SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the indicated probability.

1) If $P(A) = \dfrac{10}{11}$, find $P(\overline{A})$.

1) _____

2) Find $P(\overline{A})$, given that $P(A) = 0.662$.

2) _____

3) Based on meteorological records, the probability that it will snow in a certain town on January 1st is 0.206. Find the probability that in a given year it will not snow on January 1st in that town.

3) _____

4) The probability that Luis will pass his statistics test is 0.42. Find the probability that he will fail his statistics test.

4) _____

5) If a person is randomly selected, find the probability that his or her birthday is not in May. Ignore leap years.

5) _____

6) A spinner has equal regions numbered 1 through 15. What is the probability that the spinner will stop on an even number or a multiple of 3?

6) _____

7) If you pick a card at random from a well shuffled deck, what is the probability that you get a face card or a spade?

7) _____

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

8) _____

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	433	42	71	37	583
Women	326	47	78	39	490
Total	759	89	149	76	1073

If one of the 1073 people is randomly selected, find the probability that the person is a man or a heavy smoker.

9) A sample of 100 wood and 100 graphite tennis rackets are taken from the warehouse. If 5 wood and 10 graphite are defective and one racket is randomly selected from the sample, find the probability that the racket is wood or defective.

9) _____

10) Of the 52 people who answered "yes" to a question, 5 were male. Of the 77 people that answered "no" to the question, 11 were male. If one person is selected at random from the group, what is the probability that the person answered "yes" or was male?

10) _____

11) A study of consumer smoking habits includes 169 people in the 18–22 age bracket (46 of whom smoke), 126 people in the 23–30 age bracket (38 of whom smoke), and 100 people in the 31–40 age bracket (22 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.

11) _____

12) A study of consumer smoking habits includes 168 people in the 18–22 age bracket (48 of whom smoke), 131 people in the 23–30 age bracket (36 of whom smoke), and 99 people in the 31–40 age bracket (28 of whom smoke). If one person is randomly selected from this sample, find the probability of getting someone who is age 18–22 or does not smoke.

13) 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.

Waiting Time (minutes)	Number of Customers
0–3	13
4–7	10
8–11	11
12–15	5
16–19	4
20–23	2
24–27	3

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?

14) 100 employees of a company are asked how they get to work and whether they work full time or part time. The figure below shows the results. If one of the 100 employees is randomly selected, find the probability of getting someone who carpools or someone who works full time.
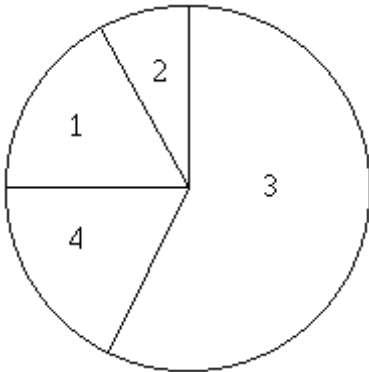
1. Public transportation: 9 full time, 6 part time
2. Bicycle: 4 full time, 5 part time
3. Drive alone: 31 full time, 30 part time
4. Carpool: 7 full time, 8 part time

15) 100 employees of a company are asked how they get to work and whether they work full time or part time. The figure below shows the results. If one of the 100 employees is randomly selected, find the probability of getting someone who carpools, someone who cycles to work, or someone who works part time.

15) _____
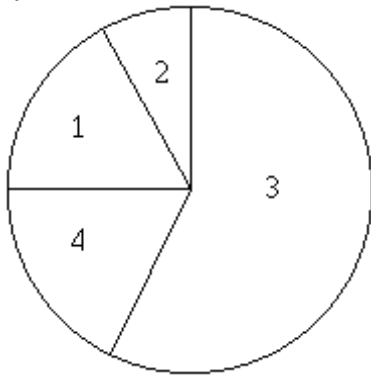
1. Public transportation: 7 full time, 7 part time
2. Bicycle: 4 full time, 4 part time
3. Drive alone: 34 full time, 30 part time
4. Carpool: 6 full time, 8 part time

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

16) _____

17) A card is drawn from a well-shuffled deck of 52 cards. Find P(drawing an ace or a 9).

17) _____

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

18) _____

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

19) _____

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	370	45	61	39	515
Women	443	39	84	38	604
Total	813	84	145	77	1119

If one of the 1119 people is randomly selected, find the probability of getting a regular or heavy smoker.

20) 100 employees of a company are asked how they get to work and whether they work full time or part time. The figure below shows the results. If one of the 100 employees is randomly selected, find the probability that the person drives alone or cycles to work.
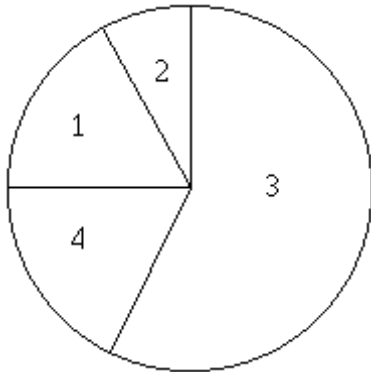
1. Public transportation: 10 full time, 9 part time
2. Bicycle: 3 full time, 4 part time
3. Drive alone: 28 full time, 29 part time
4. Carpool: 9 full time, 8 part time

20) _____

21) A bag contains 7 red marbles, 4 blue marbles, and 1 green marble. Find P(not blue).

