**MULTIPLE CHOICE.  Choose the one alternative that best completes the statement or answers the question.**

**Choose the correct response.**

1) The weather reporter predicts that there is a 10% chance of rain tomorrow for a certain region.    1) _____
   What is meant by this phrase?
   A) In circumstances "like this," rain occurs 10% of the time.
   B) The occurrence of rain is "truly random" and will occur 10% of the time.
   C) Rain occurs 10% of the time in this region.
   D) 10% of the time it rains on this date.
   E) It will rain 10% of the day tomorrow.

2) At the track, a gambler bets on the wrong horse in a 10-horse field nine times in a row. Later, when    2) _____
   talking to a friend, he said he was confident that he would pick the winner the next time, because
   he was "due to pick a winner." Comment on his reasoning.
   A) If he doesn't pick the winning horse next time, he will shortly after that.
   B) When there are 10 horses in a race and he has chosen the wrong horse nine times in a row, he
      statistically should pick a winner the next time.
   C) This is false reasoning because he doesn't appear to be lucky.
   D) This is false reasoning because there is no "law of averages" for independent events.
   E) None of the above apply.

**The plastic arrow on a spinner for a child's game stops rotating to point at a color that will determine what happens next.
Determine whether the probability assignment is possible?**

3)    Probability of ...    3) _____

| Red | Yellow | Green | Blue |
|-----|--------|-------|------|
| 0.6 | 0.2 | 0.1 | 0.1 |

   A) Yes                                          B) No

4)    Probability of ...    4) _____

| Red | Yellow | Green | Blue |
|-----|--------|-------|------|
| 0.2 | 0.3 | 0.2 | 0.4 |

   A) Yes                                          B) No

5)    Probability of ...    5) _____

| Red | Yellow | Green | Blue |
|-----|--------|-------|------|
| 0.2 | 0.3 | 0.2 | 0.2 |

   A) Yes                                          B) No

A professor divided the students in her business class into three groups: those who have never taken a statistics class, those who have taken only one semester of a statistics class, and those who have taken two or more semesters of statistics. The professor randomly assigns students to groups of three to work on a project for the course. Find the requested probability.

6) If 55% of the students have never taken a statistics class, 25% have taken only one semester of a statistics class, and the rest have taken two or more semesters of statistics, what is the probability that the first groupmate you meet has studied two or more semesters of statistics?

   A) 0.45        B) 0.20        C) 0.80        D) 0.75        E) 0.25

6) _____

7) If 65% of the students have never taken a statistics class, 15% have taken only one semester of a statistics class, and the rest have taken two or more semesters of statistics, what is the probability that the first groupmate you meet has studied at least 1 semester of statistics?

   A) 0.20        B) 0.35        C) 0.15        D) 0.85        E) 0.80

7) _____

8) If 30% of the students have never taken a statistics class, 60% have taken only one semester of a statistics class, and the rest have taken two or more semesters of statistics, what is the probability that neither of the first two groupmates you meet has studied any statistics?

   A) 0.09        B) 0.30        C) 0.60        D) 0.70        E) 0.10

8) _____

9) If 30% of the students have never taken a statistics class, 60% have taken only one semester of a statistics class, and the rest have taken two or more semesters of statistics, what is the probability that both of the first two groupmates you meet have studied at least one semester of statistics?

   A) 0.49        B) 0.60        C) 0.70        D) 0.36        E) 1.4

9) _____

10) If 30% of the students have never taken a statistics class, 60% have taken only one semester of a statistics class, and the rest have taken two or more semesters of statistics, what is the probability that at least one of the first two groupmates you meet has studied more than one semester of statistics?

   A) 0.81        B) 0.01        C) 0.10        D) 0.19        E) 0.90

10) _____

### Find the indicated probability.

11) In one town, 47% of all voters are Democrats. If two voters are randomly selected for a survey, find the probability that they are both Democrats.

