probability.

11) A bag contains 2 red marbles, 3 blue marbles, and 7 green marbles. If a marble is randomly selected from the bag, what is the probability that it is blue?
A) $\frac{1}{4}$ B) $\frac{1}{3}$ C) $\frac{1}{7}$ D) $\frac{1}{9}$

Answer the question.

12) Suppose you are playing a game of chance. If you bet \$7 on a certain event, you will collect \$217 (including your \$7 bet) if you win. Find the odds used for determining the payoff.
A) 30 : 1 B) 31 : 1
C) 1 : 30 D) 217 : 224

Determine whether the events are disjoint.

13) Meet a man with an umbrella.
Meet a man with a raincoat.
A) Yes B) No

Find the indicated probability.

14) If you pick a card at random from a well shuffled deck, what is the probability that you get a face card or a spade?
A) $\frac{11}{26}$ B) $\frac{25}{52}$
C) $\frac{1}{22}$ D) $\frac{9}{26}$

Determine whether the events are disjoint.

15) Go to a formal dinner affair.
Wear blue jeans.
A) Yes B) No

From the information provided, create the sample space of possible outcomes.

16) Flip a coin three times.
A) HHH HHT HTH HTT THH THT TTH TTT
B) HTT THT HTH HHH TTH TTT
C) HHH HTT HTH TTT HTT THH HHT THT
D) HHH TTT THT HTH HHT TTH HTH

Find the indicated probability.

17) A study of consumer smoking habits includes 167 people in the 18–22 age bracket (59 of whom smoke), 148 people in the 23–30 age bracket (31 of whom smoke), and 85 people in the 31–40 age bracket (23 of whom smoke). If one person is randomly selected from this sample, find the probability of getting someone who is age 23–30 or smokes.
A) 0.575 B) 0.653
C) 0.078 D) 0.209

18) In a poll, respondents were asked whether they had ever been in a car accident. 138 respondents indicated that they had been in a car accident and 494 respondents said that they had not been in a car accident. If one of these respondents is randomly selected, what is the probability of getting someone who has been in a car accident? Round to the nearest thousandth, if necessary.

A) 0.218 B) 0.007
C) 0.279 D) 0.782

Determine whether the events are disjoint.

19) Read a book by Mark Twain.
Read about Tom Sawyer.

A) Yes B) No

Find the indicated complement.

20) Find $P(\overline{A})$, given that $P(A) = 0.732$.

A) 0.268 B) 1.732
C) 0 D) 1.366

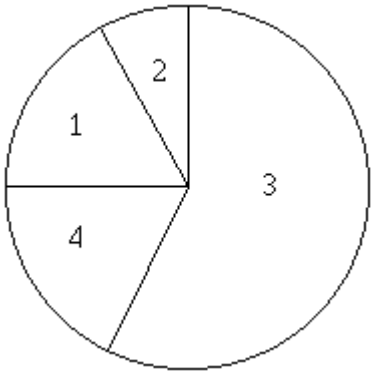
Find the indicated probability.

21) A card is drawn from a well–shuffled deck of 52 cards. Find P(drawing an ace or a 9).

A) $\frac{2}{13}$ B) $\frac{4}{13}$

C) $\frac{13}{2}$ D) 8

22) 100 employees of a company are asked how they get to work and whether they work full time or part time. The figure below shows the results. If one of the 100 employees is randomly selected, find the probability of getting someone who carpools, someone who cycles to work, or someone who works part time.



1. Public transportation: 9 full time, 6 part time
2. Bicycle: 4 full time, 4 part time
3. Drive alone: 35 full time, 30 part time
4. Carpool: 6 full time, 6 part time

A) 0.56 B) 0.66
C) 0.46 D) 0.2

23) The probability that an event will occur is 0.1. What is the probability that the event will not occur?

A) 0.9
B) 0
C) $\frac{1}{9}$
D) None of the above is correct.

24) Find the probability of correctly answering the first 5 questions on a multiple choice test if random guesses are made and each question has 6 possible answers.

