Student: _____	**Instructor:** Andrea Steel	**Assignment:** Homework 5 - Chapter 4 - Sections 3 to 4 - (ASSIGNMENT 10 pts)
Date: _____	**Course:** Math 160 Fall 2019 A	

1. In a certain country, the true probability of a baby being a girl is 0.472. Among the next five randomly selected births in the country, what is the probability that at least one of them is a boy?

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

2. 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 did not have the disease.

	The individual actually had the disease	
	Yes	**No**
Positive	124	5
Negative	34	137

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

3. Testing for a disease can be made more efficient by combining samples. If the samples from six people are combined and the mixture tests negative, then all six samples are negative. On the other hand, one positive sample will always test positive, no matter how many negative samples it is mixed with. Assuming the probability of a single sample testing positive is 0.2, find the probability of a positive result for six samples combined into one mixture. Is the probability low enough so that further testing of the individual samples is rarely necessary?

   The probability of a positive test result is _____.
   (Round to three decimal places as needed.)

   Is the probability low enough so that further testing of the individual samples is rarely necessary?

   - ○ **A.** The probability is low, so further testing of the individual samples will be a rarely necessary event.
   - ○ **B.** The probability is not low, so further testing of the individual samples will frequently be a necessary event.
   - ○ **C.** The probability is low, so further testing will be necessary for all of the combined mixtures.
   - ○ **D.** The probability is not low, so further testing will not be necessary for any of the mixtures.

4. Find the probability that when a couple has two children, at least one of them is a girl. (Assume that boys and girls are equally likely.)

   The probability is _____ that at least one of the two children is a girl.
   (Simplify your answer. Do not round.)

5. In an experiment, college students were given either four quarters or a $1 bill and they could either keep the money or spend it on gum. The results are summarized in the table. Complete parts (a) through (c) below.

	Purchased Gum	Kept the Money
Students Given Four Quarters	25	19
Students Given a $1 Bill	16	26

a. Find the probability of randomly selecting a student who spent the money, given that the student was given four quarters.

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

b. Find the probability of randomly selecting a student who kept the money, given that the student was given four quarters.

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

c. What do the preceding results suggest?

- **A.** A student given four quarters is more likely to have kept the money than a student given a $1 bill.
- **B.** A student given four quarters is more likely to have spent the money than a student given a $1 bill.
- **C.** A student given four quarters is more likely to have spent the money.
- **D.** A student given four quarters is more likely to have kept the money.

6. The accompanying table shows the results from a test for a certain disease. Find the probability of selecting a subject with a negative test result, given that the subject has the disease. What would be an unfavorable consequence of this error?

	The individual actually had the disease	
	Yes	**No**
Positive	314	6
Negative	12	1151

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

What would be an unfavorable consequence of this error?

- **A.** The test would be shown to be not reliable.
- **B.** The subject would experience needless stress and additional testing.
- **C.** The test would be shown to be not effective.
- **D.** The subject would not receive treatment and could spread the disease.

7. In horse racing, a trifecta is a bet that the first three finishers in a race are selected, and they are selected in the correct order. Does a trifecta involve combinations or permutations? Explain.

Choose the correct answer below.

- **A.** Because the order of the first three finishers does make a difference, the trifecta involves permutations.
- **B.** Because the order of the first three finishers does not make a difference, the trifecta involves combinations.
- **C.** Because the order of the first three finishers does make a difference, the trifecta involves combinations.
- **D.** Because the order of the first three finishers does not make a difference, the trifecta involves permutations.

8. In a state pick 4 lottery game, a bettor selects four numbers between 0 and 9 and any selected number can be used more than once. Winning the top prize requires that the selected numbers match those and are drawn in the same order. Do the calculations for this lottery involve the combinations rule or either of the two permutations rules? Why or why not? If not, what rule does apply?

Choose the correct answer below.

- **A.** The combination and permutations rules do not apply because repetition is allowed and numbers are selected with replacement. The multiplication counting rule applies to this problem.
- **B.** The combination and permutations rules do not apply because repetition is allowed and numbers are selected with replacement. The factorial rule applies to this problem.
- **C.** The permutation rule (with some identical items) applies to this problem because repetition is allowed. The permutation rule (with different items) and the combination rule cannot be used with repetition.
- **D.** The permutation rule (with different items) applies to this problem because repetition is allowed. The permutation rule (with some identical items) and the combination rule cannot be used with repetition.
- **E.** The combination rule applies to this problem because the numbers are selected with replacement. Neither of the permutations rules allows replacement.

9. A Social Security number consists of nine digits in a particular order, and repetition of digits is allowed. After seeing the last four digits printed on a receipt, if you randomly select the other digits, what is the probability of getting the correct Social Security number of the person who was given the receipt?

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

10. A classic counting problem is to determine the number of different ways that the letters of "personnel" can be arranged. Find that number.

The number of different ways that the letters of "personnel" can be arranged is _____.
(Simplify your answer.)

11. A corporation must appoint a president, chief executive officer (CEO), chief operating officer (COO), and chief financial officer (CFO). It must also appoint a planning committee with five different members. There are 14 qualified candidates, and officers can also serve on the committee. Complete parts (a) through (c) below.

a. How many different ways can the officers be appointed?

There are _____ different ways to appoint the officers.

b. How many different ways can the committee be appointed?

There are _____ different ways to appoint the committee.

c. What is the probability of randomly selecting the committee members and getting the five youngest of the qualified candidates?

P(getting the five youngest of the qualified candidates) = _____
(Type an integer or a simplified fraction.)

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12. Which of the following is NOT a requirement of the Permutations Rule, ${}_nP_r = \frac{n!}{(n-r)!}$, for items that are all different?

Choose the correct answer below.

- **A.** Order is not taken into account (rearrangements of the same items are considered to be the same).
- **B.** There are n different items available.
- **C.** Order is taken into account (rearrangements of the same items are considered to be different).
- **D.** Exactly r of the n items are selected (without replacement).

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13. Which of the following is NOT a requirement of the Combinations Rule, ${}_nC_r = \frac{n!}{r!(n-r)!}$, for items that are all different?

Choose the correct answer below.

- **A.** That order is taken into account (consider rearrangements of the same items to be different sequences).
- **B.** That there be n different items available.
- **C.** That r of the n items are selected (without replacement).
- **D.** That order is not taken into account (consider rearrangements of the same items to be the same).

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14. Fill in the blank.

If the order of the items selected matters, then we have a _____.

If the order of the items selected matters, then we have a (1) _____

(1)
- combination problem.
- permutation problem.