Circle the best choice.

1. If a pair of fair dice is rolled, find the probability that the sum of upturned faces is 8.
   A) 5/36  B) 6/36  C) 7/36  D) 8/36  E) 9/36

2. Let A and B be two events such that $P(A) = .4$, $P(B) = .5$, and $P(A \text{ and } B) = .3$.
   Find $P(A \text{ or } B)$.
   A) .2  B) .3  C) .4  D) .5  E) .6

3. If the odds for event $E$ are 1 to 2, then the probability of event $E$ is
   A) 1/2  B) 1/3  C) 1/4  D) 2/3  E) 3/4

4. A student is randomly selected from the MTSU football team. Which of the following events is more likely?
   A). The student is strong.
   B). The student is tall and strong.
   C). The student is fast, tall, and strong.
   D) The student is fast or tall or strong.
   E) The student is fast and strong or tall and strong.

5. A student randomly flips a coin 3 times. The sample space is given by
   $S = \{(H, H, H), (H, H, T), (H, T, H), (T, H, H), (H, T, T), (T, H, T), (T, T, H), (T, T, T)\}$. Find the probability of the event of exactly 2 heads in the 3 flips.
   A) 1/4  B) 1/8  C) 3/4  D) 3/8  E). none of the above

6. A student randomly flips a coin 4 times. Find the probability that all 4 flips result in heads.
   A) 1/4  B) 1/2  C) 1/8  D) 1/16  E) none of the above

7. Deal one card from a well-shuffled deck of playing cards. Let H denote the event that the card is a heart, and let J be the event that the card is a jack. Which of the following statements is false?
   A) Events H and J are mutually exclusive
   B) Events H and J are independent.
   C) $P(H \mid J) = P(H)$
   D) $P(H \text{ and } J) = P(H) \cdot P(J)$
   E) $P(J) < P(H)$

8. Classify the following random variable according to whether it is discrete or continuous.
   The number of goals scored in a soccer game
   A) discrete  B) continuous
9. The set of all possible outcomes from an experiment is called the ...
   A) complement space
   B) outer space
   C) sample space
   D) random space
   E) empty space

10. Janet has 4 different hats, 4 different dresses, and 4 different pairs of shoes. How many different outfits can she make if an outfit consists of a hat, a dress, and a pair of shoes?
   A) 4
   B) 12
   C) 24
   D) 64
   E) none of the above

11. A ball is randomly picked from an urn that contains
   4 red balls with number 0,
   5 red balls with number 1,
   6 green balls with number 0, and
   7 green balls with number 1.

   Find the probability that the ball is red or the ball has a number 1 on it.
   A) $\frac{9}{22}$
   B) $\frac{5}{22}$
   C) $\frac{16}{22}$
   D) $\frac{12}{22}$
   E) none of the previous

12. A ball is randomly picked from an urn that contains
   4 red balls with number 0,
   5 red balls with number 1,
   6 green balls with number 0, and
   7 green balls with number 1.

   If the ball picked has number 0 on it, find the probability that it is red.
   A) $\frac{4}{6}$
   B) $\frac{9}{16}$
   C) $\frac{4}{22}$
   D) $\frac{12}{22}$
   E) $\frac{4}{10}$

13. There are 30 people at a party, all of whom are lawyers or politicians. Twenty five of the attendees are lawyers. Fifteen of the attendees are politicians. If one of the attendees is randomly selected to sing, what is the probability that the singer is a lawyer but not a politician.
   A) $\frac{5}{30}$
   B) $\frac{10}{30}$
   C) $\frac{15}{30}$
   D) $\frac{20}{30}$
   E) $\frac{25}{30}$
14. The probability of surviving a certain transplant operation is 0.75. If a patient survives the operation, the probability that his or her body will reject the transplant within a month is 0.20. What is the probability of surviving both of these stages?