A) $\frac{1}{7776}$ B) $\frac{5}{6}$

C) $\frac{6}{5}$ D) $\frac{1}{15625}$

Is Event B dependent or independent of Event A?

25) A: A green ball is drawn from a box with five balls and placed next to the box.
B: A red ball is drawn next and placed next to the green one.

A) Dependent B) Independent

26) A: A Chicagoan visits New York on vacation.
B: He visits Central Park.

A) Dependent B) Independent

27) A: A bird lands on your head.
B: The bird lays an egg.

A) Independent B) Dependent

Find the indicated probability.

28) In a homicide case 7 different witnesses picked the same man from a line up. The line up contained 5 men. If the identifications were made by random guesses, find the probability that all 7 witnesses would pick the same person.

A) 0.000064 B) 0.0000128

C) 0.0000595 D) 1.4

29) The table below describes the smoking habits of a group of asthma sufferers.

	Nonsmoker	Occasional smoker	Regular smoker
Men	444	37	76
Women	429	47	86
Total	873	84	162

If one of the 1197 people is randomly selected, find the probability of getting a regular or heavy smoker.

A) 0.201 B) 0.092

C) 0.458 D) 0.135

30) A manufacturing process has a 70% yield, meaning that 70% of the products are acceptable and 30% are defective. If three of the products are randomly selected, find the probability that all of them are acceptable.

A) 0.343 B) 0.027

C) 2.1 D) 0.429

31) A sample of 4 different calculators is randomly selected from a group containing 46 that are defective and 26 that have no defects. What is the probability that all four of the calculators selected are defective? Round to four decimal places.

A) 0.1586 B) 10.9154

C) 0.1666 D) 0.1021

32) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that the first card is a King and the second card is a queen. Express your answer as a simplified fraction.

A) $\frac{4}{663}$ B) $\frac{2}{13}$

C) $\frac{1}{663}$ D) $\frac{13}{102}$

33) The table below describes the smoking habits of a group of asthma sufferers.

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	305	42	31	378
Women	442	34	30	506
Total	747	76	61	884

If two different people are randomly selected from the 884 subjects, find the probability that they are both women. Round to four decimal places.

A) 0.3274 B) 0.3276

C) 0.000003906 D) 0.2500

Evaluate the expression.

34) $_{11}C_4$

A) 330 B) 1980

C) 3 D) 5040

35) $\frac{9!}{6!}$

A) 504 B) 2!

C) $\frac{3}{2}$ D) 54,000

Find the indicated probability. Express your answer as a simplified fraction unless otherwise noted.

36) The table below shows the soft drinks preferences of people in three age groups.

	cola	root beer	lemon-
under 21 years of age	40	25	
between 21 and 40	35	20	
over 40 years of age	20	30	

If one of the 255 subjects is randomly selected, find the probability that the person is over 40 years of age.

A) $\frac{1}{3}$ B) $\frac{1}{2}$ C) $\frac{2}{5}$ D) $\frac{3}{5}$

Solve the problem.

37) The library is to be given 3 books as a gift. The books will be selected from a list of 16 titles. If each book selected must have a different title, how many possible selections are there?

A) 560 B) 4096
C) 3360 D) 48

Find the indicated probability. Round to the nearest thousandth.

38) A sample of 4 different calculators is randomly selected from a group containing 16 that are defective and 30 that have no defects. What is the probability that at least one of the calculators is defective?

A) 0.832 B) 0.819
C) 0.168 D) 0.160

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

Provide an appropriate response.

39) List the four requirements for a binomial distribution. Describe an experiment which is binomial and discuss how the experiment fits each of the four requirements.

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

Solve the problem.

40) In a certain lottery, five different numbers between 1 and 20 inclusive are drawn. These are the winning numbers. To win the lottery, a person must select the correct 5 numbers in the same order in which they were drawn. What is the probability of winning?

