Math 2101
Unit II Practice Test **Name** ________________________

Show work to support your solutions, whenever possible.

1. A fair coin was flipped three times and landed heads three times. What is the probability of a head on the very next toss?

2. What is the probability of a fair coin landing heads four times in a row?

3. A box contains four red marbles, six white marbles, and ten blue marbles. If one marble is drawn at random, find the probability that

   (a) a red or a blue marble is drawn (b) neither a red nor a blue marble is drawn

4. In a NASA rocket firing, the probability of the success of the first stage is 95%, of the second stage 97%, and of the third stage 99%. What is the probability for success for the three-stage rocket firing?

5. Consider the two containers below.

   (a) If a container above is selected at random, and then a letter is selected at random from the chosen container, what is the probability that the letter chosen is a T? ________

   (b) If a letter is drawn from container #1, shown below, and placed in container #2, and then a letter is drawn from container #2, what is the probability that the letter is an H? _________

6. Compute: (a) $\dfrac{200!}{198!}$ (b) 7! (c) $\dfrac{10!}{4! \cdot 6!}$

7. A committee of five is selected at random from a set consisting of five Democrats, eight Republicans, and two Independents.

(a) How many committees of 5 can be formed consisting of 2 Republicans, 2 Democrats, and 1 Independent?

(b) What is the probability that the committee formed consists of 2 Republicans, 2 Democrats, and 1 Independent?

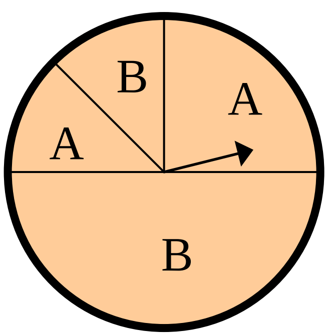
8. If automobile license plates consist of two letters followed by three digits, how many different possible license plates are possible if letters and numbers may be repeated?

9 If two dice are rolled 360 times, approximately how many times should you expect

(a) a sum of 12?

(b) the sums of 6, 7, or 8?

10. Spin the following spinner.



(a) What is the probability in favor of landing in a region marked A? ______

(b) Spin the spinner 400 times. How many times to you expect a B? ______

11. Compute, showing the correct use of the formula for combinations.

(a) ${}_6C_2$ ___________

(b) ${}_6C_3$ ___________

12. Compute, showing the correct use of the formula for permutations.

(a) ${}_6P_2$ ___________

(b) ${}_6P_4$ ___________

13. (a) How many outcomes are there for flipping 3 coins? ______

(b) How many outcomes are there for rolling 2 dice? ______

(c) If I have 5 pairs of pants from which to choose and 9 shirts from which to choose, how many "outfits" can I put together? ______

14. Five cards are drawn from a standard 52-card deck without replacement. Find the probability of getting all face cards.

15. (a) Flip a coin 1000 times. How many heads do you expect? ______

(b) Roll 1 die 60 times. How many 2s do you expect? ______

16. (a) With 9 baseball players, how many different ways can the coach arrange the first four batters? ______

(b) With 9 club members, how many different committees of 4 can be selected to go to a conference? ______

17. (a) There are 10 players on a U-8 soccer team, and the coach picks a group of 6 to start the game. How many different groups of starters can the coach choose? ______

(b) There are 15 members of a club. How many different "slates" could the membership elect as president, vice-president, and secretary/treasurer (3 offices)? ______

18. Using the given probability, P(E) , of an event, find the probability of its complement, $P\left(\overline{E}\right)$.

(a) $\frac{1}{6}$ _____ (b) 25% _____ (c) 0.65 _____ (d) 0.4 _____

19. (a) If an event E cannot occur, its corresponding probability is P(E) = __________.

(b) When 2 events cannot occur at the same time, they are said to be _______________.

20. When a group of 37 people are assembled, there is a $1 - \frac{{}_{365}P_{37}}{365^{37}}$ probability that at least two will have the same birthday. Find this probability to the nearest percent.

21. If a person is male or female, blood types are A, B, AB, or O, and Rh+ or Rh–, draw a tree diagram for the 16 possibilities.

22. A combination lock dial consists of the numbers 0 to 39.

(a) If no number can be used twice, how many different "combinations" are possible using three numbers? Remember, a combination lock is really a permutation lock.

(b) How many different "combinations" are possible if you can repeat the same number?

23. In how many ways can a committee of 4 be selected from a club with 15 members?

24. Given the following chart:

X	0	1	2	3	4
P(X)	0.12	0.34	0.29	0.17	0.08

(a) Determine whether it is a probability distribution. Explain your reasoning.

(b) Construct a graph for this distribution.

(c) Find the mean, variance, and standard deviation for this distribution. Round to the nearest tenth.

25. In a CISM 2201 class, there are 14 freshmen and 12 sophomores. Five of the freshmen are males and seven of the sophomores are females. If one student is selected randomly, find the probability that a female or a sophomore is selected.

26. At a small college, the probability that a student takes physics and sociology is 0.33. The probability that a student takes sociology is 0.60. Find the probability that a student is taking physics, given the fact that he is taking sociology. Use a formula to find your answer.

27. In an election, 40% of eligible voters did not vote. If four eligible voters are selected at random, find the probability that at least one of the four voted in the election. [Hint: Use complementary events.]

28. A study was conducted to determine the number of radios each household owns. Find the mean and standard deviation for this probability distribution. Round to the nearest tenth.

Number of radios (X)	0	1	2	3	4
Probability P(X)	0.10	0.30	0.40	0.15	0.05

29. Friendly City College needs to raise money to buy several computers. They decide to conduct a raffle. A single cash prize of $1,500 is to be awarded. If they sell 1,200 tickets at $3 each, find the expected gain (loss) if you buy one ticket. There is only one winning ticket. Round to the nearest hundredth.

30. With an auto insurance company, 50% of its customers are considered low risk, 35% are medium risk, and 15% are high risk. After a study, the company finds that during a 1-yr period, 1% of its low-risk drivers had an accident, 4% of its medium-risk drivers had an accident, and 8% of its high-risk drivers had an accident. If a driver is selected at random, find the probability that the driver will have had an accident during the year.

Do your best! Rise to the challenge! Live and learn!