21) _____

22) The probability that an event will occur is 0.2. What is the probability that the event will not occur?

22) _____

Is Event B dependent or independent of Event A?

23) A: A mosquito lands on your arm.
B: You get a mosquito bite.

23) _____

24) A: A green ball is drawn from a box with five balls and placed next to the box.
B: A red ball is drawn next and placed next to the green one.

24) _____

25) A: A Chicagoan visits New York on vacation.
B: He visits Central Park.

25) _____

26) A: A bird lands on your head.
B: The bird lays an egg.

26) _____

27) A: You cook your chicken improperly.
B: You get salmonella poisoning.

27) _____

Find the indicated probability.

28) In one town, 53% of all voters are Democrats. If two voters are randomly selected for a survey, find the probability that they are both Democrats.

28) _____

29) 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.

29) _____

30) A batch consists of 12 defective coils and 88 good ones. Find the probability of getting two good coils when two coils are randomly selected if the first selection is replaced before the second is made.

30) _____

31) A bin contains 71 light bulbs of which 9 are defective. If 6 light bulbs are randomly selected from the bin with replacement, find the probability that all the bulbs selected are good ones.

31) _____

32) When a pair of dice are rolled there are 36 different possible outcomes: 1–1, 1–2, ... 6–6. If a pair of dice are rolled 4 times, what is the probability of getting a sum of 7 every time?

32) _____

33) In one town, 60% of adults have health insurance. What is the probability that 9 adults selected at random from the town all have health insurance?

33) _____

34) A study conducted at a certain college shows that 60% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that 11 randomly selected graduates all find jobs in their chosen field within a year of graduating.

34) _____

35) Find the probability that 3 randomly selected people all have the same birthday. Ignore leap years.

35) _____

36) In a homicide case 6 different witnesses picked the same man from a line up. The line up contained 5 men. If the identifications were made by random guesses, find the probability that all 6 witnesses would pick the same person.

36) _____

37) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that both cards are black.

37) _____

38) You are dealt two cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that the first card is a King and the second card is a queen.

38) _____

39) What is the probability that 4 randomly selected people all have different birthdays?

39) _____

40) Among the contestants in a competition are 42 women and 28 men. If 5 winners are randomly selected, what is the probability that they are all men?

40) _____

41) A sample of 4 different calculators is randomly selected from a group containing 42 that are defective and 27 that have no defects. What is the probability that all four of the calculators selected are defective?

41) _____

42) The table below describes the smoking habits of a group of asthma sufferers.   42) _____

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	417	34	31	482
Women	367	45	47	459
Total	784	79	78	941

If two different people are randomly selected from the 941 subjects, find the probability that they are both women.

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

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	341	45	36	422
Women	383	38	37	458
Total	724	83	73	880

If two different people are randomly selected from the 880 subjects, find the probability that they are both heavy smokers.

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

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

44) When 10 adults are tested for high blood pressure, at least one of the results are positive.   44) _____
   A) None of the adults have high blood pressure.
   B) All of the adults have high blood pressure.
   C) Nine of the adults have high blood pressure.

45) When 100 engines are shipped, all of them are free of defects.   45) _____
   A) At least one of the engines is defective.
   B) All of the engines are defective.
   C) None of the engines are defective.

46) When several textbooks are returned from editing, none of the books are found to be errorless.   46) _____
   A) At least one of the textbooks is errorless.
   B) All of the textbooks are errorless.
   C) None of the textbooks are errorless.

47) Of the thirteen different women Calvin asks for a date, at least one of them accepts.   47) _____
   A) None of the women accept Calvin's offer.
   B) All of the women accept Calvin's offer.
   C) All but one woman accepts Calvin's offer.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Find the indicated probability.

48) An unprepared student makes random guesses for the ten true–false questions on a   48) _____
   quiz. Find the probability that there is at least one correct answer.

49) A study conducted at a certain college shows that 53% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that among 7 randomly selected graduates, at least one finds a job in his or her chosen field within a year of graduating.

49) _____

50) A sample of 4 different calculators is randomly selected from a group containing 15 that are defective and 30 that have no defects. What is the probability that at least one of the calculators is defective?

50) _____

51) In a batch of 8,000 clock radios 9% are defective. A sample of 15 clock radios is randomly selected without replacement from the 8,000 and tested. The entire batch will be rejected if at least one of those tested is defective. What is the probability that the entire batch will be rejected?

51) _____

52) In a blood testing procedure, blood samples from 5 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 0.09, what is the probability that the mixture will test positive?