A) $\frac{1}{1{,}860{,}480}$ B) $\frac{1}{20!}$
C) $\frac{120}{1{,}860{,}480}$ D) $\frac{1}{120}$

41) A musician plans to perform 5 selections. In how many ways can she arrange the musical selections?

A) 120 B) 5
C) 25 D) 720

42) How many 5–digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6, 7 if repetition of digits is not allowed?

A) 2520 B) 16,807
C) 119 D) 120

Identify the given random variable as being discrete or continuous.

43) The number of oil spills occurring off the Alaskan coast

A) Discrete B) Continuous

Solve the problem.

44) 8 basketball players are to be selected to play in a special game. The players will be selected from a list of 27 players. If the players are selected randomly, what is the probability that the 8 tallest players will be selected?

A) $\frac{1}{2{,}220{,}075}$ B) $\frac{1}{213{,}127{,}200}$

C) $\frac{1}{40{,}320}$ D) $\frac{8}{27}$

Provide a written description of the complement of the given event.

45) When 100 engines are shipped, all of them are free of defects.

A) At least one of the engines is defective.

B) All of the engines are defective.

C) None of the engines are defective.

D) At most one of the engines is defective.

Find the mean of the given probability distribution.

46) A police department reports that the probabilities that 0, 1, 2, and 3 burglaries will be reported in a given day are 0.53, 0.43, 0.03, and 0.01, respectively.

A) $\mu = 0.52$ B) $\mu = 1.05$

C) $\mu = 1.50$ D) $\mu = 0.25$

Identify the given random variable as being discrete or continuous.

47) The pH level in a shampoo

A) Continuous B) Discrete

Find the mean of the given probability distribution.

48) The random variable x is the number of houses sold by a realtor in a single month at the Sendsom's Real Estate office. Its probability distribution is as follows.

Houses Sold (x)	Probability P(x)
0	0.24
1	0.01
2	0.12
3	0.16
4	0.01
5	0.14
6	0.11
7	0.21

A) $\mu = 3.60$ B) $\mu = 3.50$

C) $\mu = 3.40$ D) $\mu = 3.35$

49) The accompanying table shows the probability distribution for x, the number that shows up when a loaded die is rolled.

x	P(x)
1	0.14
2	0.11
3	0.14
4	0.10
5	0.10
6	0.41

A) $\mu = 4.14$ B) $\mu = 4.01$

C) $\mu = 3.50$ D) $\mu = 0.17$

Provide an appropriate response. Round to the nearest hundredth.

50) In a certain town, 40% 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	0.1296
1	0.3456
2	0.3456
3	0.1536
4	0.0256

A) $\sigma = 0.98$ B) $\sigma = 0.96$
C) $\sigma = 1.88$ D) $\sigma = 1.12$

Answer the question.

51) Focus groups of 11 people are randomly selected to discuss products of the Yummy Company. It is determined that the mean number (per group) who recognize the Yummy brand name is 7.8, and the standard deviation is 0.97. Would it be unusual to randomly select 11 people and find that fewer than 4 recognize the Yummy brand name?

A) Yes B) No

Provide an appropriate response.

52) Suppose you pay $3.00 to roll a fair die with the understanding that you will get back $5.00 for rolling a 1 or a 6, nothing otherwise. What is your expected value?

A) –$1.33 B) $5.00
C) $3.00 D) –$3.00

Provide an appropriate response. Round to the nearest hundredth.

53) Find the standard deviation for the given probability distribution.

x	P(x)
0	0.12
1	0.07
2	0.21
3	0.30
4	0.30

A) $\sigma = 1.30$ B) $\sigma = 1.35$
C) $\sigma = 2.90$ D) $\sigma = 1.70$

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.

Probabilities of Girls

x(girls)	P(x)	x(girls)	P(x)	x(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**

54) Find the probability of selecting 2 or more girls.

A) 0.999 B) 0.001
C) 0.006 D) 0.994

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

55) Rolling a single "loaded" die 15 times, keeping track of the numbers that are rolled.
A) Not binomial: there are more than two outcomes for each trial.
B) Not binomial: the trials are not independent.
C) Procedure results in a binomial distribution.
D) Not binomial: there are too many trials.

