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

Express the indicated degree of likelihood as a probability value.

1) "There is a 40% chance of rain tomorrow."   1) _____
   A) 0.60   B) 0.40   C) 40   D) 4

2) "It will definitely turn dark tonight."   2) _____
   A) 0.30   B) 1   C) 0.5   D) 0.67

Answer the question.

3) Which of the following cannot be a probability?   3) _____
   A) $\frac{2}{3}$ B) $\frac{5}{3}$ C) $\frac{1}{2}$ D) $\frac{3}{5}$

4) What is the probability of an impossible event?   4) _____
   A) 1   B) -1   C) 0.1   D) 0

5) On a multiple choice test with four possible answers for each question, what is the probability of   5) _____
   answering a question correctly if you make a random guess?
   A) $\frac{1}{2}$ B) $\frac{3}{4}$ C) $\frac{1}{4}$ D) 1

Find the indicated probability.

6) A die with 12 sides is rolled. What is the probability of rolling a number less than 11?   6) _____
   A) $\frac{1}{12}$ B) $\frac{11}{12}$ C) 10   D) $\frac{5}{6}$

7) Two 6-sided dice are rolled. What is the probability that the sum of the two numbers on the dice   7) _____
   will be 5?
   A) $\frac{8}{9}$ B) $\frac{1}{9}$ C) $\frac{5}{6}$ D) 4

8) The data set represents the income levels of the members of a country club. Find the probability   8) _____
   that a randomly selected member earns at least $88,000. Round your answers to the nearest tenth.
   108,000   128,000   82,000   138,000   85,000   108,000   88,000   76,000   158,000   208,000
   79,000   98,000   148,000   85,000   128,000   118,000   88,000   168,000   73,000   118,000
   A) 0.8   B) 0.6   C) 0.4   D) 0.7

9) Refer to the table which summarizes the results of testing for a certain disease.

	Positive Test Result	Negative Test Result
Subject has the disease	83	7
Subject does not have the disease	26	153

If one of the results is randomly selected, what is the probability that it is a false positive (test indicates the person has the disease when in fact they don't)? What does this probability suggest about the accuracy of the test?

    A) 0.0967; The probability of this error is high so the test is not very accurate.
    B) 0.405; The probability of this error is high so the test is not very accurate.
    C) 0.145; The probability of this error is high so the test is not very accurate.
    D) 0.0260; The probability of this error is low so the test is fairly accurate.

9) _____

Estimate the probability of the event.

10) A polling firm, hired to estimate the likelihood of the passage of an up-coming referendum, obtained the set of survey responses to make its estimate. The encoding system for the data is: 0 = FOR, 1 = AGAINST. If the referendum were held today, estimate the probability that it would pass.

    0, 1, 1, 0, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0

    A) 0.5   B) 0.65   C) 0.4   D) 0.6

10) _____

11) Of 1936 people who came into a blood bank to give blood, 200 people had high blood pressure. Estimate the probability that the next person who comes in to give blood will have high blood pressure.

    A) 0.022   B) 0.103   C) 0.071   D) 0.154

11) _____

Answer the question, considering an event to be "unusual" if its probability is less than or equal to 0.05.

12) Is it "unusual" to get a 12 when a pair of dice is rolled?

    A) Yes   B) No

12) _____

13) Is it "unusual" to get 7 when a pair of dice is rolled?

    A) Yes   B) No

13) _____

14) Assume that a study of 500 randomly selected school bus routes showed that 477 arrived on time. Is it "unusual" for a school bus to arrive late?

    A) Yes   B) No

14) _____

15) Assume that one student in your class of 23 students is randomly selected to win a prize. Would it be "unusual" for you to win?

    A) Yes   B) No

15) _____

From the information provided, create the sample space of possible outcomes.

16) Flip a coin three times.

