

Instructions: Show your work thoroughly and systematically. Use notations and symbols appropriately.

- 1) (Pg.174, 1) **Identifying Discrete and Continuous Random Variables.** In following exercises, identify the given random variable as being discrete or continuous.
- (a) The weight of the cola in a randomly selected can.
 - (b) The cost of a randomly selected can of Coke.
 - (c) The time it takes to fill a can of Pepsi
 - (d) The amount of cola (in ounces) in a can of Pepsi
 - (e) The number of cans of Coke on a beverage delivery truck

Identifying Probability Distributions. In Exercises 2-4, determine whether a probability distribution is given. In those cases where a probability distribution is not described, identify the requirements that are not satisfied. In those cases where a probability distribution is described, find its mean and standard deviation.

- 2) (Pg.174, 3) Gender Selection In a study of the MicroSort gender selection method, couples in a control group are not given a treatment, and they each have three children. The probability distribution for the number of girls is given in the accompanying table.

x	$P(x)$
0	0.125
1	0.375
2	0.375
3	0.125

3) (Pg.174, 6) **Videotape Rentals** The accompanying table is constructed from data obtained in a study of the number of video- tapes rented from Blockbuster.

x	$P(x)$
0	0.04
1	0.26
2	0.36
3	0.20
4	0.08
5	0.04
6	0.02

4) (Pg.174, 8) **Overbooked Flights** Air America has a policy of routinely overbooking flights, because past experience shows that some passengers fail to show. The random variable x represents the number of passengers who cannot be boarded because there are more passengers than seats.

x	$P(x)$
0	0.805
1	0.113
2	0.057
3	0.009
4	0.002

5) (Pg.175, 13) **Finding Expected Value in Roulette** When you give a casino \$5 for a bet on the number 7 in roulette, you have a $\frac{1}{38}$ probability of winning \$175 and a $\frac{37}{38}$ probability of losing \$5. If you bet \$5 that the outcome is an odd number, the probability of winning \$5 is $\frac{18}{38}$, and the probability of losing \$5 is $\frac{20}{38}$.

- (a) If you bet \$5 on the number 7, what is your expected value?
- (b) If you bet \$5 that the outcome is an odd number, what is your expected value?
- (c) Which of these options is best: bet on 7, bet on odd, or don't bet? Why?

6) (Pg.176, 19) **Rolling Dice** Consider the procedure of rolling a pair of dice five times and letting the random variable x represent the number of times that 7 occurs. The accompanying table describes the probability distribution.

x	$P(x)$
0	0.402
1	0.402
2	?
3	0.032
4	0.003
5	0.000

- (a) Find the value of the missing probability.
- (b) Would it be unusual to roll a pair of dice five times and get at least three 7s? Why or why not?

7) (Pg.177, 24) **Identifying Probability Distributions** In each case, determine whether the given function is a probability distribution.

(a) $P(x) = 1/4$, where $x = 1,2,3,4$

(b) $P(x) = 1/(2x)$, where $x = 1,2,3,\dots$

8) (pg. 184, 1-8) **Identifying Binomial Distributions.** In following Exercises, determine whether the given procedure result in a binomial distribution. For those that are not binomial, identify at least one requirement that is not satisfied.

(a) Guessing the answer to 20 multiple-choice test questions, then determining whether the answers are correct or wrong (assume each multiple choice question has the same number of choices, and only one of which is correct)

(b) Rolling a fair die 50 times

(c) Surveying 1000 college students by asking them how many credits they are currently taking

(d) Surveying 1000 college students by asking them if they recognize the brand name Microsoft

- 9) (pg. 184, 9) **Finding Probabilities** When Guessing Answers Multiple-choice questions each have five possible answers, one of which is correct. Assume that you guess the answers to three such questions.
- (a) Use the multiplication rule to find the probability that the first two guesses are wrong and the third is correct. That is, find $P(WWC)$, where C denotes a correct answer and W denotes a wrong answer.
 - (b) Beginning with WWC, make a complete list of the different possible arrangements of two wrong answers and one correct answer, then find the probability for each entry in the list.
 - (c) Based on the preceding results, what is the probability of getting exactly one correct answer when three guesses are made?

- 10) (pg. 190, 1-2) **Finding μ , σ , and Unusual Values.** In following Exercises, assume that a procedure yields a binomial distribution with n trials and the probability of success for one trial is p . Use the given values of n and p to find the mean μ and standard deviation σ . Also, use the range rule of thumb to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$.

(a) $n = 100, p = 0.25$

(b) $n = 1068, p = 0.88$

- 11) (pg. 191, 6) **Guessing Answers** Several students are unprepared for a multiple-choice quiz with 20 questions, and all of their answers are guesses. Each question has five possible answers, and only one of them is correct.
- (a) Find the mean and standard deviation for the number of correct answers for such students.
 - (b) Would it be unusual for a student to pass by guessing and getting at least 12 correct answers? Why or why not?
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- 12) (pg. 191, 10) **College Student Housing** In planning for enrollment, which is expected to grow by 200 students, the College of Newport has found that 9% of college students live in their own off-campus housing (based on data from the Independent Insurance Agents of America).
- (a) For randomly selected groups of 200 college students, find the mean and standard deviation for the numbers who live in their own off-campus housing.
 - (b) Would it be unusual to find that 50 of the 200 new students live in their own off-campus housing? What is a likely cause of a number that is unusually high?