56) Spinning a roulette wheel 6 times, keeping track of the occurrences of a winning number of "16".
A) Procedure results in a binomial distribution..
B) Not binomial: the trials are not independent.
C) Not binomial: there are too many trials.
D) Not binomial: there are more than two outcomes for each trial.

Find the indicated probability. Round to three decimal places.

57) In a study, 43% of adults questioned reported that their health was excellent. A researcher wishes to study the health of people living close to a nuclear power plant. Among 13 adults randomly selected from this area, only 3 reported that their health was excellent. Find the probability that when 13 adults are randomly selected, 3 or fewer are in excellent health.
A) 0.119 B) 0.077
C) 0.082 D) 0.037

Solve the problem.

58) A company manufactures batteries in batches of 18 and there is a 3% rate of defects. Find the variance for the number of defects per batch.
A) 0.5 B) 0.7
C) 0.3 D) 52.4

59) A die is rolled 23 times and the number of twos that come up is tallied. If this experiment is repeated many times, find the standard deviation for the number of twos.
A) 1.8 B) 19.2
C) 2.4 D) 5.8

60) The probability is 0.2 that a person shopping at a certain store will spend less than $20. For groups of size 17, find the mean number who spend less than $20.
A) 3.4 B) 13.6
C) 4.0 D) 16.0

61) A die is rolled 9 times and the number of times that two shows on the upper face is counted. If this experiment is repeated many times, find the mean for the number of twos.

A) 1.5 B) 3
C) 2.25 D) 7.5

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.

62) n = 2165; p = 0.63

A) σ = 22.46 B) σ = 25.73
C) σ = 20.05 D) σ = 26.58

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

63) n = 523; p = 0.7

A) μ = 366.1 B) μ = 367.4
C) μ = 367.8 D) μ = 364.6

Find the indicated probability.

64) Suppose that 11% of people are left handed. If 8 people are selected at random, what is the probability that exactly 2 of them are left handed?

A) 0.168 B) 0.0121
C) 0.337 D) 0.0416

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. Round to three decimal places.

65) $n = 6, x = 3, p = \frac{1}{6}$

A) 0.054 B) 0.032
C) 0.029 D) 0.015

Provide an appropriate response.

66) 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?

A) –$0.50 B) $0.00
C) –$1.00 D) –$0.40

Find the indicated probability.

67) The brand name of a certain chain of coffee shops has a 58% recognition rate in the town of Coffleton. An executive from the company wants to verify the recognition rate as the company is interested in opening a coffee shop in the town. He selects a random sample of 9 Coffleton residents. Find the probability that the number that recognize the brand name is not 4.

A) 0.814 B) 0.00148
C) 0.0900 D) 0.186

Find the indicated probability. Round to three decimal places.

68) A machine has 12 identical components which function independently. The probability that a component will fail is 0.2. The machine will stop working if more than three components fail. Find the probability that the machine will be working.

A) 0.795 B) 0.206

C) 0.133 D) 0.927

1) A
2) A
3) A
4) A
5) A
6) B
7) A
8) A
9) A
10) A
11) A
12) A
13) B
14) A
15) A
16) A
17) A
18) A
19) B
20) A
21) A
22) A
23) A
24) A
25) A
26) A
27) A
28) A
29) A
30) A
31) A
32) A
33) A
34) A
35) A
36) A
37) A
38) A
39) The four requirements are:
    1) The experiment must have a fixed number of trials.
    2) The trials must be independent.
    3) Each trial must have all outcomes classified into two categories.
    4) The probabilities must remain constant for each trial.

    Answers will vary for the experiment.
40) A
41) A
42) A
43) A
44) A
45) A

46) A
47) A
48) A
49) A
50) A
51) A
52) A
53) A
54) A
55) A
56) A
57) A
58) A
59) A
60) A
61) A
62) A
63) A
64) A
65) A
66) A
67) A
68) A