Pre-calculus   11.2 Homework

Name _____ **period**_____ **date**_____ **score** _____

Answer the questions based on each situation. Express all probabilities as both fractions (it is not necessary to simplify) and as decimals. Round to three significant digits, if necessary.

1. Randomly rearranging the letters in the word HELP.
   a. List the sample space.

   b. What is the probability that the E is somewhere after the L in the rearrangement?

   c. What is the probability that the sequence PH will occur?

2. Flipping a fair coin four times.
   a. List the sample space.

   b. What is the probability of flipping exactly 2 heads?

   c. What is the probability the sequence THH occurs somewhere in the four-flip sequence?

   d. What is the probability of flipping tails at least once?

   e. What is the probability of flipping three or more heads?

3. From a family of four children (Ann, Betty, Carl, and Dan), randomly choosing one child to wash the dishes and one child to dry the dishes.
   a. What is the probability that boys are chosen to do both chores?

   b. What is the probability that one boy and one girl are chosen?

   c. What is the probability that the child chosen to wash the dishes has a first initial that comes earlier in the alphabet than the child chosen to dry the dishes?

4. License plates are to be issued with 3 letters followed by 4 single digits.
   a. How many such license plates are possible? (Assume that letters and numbers can be repeated and all sequences are allowed.)

   b. If the plates are issued at random, what is the probability that the license plate starts with the letters USA followed by a number that is divisible by 5?

5. A certain state's license plates have 3 letters followed by 4 numbers. Repeats are not allowed for the letters, but they are for the numbers.
   a. How many such license plates are possible?

   b. If the plates are issued at random, what is the probability that the 3 letters are 3 consecutive letters in alphabetical order?

   c. If the plates are issued at random, what is the probability that the 4 numbers are all odd?

6. Find the probability that if 5 books are arranged randomly on a shelf, they will end up arranged in alphabetical order by title.

7. Gus is posting 2 photographs on his website. He has narrowed his choices to 4 landscape photos and 3 portraits. If he chooses the 2 photographs at random, find the probability of each selection
   a. 2 portraits

   b. 2 landscapes

   c. 1 portrait and 1 landscape

8. Suppose you have a bag with 8 AAA batteries but only 6 of them are good. You need to choose 4 for your graphing calculator. If you randomly select 4 batteries, what is the probability that all 4 of the batteries you choose will work?

9. Five books are chosen at random from a best-seller list that includes 12 novels and 6 biographies. Find the probability of each selection.
   a. 5 novels

   b. 5 biographies

   c. 3 novels, 2 biographies

   d. 1 novel, 4 biographies

10. Out of 100 bulbs produced by a manufacturing company, 35 are white light bulbs and the rest are yellow light bulbs. If 15 bulbs are randomly selected without replacement, find the probability that 7 of them are white bulbs.

11. A school is going to randomly choose a delegation of 10 students to be sent to a cultural event from a group of 105 female students and 90 male students. What is the probability that 7 out of the 10 chosen students are females?

12. A consignment of 20 microprocessors includes 4 that are defective. To check the consignment, the buyer randomly checks 3 microprocessors. Find the probability that the buyer finds two or more defective processors in the check he conducts.

13. Mega Millions is a multi-state lottery played in most US states with a top cash prize around $656 million. Players pick five different numbers from 1 to 56 and one number from 1 to 46. A player wins the jackpot by matching all five numbers drawn from white balls (1 through 56) and matching the number on the gold Mega Ball (1 through 46).
   a. What is the probability of winning the jackpot?

   b. A player wins a minimum amount of $10,000 by correctly matching four numbers drawn from white balls and matching the number on the gold Mega Ball. What is the probability of winning this consolation prize?

   c. A player wins a minimum amount of $10 by correctly matching two numbers drawn from white balls and matching the number on the gold Mega Ball. What is the probability of winning this consolation prize?