    A) HHH HTT HTH TTT HTT THH HHT THT
    B) HHH HHT HTH HTT THH THT TTH TTT
    C) HTT THT HTH HHH TTH TTT
    D) HHH TTT THT HTH HHT TTH HTH

16) _____

17) Both Fred and Ed have a bag of candy containing a lemon drop, a cherry drop, and a lollipop. Each   17) _____
    takes out a piece and eats it. What are the possible pairs of candies eaten?
      A) CD-LD LD-LP LP-CD LP-LP LD-LD
      B) LD-LD CD-LD LP-LP LD-LP CD-CD LD-LP LP-CD CD-LD LP-LD
      C) LD-LD CD-LD LP-LP LD-CD CD-CD LD-LP LP-CD CD-LP LP-LD
      D) LD-CD LD-CD LD-CD LD-LP LD-LP LD-LP CD-LP CD-LP CD-LP

Answer the question.
18) Find the odds against correctly guessing the answer to a multiple choice question with 7 possible   18) _____
    answers.
      A) 6 : 1   B) 6 : 7   C) 7 : 6   D) 7 : 1

19) Suppose you are playing a game of chance. If you bet $6 on a certain event, you will collect $174   19) _____
    (including your $6 bet) if you win. Find the odds used for determining the payoff.
      A) 174 : 180   B) 1 : 28   C) 29 : 1   D) 28 : 1

Determine whether the events are disjoint.
20) Draw one ball colored red from a bag.   20) _____
    Draw one ball colored blue from the same bag.
      A) Yes   B) No

21) Meet a man with an umbrella.   21) _____
    Meet a man with a raincoat.
      A) Yes   B) No

22) Get a full time day job as a teller with a bank.   22) _____
    Get a full time day job as a cashier at a store.
      A) Yes   B) No

Find the indicated complement.
23) If $P(A) = \dfrac{15}{17}$, find $P(\overline{A})$.   23) _____

      A) $\dfrac{17}{15}$ B) $\dfrac{15}{32}$ C) $\dfrac{2}{17}$ D) 0

24) If a person is randomly selected, find the probability that his or her birthday is not in May. Ignore   24) _____
    leap years.
      A) $\dfrac{31}{365}$ B) $\dfrac{11}{12}$ C) $\dfrac{31}{334}$ D) $\dfrac{334}{365}$

Find the indicated probability.
25) A spinner has equal regions numbered 1 through 15. What is the probability that the spinner will   25) _____
    stop on an even number or a multiple of 3?
      A) $\dfrac{1}{3}$ B) $\dfrac{2}{3}$ C) 12   D) $\dfrac{7}{9}$

26) The table below describes the smoking habits of a group of asthma sufferers.

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	389	36	83	37	545
Women	419	36	89	35	579
Total	808	72	172	72	1124

If one of the 1124 people is randomly selected, find the probability that the person is a man or a heavy smoker.

26) _____

    A) 0.516   B) 0.514   C) 0.483   D) 0.549

27) A sample of 100 wood and 100 graphite tennis rackets are taken from the warehouse. If 9 wood and 14 graphite are defective and one racket is randomly selected from the sample, find the probability that the racket is wood or defective.

27) _____

    A) 0.115
    B) 0.545
    C) 0.57
    D) There is insufficient information to answer the question.

28) A study of consumer smoking habits includes 175 people in the 18-22 age bracket (42 of whom smoke), 136 people in the 23-30 age bracket (40 of whom smoke), and 96 people in the 31-40 age bracket (26 of whom smoke). If one person is randomly selected from this sample, find the probability of getting someone who is age 23-30 or smokes.

28) _____

    A) 0.294   B) 0.6   C) 0.501   D) 0.098

29) The manager of a bank recorded the amount of time each customer spent waiting in line during peak business hours one Monday. The frequency table below summarizes the results.

29) _____

Waiting Time (minutes)	Number of Customers
0-3	11
4-7	11
8-11	10
12-15	6
16-19	4
20-23	2
24-27	2

If we randomly select one of the customers represented in the table, what is the probability that the waiting time is at least 12 minutes or between 8 and 15 minutes?

    A) 0.13   B) 0.652   C) 0.522   D) 0.727

30) A 6-sided die is rolled. Find P(3 or 5).

30) _____

    A) $\frac{1}{6}$ B) $\frac{1}{36}$ C) $\frac{1}{3}$ D) 2

31) A card is drawn from a well-shuffled deck of 52 cards. Find P(drawing a face card or a 4).