   A) .95
   B) .55
   C) .60
   D) .20
   E) .15

15. Consider the following data on traffic accidents.

<table>
<thead>
<tr>
<th>age group</th>
<th>% of drivers</th>
<th>accident probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 to 25</td>
<td>20</td>
<td>.10</td>
</tr>
<tr>
<td>26 to 45</td>
<td>35</td>
<td>.07</td>
</tr>
<tr>
<td>46 to 65</td>
<td>30</td>
<td>.06</td>
</tr>
<tr>
<td>over 65</td>
<td>15</td>
<td>.07</td>
</tr>
</tbody>
</table>

Calculate the probability that a randomly chosen driver has an accident.

   A) .084   B) .075   C) .073   D) .070   E) .300

16. If the occurrence or non-occurrence of event A does not affect the probability of event B occurring, and vice versa, then the events A and B are said to be...

   A) independent events
   B) mutually exclusive events
   C) dependent events
   D) separate events
   E) compound events

17. A human gene carries a certain disease from the mother to the child with a probability rate of 25%. That is, there is a 25% chance that the child becomes infected with the disease. Suppose a female carrier of the gene has three children. Assume that the infections of the three children are independent of one another. Find the probability that none of the children get the disease from their mother. (Round your answer to 4 decimal places.)

   A) .0156   B) .0251   C) .0377   D) .4219   E) .6667
18. According to a survey, 87% of students at a certain college own a cell phone. If 3 students are randomly selected from this college, what is the probability that exactly 2 of the three selected own a cell phone?

A) .87+.87+.13
B) 3(.87+.87+.13)
C) (.87)(.87)(.13)
D) 3(.87)(.87)(.13)
E) 2(.87)(.87)(.13)

19. Combinatorics is an area of mathematics that deals with ...

a. farm equipment
b. counting
c. perspiration
d. rates of change
e. none of the above

20. A different arrangement or ordering of a list of objects is called a ...

a. combination
b. permutation
c. truncation
d. partition
e. digestion

21. Coach Fickleberry must pick 2 players from her 4 reserve players (Monique, Tanesha, Angela, and Nadine) to play in Saturday's game. In how many ways can she do this?

a. 2
b. 6
c. 8
d. 16
e. none of the above

22. Find the number of ways in which two A's, three B's, five C's, and one D can be distributed among eleven students taking a course in statistics.

a. 39,916,880
b. 1,663,200
c. 1,330,560
d. 27,720
e. 1,440
23. A barrel contains 100 apples of which 15 are rotten. If ten apples are randomly picked from the barrel, what is the probability that none of the apples picked are rotten. Round your answer to 4 decimal places.

a. .1808     b. .1176     c. .1969     d. .3791     e. none of the previous

24. In how many ways can 4 people line up at a bus stop?

a. 4     b. 8     c. 24     d. 32     e. 256

25. Suppose the probability that a jet pilot is shot down during any mission is .03. Assume that the outcomes of all missions are mutually independent. Find the maximum number of missions the pilot can fly such that the probability of never being shot down is at least .50.

a. 11     b. 16     c. 22     d. 32     e. none of the above

26. In a certain community, 7 percent of all adults over 50 have diabetes. If a health service in this community correctly diagnoses 95 percent of all persons with diabetes as having the disease and incorrectly diagnoses 3 percent of all persons without diabetes as having the disease, find the probability (under random testing) that a person over 50 diagnosed by the health service as having diabetes actually has the disease. [If T denotes the event an adult over 50 tests positive (being diagnosed) for diabetes and D denotes the event an adult over 50 has diabetes, find \( P(D | T) \).] Round your answer to 4 decimal places.

a. .9500     b. .9215     c. .8835     d. .8275     e. .7044

27. You live 4 blocks south and 5 blocks east of Granny's Grocery. You randomly select one of the many direct routes and proceed to walk to Granny's. Unbeknownst to you a group of hoodlums is harassing pedestrians at the intersection two blocks north and two blocks west of your home. What is the probability that you will "cross paths" with the hoodlums? Round your answer to 3 decimal places.

a. .381     b. .415     c. .476     d. .524     e. .585