   A) 0.470        B) 0.221        C) 0.216        D) 0.940

11) _____

12) A manufacturing process has a 70% yield, meaning that 70% of the products are acceptable and 30% are defective. If three of the products are randomly selected, find the probability that all of them are acceptable.

   A) 0.429        B) 0.343        C) 0.027        D) 2.1

12) _____

13) A study conducted at a certain college shows that 71% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that 10 randomly selected graduates all find jobs in their chosen field within a year of graduating.

   A) 0.033        B) 0.046        C) 7.100        D) 0.141

13) _____

14) A study conducted at a certain college shows that 65% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that among 6 randomly selected graduates, at least one finds a job in his or her chosen field within a year of graduating.

   A) 0.167        B) 0.650        C) 0.925        D) 0.998

14) _____

15) In a blood testing procedure, blood samples from 6 people are combined into one mixture. The    15) _____
mixture will only test negative if all the individual samples are negative. If the probability that an
individual sample tests positive is 0.08, what is the probability that the mixture will test positive?
    A) 1.00                B) 0.394                C) 0.000000262                D) 0.00640

16) You roll a fair die four times. What is the probability that you roll all 6's?    16) _____
    A) 0.0008        B) 0.167        C) 0.667        D) 0.6        E) 1

17) You roll a fair die five times. What is the probability that you roll at least one 3?    17) _____
    A) 0.833        B) 0.598        C) 0.167        D) 0.0001        E) 0.402

18) You roll a fair die two times. What is the probability that the numbers you roll are not all 4's?    18) _____
    A) 0.306        B) 0.833        C) 0.972        D) 0.028        E) 0.694

**Determine whether the events are disjoint, independent, both, or neither.**
19) You roll a fair die two times.    19) _____
    A) Disjoint            B) Independent        C) Both            D) Neither

20) One ball is removed from a bag containing 1 blue ball, 1 red ball, 1 yellow ball, and 1 green ball.    20) _____
    Without returning the first ball to the bag a second ball is removed.
    A) Disjoint            B) Independent        C) Both            D) Neither

**List the sample space and tell whether the events are equally likely.**
21) An ordinary die is rolled; record the number.    21) _____
        A) {1, 6}, not equally likely
        B) {1, 2, 3, 4, 5, 6}, equally likely
        C) {6}, not equally likely
        D) {1, 2, 3, 4, 5, 6}, not equally likely
        E) {6}, equally likely

22) Roll two dice; record the positive difference.    22) _____
        A) {0, 6}, not equally likely
        B) {0, 1, 2, 3, 4, 5}, not equally likely
        C) {1, 2, 3, 4, 5, 6}, equally likely
        D) {0, 1, 2, 3, 4, 5}, equally likely
        E) {1, 2, 3, 4, 5, 6}, not equally likely

23) A family has two children; record the genders in order of birth.    23) _____
        A) {BB, BG, GG}, equally likely
        B) {BB, BG, GB, GG}, equally likely
        C) {BB, BG, GG}, not equally likely
        D) {B, G}, equally likely
        E) {BB, BG, GB, GG}, not equally likely

24) A family has two children; record the possible genders.    24) _____
        A) {B, G}, equally likely
        B) {BB, BG, GB, GG}, not equally likely
        C) {BB, BG, GG}, equally likely
        D) {BB, BG, GB, GG}, equally likely
        E) {BB, BG, GG}, not equally likely

25) Toss a coin five times; record the number of heads.  25) _____

    A) {1, 2, 3, 4, 5}, equally likely

    B) {0, 1, 2, 3, 4, 5}, not equally likely

    C) {0, 1, 2, 3, 4, 5}, equally likely

    D) {1, 2, 3, 4, 5}, not equally likely

    E) {1, 2}, equally likely


26) Toss a coin three times; record the order of heads and tails.  26) _____

    A) {H, T}, equally likely

    B) {HHH, HHT, HTH, HHT, HTT, THT, TTH, TTT}, not equally likely

    C) {HHH, HHT, HTH, HHT, HTT, THT, TTH, TTT}, equally likely

    D) {HHH, HHT, TTH, TTT}, equally likely

    E) {HHH, HHT, TTH, TTT}, not equally likely


**Find the probability or percent of the event described.**

27) A survey revealed that 46% of people are entertained by reading books, 30% are entertained by  27) _____
watching TV, and 24% are entertained by both books and TV. What is the probability that a person
will be entertained by either books or TV?