31) _____

    A) 16   B) $\frac{2}{13}$ C) $\frac{4}{13}$ D) $\frac{12}{13}$

32) A bag contains 6 red marbles, 2 blue marbles, and 1 green marble. Find P(not blue).   32) _____

   A) $\frac{7}{9}$ B) 7   C) $\frac{2}{9}$ D) $\frac{9}{7}$

Is Event B dependent or independent of Event A?

33) A: A mosquito lands on your arm.   33) _____
   B: You get a mosquito bite.
      A) Dependent   B) Independent

34) A: A bird lands on your head.   34) _____
   B: The bird lays an egg.
      A) Independent   B) Dependent

Find the indicated probability.

35) In one town, 20% of all voters are Democrats. If two voters are randomly selected for a survey,   35) _____
   find the probability that they are both Democrats. Round to the nearest thousandth if necessary.
      A) 0.038   B) 0.040   C) 0.400   D) 0.200

36) Find the probability of correctly answering the first 2 questions on a multiple choice test if random   36) _____
   guesses are made and each question has 5 possible answers.

   A) $\frac{5}{2}$ B) $\frac{1}{32}$ C) $\frac{2}{5}$ D) $\frac{1}{25}$

37) A batch consists of 12 defective coils and 88 good ones. Find the probability of getting two good   37) _____
   coils when two coils are randomly selected if the first selection is replaced before the second is
   made.
      A) 0.7733   B) 0.7744   C) 0.0144   D) 0.176

38) When a pair of dice are rolled there are 36 different possible outcomes: 1-1, 1-2, ... 6-6. If a pair of   38) _____
   dice are rolled 5 times, what is the probability of getting a sum of 5 every time? Round to eight
   decimal places.
      A) 0.00005168   B) 0.00032   C) 0.00001694   D) 0.04

39) A study conducted at a certain college shows that 61% of the school's graduates find a job in their   39) _____
   chosen field within a year after graduation. Find the probability that 5 randomly selected
   graduates all find jobs in their chosen field within a year of graduating. Round to the nearest
   thousandth if necessary.
      A) 0.082   B) 3.050   C) 0.138   D) 0.084

40) In a homicide case 7 different witnesses picked the same man from a line up. The line up   40) _____
   contained 5 men. If the identifications were made by random guesses, find the probability that all
   7 witnesses would pick the same person.
      A) 0.000064   B) 1.4   C) 0.0000595   D) 0.0000128

41) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing   41) _____
   cards. Find the probability that both cards are black. Express your answer as a simplified fraction.

   A) $\frac{25}{102}$ B) $\frac{25}{51}$ C) $\frac{13}{51}$ D) $\frac{1}{2,652}$

42) A IRS auditor randomly selects 3 tax returns from 55 returns of which 6 contain errors. What is the probability that she selects none of those containing errors? Round to four decimal places.

    42) _____

    A) 0.0008   B) 0.7023   C) 0.0013   D) 0.7071

43) The table below describes the smoking habits of a group of asthma sufferers.

    43) _____

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	402	35	42	479
Women	376	45	33	454
Total	778	80	75	933

If two different people are randomly selected from the 933 subjects, find the probability that they are both heavy smokers. Round to six decimal places.

    A) 0.006383   B) 0.006462   C) 0.002026   D) 0.0001778

Provide a written description of the complement of the given event.

44) Of ten adults, at least one of them has high blood pressure.

    44) _____

    A) Nine of the adults have high blood pressure.
    B) None of the adults have high blood pressure.
    C) All of the adults have high blood pressure.
    D) At most one of the adults has high blood pressure.

45) When several textbooks are edited, none of them are found to be free of errors.

    45) _____

    A) At least one of the textbooks is free of errors.
    B) One of the textbooks is free of errors.
    C) All of the textbooks are free of errors.
    D) At most one of the textbooks is free of errors.

Find the indicated probability. Round to the nearest thousandth.

46) An unprepared student makes random guesses for the ten true-false questions on a quiz. Find the probability that there is at least one correct answer.

    46) _____

    A) 0.900   B) 0.999   C) 0.100   D) 0.001

47) A study conducted at a certain college shows that 59% 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.