52) _____

53) 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.

53) _____

54) 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 and drinks cola.

54) _____

55) 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 given that they drink root beer.

55) _____

56) 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 drinks root beer given that they are over 40.

57) 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.

58) 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 given that it was an Upstate Airlines flight.

59) 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 is an Upstate Airlines flight given that it was late.

60) 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

60) _____

If one of the 87 flights is randomly selected, find the probability that the flight selected is an Upstate Airlines flight which was on time.

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

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	344	61	77	482
Women	374	74	62	510
Total	718	135	139	992

61) _____

If one of the 992 subjects is randomly selected, find the probability that the person chosen is a nonsmoker given that it is a woman. Round to the nearest thousandth.

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

	Nonsmoker	Light smoker	Heavy smoker	Total
Men	399	69	79	547
Women	397	85	60	542
Total	796	154	139	1089

62) _____

If one of the 1089 subjects is randomly selected, find the probability that the person chosen is a woman given that the person is a light smoker.

Solve the problem.

63) There are 8 members on a board of directors. If they must form a subcommittee of 5 members, how many different subcommittees are possible?

63) _____

64) The library is to be given 3 books as a gift. The books will be selected from a list of 18 titles. If each book selected must have a different title, how many possible selections are there?

64) _____

65) How many ways can an IRS auditor select 4 of 10 tax returns for an audit?

65) _____

66) A state lottery involves the random selection of six different numbers between 1 and 29. If you select one six number combination, what is the probability that it will be the winning combination?

66) _____

67) 8 basketball players are to be selected to play in a special game. The players will be selected from a list of 27 players. If the players are selected randomly, what is the probability that the 8 tallest players will be selected?

67) _____

68) The organizer of a television show must select 5 people to participate in the show. The participants will be selected from a list of 26 people who have written in to the show. If the participants are selected randomly, what is the probability that the 5 youngest people will be selected?

68) _____

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

69) _____

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

70) _____

71) A musician plans to perform 11 selections. In how many ways can she arrange the musical selections?

71) _____

72) A pollster wants to minimize the effect the order of the questions has on a person's response to a survey. How many different surveys are required to cover all possible arrangements if there are 5 questions on the survey?

72) _____

73) There are 7 members on a board of directors. If they must elect a chairperson, a secretary, and a treasurer, how many different slates of candidates are possible?

73) _____

74) A tourist in France wants to visit 7 different cities. How many different routes are possible?

74) _____

75) A tourist in France wants to visit 10 different cities. If the route is randomly selected, what is the probability that she will visit the cities in alphabetical order?

75) _____

76) In a certain lottery, five different numbers between 1 and 36 inclusive are drawn. These are the winning numbers. To win the lottery, a person must select the correct 5 numbers in the same order in which they were drawn. What is the probability of winning?

76) _____

77) A class has 11 students who are to be assigned seating by lot. What is the probability that the students will be arranged in order from shortest to tallest? (Assume that no two students are the same height.)

77) _____

1) $\dfrac{1}{11}$

2) 0.338

3) 0.794

4) 0.58

5) $\dfrac{334}{365}$

6) $\dfrac{2}{3}$

7) $\dfrac{11}{26}$

8) 0.580

9) 0.55

10) 0.488

11) 0.491

12) 0.839

13) 0.521

14) 0.59

15) 0.59

16) $\dfrac{1}{3}$

17) $\dfrac{2}{13}$

18) $\dfrac{4}{13}$

19) 0.198

20) 0.64

21) $\dfrac{2}{3}$

22) 0.8

23) Dependent

24) Dependent

25) Dependent

26) Independent

27) Dependent

28) 0.281

29) 0.343

30) 0.7744

31) 0.443

32) 0.0007716

33) 0.01

34) 0.004

35) 0.00000751

36) 0.00032

37) $\dfrac{25}{102}$

38) $\dfrac{4}{663}$

39) 0.9836
40) 0.00812
41) 0.1295
42) 0.2377
43) 0.006795
44) A
45) A
46) A
47) A

48) $\dfrac{1,023}{1,024}$

49) 0.995
50) 0.816
51) 0.757
52) 0.376

53) $\dfrac{1}{3}$

54) $\dfrac{4}{51}$

55) $\dfrac{2}{5}$

56) $\dfrac{6}{17}$

57) $\dfrac{76}{87}$

58) $\dfrac{43}{48}$

59) $\dfrac{5}{11}$

60) $\dfrac{43}{87}$

61) 0.733
62) 0.552
63) 56
64) 816
65) 210

66) $\dfrac{1}{475,020}$

67) $\dfrac{1}{2,220,075}$

68) $\dfrac{1}{65,780}$

69) 2520

70) 20,160

71) 39,916,800

72) 120

73) 210

74) 5040

75) $\dfrac{1}{3,628,800}$

76) $\dfrac{1}{45,239,040}$

77) 0.00000003