    A) 0.76        B) 0.40        C) 1        D) 0.24        E) 0.52


28) Of the coffee makers sold in an appliance store, 6.0% have either a faulty switch or a defective cord,  28) _____
1.0% have a faulty switch, and 0.8% have both defects. What percent of the coffee makers will have
a defective cord?

    A) 5.8%        B) 6.8%        C) 5%        D) 6.0%        E) 1.8%


29) A survey of senior citizens at a doctor's office shows that 41% take blood pressure–lowering  29) _____
medication, 47% take cholesterol–lowering medication, and 12% take both medications. What is the
probability that a senior citizen takes either blood pressure–lowering or cholesterol–lowering
medication?

    A) 0        B) 0.76        C) 0.88        D) 0.6        E) 1


30) For a person selected randomly from a certain population, events A and B are defined as follows.  30) _____

A = event the person is male
B = event the person is a smoker
P(A) = 0.47
P(B) = 0.28
P(A and B) = 0.15

Find P(A or B). Round approximations to two decimal places.

    A) 0.60        B) 0.45        C) 0.90        D) 0.46        E) 0.75


31) In one city, 50.4% of adults are female, 8.0% of adults are left–handed, and 5.0% are left–handed  31) _____
females. For an adult selected at random from the city, let

F = event the person is female
L = event the person is left–handed.

Find P(F or L). Round approximations to three decimal places.

    A) 0.534        B) 0.6344        C) 0.584        D) 0.664        E) 0.483

**Use the given table to find the indicated probability.**

32) College students were given three choices of pizza toppings and asked to choose one favorite. The following table shows the results.

32) _____

| toppings | freshman | sophomore | junior | senior |
|----------|----------|-----------|--------|--------|
| cheese   | 14       | 12        | 18     | 27     |
| meat     | 26       | 27        | 12     | 14     |
| veggie   | 12       | 14        | 26     | 27     |

Find P(favorite topping is meat | student is junior).

A) 0.152          B) 0.12          C) 0.371          D) 0.052          E) 0.214

33) College students were given three choices of pizza toppings and asked to choose one favorite. The following table shows the results.

33) _____

| toppings | freshman | sophomore | junior | senior |
|----------|----------|-----------|--------|--------|
| cheese   | 12       | 15        | 28     | 24     |
| meat     | 20       | 24        | 15     | 12     |
| veggie   | 15       | 12        | 20     | 24     |

Given that a student's favorite topping is meat, what is the probability that the student is a junior?

A) 0.267
B) 0.068
C) 0.211
D) 0.15
E) 0.238

34) College students were given three choices of pizza toppings and asked to choose one favorite. The following table shows the results.

34) _____

| toppings | freshman | sophomore | junior | senior |
|----------|----------|-----------|--------|--------|
| cheese   | 13       | 10        | 24     | 20     |
| meat     | 29       | 20        | 10     | 13     |
| veggie   | 10       | 13        | 29     | 20     |

Find P(favorite topping is veggie | student is junior or senior).

A) 0.232          B) 0.460          C) 0.681          D) 0.422          E) 0.49

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35) College students were given three choices of pizza toppings and asked to choose one favorite. The <span>35)</span> _____
following table shows the results.

| toppings | freshman | sophomore | junior | senior |
|---|---|---|---|---|
| cheese | 13 | 13 | 26 | 24 |
| meat | 22 | 24 | 13 | 13 |
| veggie | 13 | 13 | 22 | 24 |

Given that a student's favorite topping is veggie, what is the probability that the student is a junior
or a senior?
   A) 0.377
   B) 0.361
   C) 0.209
   D) 0.46
   E) 0.639