    47) _____

    A) 0.590   B) 0.167   C) 0.995   D) 0.958

48) In a blood testing procedure, blood samples from 3 people are combined into one mixture. The mixture will only test negative if all the individual samples are negative. If the probability that an individual sample tests positive is 0.1, what is the probability that the mixture will test positive?

    48) _____

    A) 0.729   B) 0.999   C) 0.00100   D) 0.271

Find the indicated probability. Express your answer as a simplified fraction unless otherwise noted.

49) The table below shows the soft drinks preferences of people in three age groups.

	cola	root beer	lemon-lime
under 21 years of age	40	25	20
between 21 and 40	35	20	30
over 40 years of age	20	30	35

If one of the 255 subjects is randomly selected, find the probability that the person is over 40 years of age.

A) $\frac{3}{5}$ B) $\frac{1}{2}$ C) $\frac{2}{5}$ D) $\frac{1}{3}$

49) _____

50) The following table contains data from a study of two airlines which fly to Small Town, USA.

	Number of flights which were on time	Number of flights which were late
Podunk Airlines	33	6
Upstate Airlines	43	5

If one of the 87 flights is randomly selected, find the probability that the flight selected arrived on time.

A) $\frac{76}{87}$ B) $\frac{11}{76}$

C) $\frac{43}{87}$ D) None of the above is correct.

50) _____

Evaluate the expression.

51) $\frac{12!}{7!}$

A) 95,040   B) 84,000   C) 2!   D) $\frac{12}{7}$

51) _____

52) $8P_4$

A) 4   B) 70   C) 2   D) 1680

52) _____

53) $8C_3$

A) 3   B) 120   C) 56   D) 112

53) _____

Solve the problem.

54) There are 13 members on a board of directors. If they must form a subcommittee of 5 members, how many different subcommittees are possible?

A) 120   B) 371,293   C) 154,440   D) 1287

54) _____

55) How many ways can an IRS auditor select 4 of 12 tax returns for an audit?

A) 20,736   B) 11,880   C) 24   D) 495

55) _____

56) A state lottery involves the random selection of six different numbers between 1 and 28. If you select one six number combination, what is the probability that it will be the winning combination?

A) $\dfrac{1}{376,740}$ B) $\dfrac{1}{720}$ C) $\dfrac{1}{271,252,800}$ D) $\dfrac{1}{481,890,304}$

57) How many 3-digit numbers can be formed using the digits 1, 2, 3, 4, 5, 6, 7 if repetition of digits is not allowed?

A) 5   B) 6   C) 210   D) 343

58) How many ways can 6 people be chosen and arranged in a straight line if there are 8 people to choose from?

A) 48   B) 20,160   C) 40,320   D) 720

59) A musician plans to perform 7 selections. In how many ways can she arrange the musical selections?

A) 7   B) 5040   C) 40,320   D) 49

60) A tourist in France wants to visit 5 different cities. If the route is randomly selected, what is the probability that she will visit the cities in alphabetical order?

A) $\dfrac{1}{25}$ B) $\dfrac{1}{120}$ C) 120   D) $\dfrac{1}{5}$

Answer the question.

61) If you are told that a randomly selected mystery person was born in the 1990's, what is the probability of guessing his/her exact birth date (including year)?

A) 2.738×10^{-3} B) 2.740×10^{-4} C) 2.737×10^{-3} D) 2.738×10^{-4}

62) 12 wrestlers compete in a competition. If each wrestler wrestles one match with each other wrestler, what are the total numbers of matches?

A) 78   B) 66   C) 132   D) 156

1) B
2) B
3) B
4) D
5) C
6) D
7) B
8) D
9) A
10) D
11) B
12) A
13) B
14) A
15) A
16) B
17) C
18) A
19) D
20) A
21) B
22) A
23) C
24) D
25) B
26) A
27) C
28) C
29) C
30) C
31) C
32) A
33) A
34) A
35) B
36) D
37) B
38) C
39) D
40) A
41) A
42) B
43) A
44) B
45) A
46) B
47) C
48) D
49) D
50) A

51) A
52) D
53) C
54) D
55) D
56) A
57) C
58) B
59) B
60) B
61) D
62) B