Statistics SIA #2 Practice Exam

Name_____

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

**Estimate the probability of the event.**

1) Of 1232 people who came into a blood bank to give blood, 397 people had high blood pressure. Estimate the probability that the next person who comes in to give blood will have high blood pressure. 1) _____

A) 0.373 B) 0.322 C) 0.29 D) 0.241

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

2) A multiple choice question has 18 possible answers, only one of which is correct. Is it "unusual" to answer a question correctly if a random guess is made? 2) _____

A) Yes B) No

3) Assume that a study of 500 randomly selected school bus routes showed that 482 arrived on time. Is it "unusual" for a school bus to arrive late? 3) _____

A) Yes B) No

**Answer the question.**

4) In a certain town, 10% of people commute to work by bicycle. If a person is selected randomly from the town, what are the odds against selecting someone who commutes by bicycle? 4) _____

A) 1 : 10 B) 9 : 1 C) 1 : 9 D) 9 : 10

5) Suppose you are playing a game of chance. If you bet $5 on a certain event, you will collect $115 (including your $5 bet) if you win. Find the odds used for determining the payoff. 5) _____

A) 23 : 1 B) 1 : 22 C) 115 : 120 D) 22 : 1

**Is Event B dependent or independent of Event A?**

6) A: A bird lands on your head. 6) _____
B: The bird lays an egg.

A) Independent B) Dependent

7) A: A green ball is drawn from a box with five balls and placed next to the box. 7) _____
B: A red ball is drawn next and placed next to the green one.

A) Independent B) Dependent

**Find the indicated probability.**

8) Find the probability of correctly answering the first 3 questions on a multiple choice test if random guesses are made and each question has 6 possible answers. 8) _____

A) $\frac{1}{216}$ B) $\frac{1}{2}$ C) $\frac{1}{729}$ D) 2

9) What is the probability that 4 randomly selected people all have different birthdays? Round to four decimal places. 9) _____

A) 0.9918 B) 0.9891 C) 0.9836 D) 0.9729

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

10) The table below shows the soft drinks preferences of people in three age groups. 10) _____

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

If one of the 255 subjects is randomly selected, find the probability that the person is over 40 and drinks cola.

A) $\frac{4}{17}$ B) $\frac{4}{19}$

C) $\frac{4}{51}$ D) None of the above is correct.

**Find the indicated probability. Round to the nearest thousandth.**

11) A study conducted at a certain college shows that 57% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that among 9 randomly selected graduates, at least one finds a job in his or her chosen field within a year of graduating. 11) _____

A) 0.994 B) 0.999 C) 0.111 D) 0.570

**Evaluate the expression.**

12) $\frac{11!}{7!}$ 12) _____

A) 2! B) 77,000 C) $\frac{11}{7}$ D) 7920

13) ${}_8P_4$ 13) _____

A) 2 B) 70 C) 1680 D) 4

**Solve the problem.**

14) There are 8 members on a board of directors. If they must form a subcommittee of 6 members, how many different subcommittees are possible? 14) _____

A) 720 B) 262,144 C) 20,160 D) 28

15) How many ways can an IRS auditor select 3 of 9 tax returns for an audit? 15) _____

A) 6 B) 84 C) 504 D) 729

16) There are 6 members on a board of directors. If they must elect a chairperson, a secretary, and a treasurer, how many different slates of candidates are possible? 16) _____

A) 720 B) 20 C) 120 D) 216

17) A tourist in France wants to visit 8 different cities. If the route is randomly selected, what is the probability that she will visit the cities in alphabetical order? 17) _____

A) $\frac{1}{64}$ B) $\frac{1}{8}$ C) 40,320 D) $\frac{1}{40,320}$

**Answer the question.**

18) Assume that there is a 0.15 probability that a basketball playoff series will last four games, a 0.30 probability that it will last five games, a 0.25 probability that it will last six games, and a 0.30 probability that it will last seven games. Is it unusual for a team to win a series in 7 games? 18) _____

A) Yes B) No

**Provide an appropriate response. Round to the nearest hundredth.**

19) 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. Find the standard deviation for the probability distribution. 19) _____

| 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) $\sigma = 6.86$ B) $\sigma = 4.45$ C) $\sigma = 2.62$ D) $\sigma = 2.25$

**Provide an appropriate response.**

20) 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? 20) _____

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

21) Suppose you pay $2.00 to roll a fair die with the understanding that you will get back $4.00 for rolling a 2 or a 3, nothing otherwise. What is your expected value? 21) _____

A) $4.00 B) –$2.00 C) $2.00 D) –$0.67

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

**Solve the problem.**

22) Multiple–choice questions on a test each have 5 possible answers, one of which is correct. Assume that you guess the answers to 5 such questions. 22) _____

a. Use the multiplication rule to find the probability that the first 2 guesses are wrong and the last 3 guesses are correct. That is, find P(WWCCC), where C denotes a correct answer and W denotes a wrong answer.

b. Make a complete list of the different possible arrangements of 2 wrong answers and 3 correct answers, then find the probability for each entry in the list.

c. Based on the preceding results, what is the probability of getting exactly 3 correct answers when 5 guesses are made?

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

**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.**

23) $n = 5, x = 2, p = 0.70$ 23) _____

A) 0.198 B) 0.700 C) 0.132 D) 0.464

24) $n = 6, x = 3, p = \frac{1}{6}$ 24) _____

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

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

25) $n = 38; p = 0.2$ 25) _____

A) $\mu = 8.3$ B) $\mu = 7.1$ C) $\mu = 7.9$ D) $\mu = 7.6$

26) $n = 676; p = 0.7$ 26) _____

A) $\mu = 471.7$ B) $\mu = 474.5$ C) $\mu = 474.9$ D) $\mu = 473.2$

**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.**

27) $n = 48; p = 3/5$ 27) _____

A) $\sigma = 3.39$ B) $\sigma = 6.66$ C) $\sigma = 7.51$ D) $\sigma = 0.98$

28) $n = 2219; p = 0.63$ 28) _____

A) $\sigma = 26.86$ B) $\sigma = 26.01$ C) $\sigma = 22.74$ D) $\sigma = 20.33$

**Use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$. Round your answer to the nearest hundredth unless otherwise noted.**

29) $n = 1042, p = 0.80$ 29) _____

A) Minimum: 815.34; maximum: 851.86 B) Minimum: 807.78; maximum: 859.42

C) Minimum: 820.69; maximum: 846.51 D) Minimum: 859.42; maximum: 807.78

30) $n = 1205, p = 0.98$ 30) _____

A) Minimum: 1190.62; maximum: 1171.18 B) Minimum: 1171.18; maximum: 1190.62

C) Minimum: 1176.04; maximum: 1185.76 D) Minimum: 1174.03; maximum: 1187.77

1) B
2) B
3) A
4) B
5) D
6) A
7) B
8) A
9) C
10) C
11) B
12) D
13) C
14) D
15) B
16) C
17) D
18) B
19) C
20) B
21) D
22) a. 0.00512
b. WWCCC
WCWCC
WCCWC
WCCCW
CWWCC
CWCWC
CWCCW
CCWWC
CCWCW
CCCWW
Each of the 10 arrangements has probability 0.00512
c. 0.0512
23) C
24) B
25) D
26) D
27) A
28) C
29) B
30) B