

1. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of industrial customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by surveying all 1,500 industrial customers. For this study, the set of 1,500 industrial customers is _____.

- a) a parameter
- b) a sample
- c) the population
- d) a statistic
- e) the frame

2. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of industrial customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by selecting a focus group of 40 industrial customers. For this study, the set of 40 industrial customers is _____.

- a) a parameter
- b) a sample
- c) the population
- d) a statistic
- e) the frame

3. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of customers is stable at 1,500, but they are purchasing less each year. She orders her staff to search for causes of the downward trend by surveying all 1,500 industrial customers. Sue is ordering a _____.

- a) statistic from the industrial customers
- b) census of the industrial customers
- c) sample of the industrial customers
- d) sorting of the industrial customers
- e) parameter of the industrial customers

4. Sue Taylor, Director of Global Industrial Sales, is concerned by a deteriorating sales trend. Specifically, the number of customers is stable at 1,500, but they are purchasing less each year.

She orders her staff to search for causes of the downward trend by surveying all 1,500 industrial customers. One question on the survey asked the customers: "Which of the following best describes your primary business: a. manufacturing, b. wholesaler, c. retail, d. service." The measurement level for this question is _____.

- a) interval level
- b) ordinal level
- c) nominal level
- d) ratio level
- e) relative level

5. Which scale of measurement has these two properties: linear distance is meaningful and the location of origin (or zero point) is arbitrary?

- a) Interval level
- b) Ordinal level
- c) Nominal level
- d) Ratio level
- e) Minimal level

6. Which scale of measurement has these two properties: linear distance is meaningful and the location of origin (or zero point) is absolute (or natural)?

- a) Interval level
- b) Ordinal level
- c) Nominal level
- d) Ratio level
- e) Relative level

7. Which of the following operations is meaningful for processing nominal data?

- a) Addition
- b) Multiplication
- c) Ranking
- d) Counting
- e) Division

8. Which of the following operations is meaningful for processing ordinal data, but is meaningless for processing nominal data?

- a) Addition
- b) Multiplication
- c) Ranking
- d) Counting
- e) Division

9. The social security number of employees would be an example of what level of data measurement?

- a) Interval level data
- b) Ordinal level data
- c) Nominal level data
- d) Ratio level data
- e) Relative level data

10. Sales of a restaurant (in dollars) are an example of what level of data measurement?

- a) Interval level data
- b) Ordinal level data
- c) Nominal level data
- d) Ratio level data
- e) Relative level data

11. A market researcher is interested in determining the average income for families in Bexar County, San Antonio. To accomplish this, she takes a random sample of 400 families from the county and uses the data gathered from them to estimate the average income for families of the entire county. This process is an example of _____.

- a) nonparametric statistics
- b) nominal data
- c) descriptive statistics
- d) inferential statistics
- e) census

12. The Magnolia Swimming Pool Company wants to determine the average number of years it takes before a major repair is required on one of the pools that the company constructs. The president of the company asks Rick Johnson, a company

accountant, to randomly contact fifty families that built Magnolia pools in the past ten years and determine how long it was in each case until a major repair. The information will then be used to estimate the average number of years until a major repair for all pools sold by Magnolia. The average based on the data gathered from the fifty families can best be described as a _____.

- a) parameter
- b) sample
- c) population
- d) statistic
- e) frame

13. What proportion of San Diego's registered voters favor trade restrictions with China? In an effort to determine this, a research team calls every registered voter in San Diego and contacts them. The proportion determined from the data gathered is a _____.

- a) parameter
- b) sample
- c) population
- d) statistic
- e) frame

14. Jessica Salas, president of Salas Products, is reviewing the warranty policy for her company's new model of automobile batteries. Life tests performed on a sample of 100 batteries indicated: (1) an average life of 75 months, (2) a standard deviation of 5 months, and (3) a bell shaped battery life distribution. Approximately 68% of the batteries will last between _____.

- a) 70 and 80 months
- b) 60 and 90 months
- c) 65 and 85 months
- d) 55 and 95 months
- e) 60 and 100 months

15. Jessica Salas, president of Salas Products, is reviewing the warranty policy for her company's new model of automobile batteries. Life tests performed on a sample of 100 batteries indicated: (1) an average life of 75 months, (2) a standard deviation of 5 months, and (3) a bell shaped battery life distribution. Approximately 95% of the batteries will last between _____.

- a) 70 and 80 months
- b) 60 and 90 months
- c) 65 and 85 months
- d) 55 and 95 months
- e) 60 and 100 months

16. Jessica Salas, president of Salas Products, is reviewing the warranty policy for her company's new model of automobile batteries. Life tests performed on a sample of 100 batteries indicated: (1) an average life of 75 months, (2) a standard deviation of 5 months, and (3) a bell shaped battery life distribution. Approximately 99.7% of the batteries will last between _____.

- a) 70 and 80 months
- b) 60 and 90 months
- c) 65 and 85 months
- d) 55 and 95 months
- e) 50 and 100 months

17. Jessica Salas, president of Salas Products, is reviewing the warranty policy for her company's new model of automobile batteries. Life tests performed on a sample of 100 batteries indicated: (1) an average life of 75 months, (2) a standard deviation of 5 months, and (3) a bell shaped battery life distribution. What percentage of the batteries will fail within the first 65 months of use?

- a) 0.5%
- b) 1%
- c) 2.5%
- d) 5%
- e) 7.5%

18. An instructor is evaluating the performance of students on a test. He records the number of points that each student missed and created a frequency distribution. This is provided below:

Points missed	Number of students
0-under 10	2
10-under 20	4
20-under 30	10
30-under 40	8
40-under 50	6

What is the mean number of points missed?

- a) 20
- b) 25
- c) 29
- d) 30
- e) 35

19. An instructor is evaluating the performance of students on a test. He records the number of points that each student missed and created a frequency distribution. This is provided below:

Points missed	Number of students
0-under 10	2
10-under 20	4
20-under 30	10
30-under 40	8
40-under 50	6

What is the standard deviation for this population?

- a) 11.43
- b) 14.14
- c) 12.63
- d) 13.17
- e) 16.90

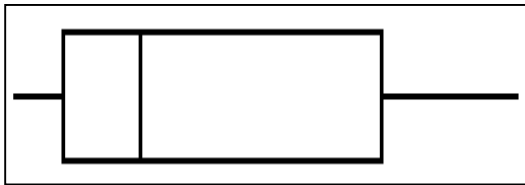
20. An instructor is evaluating the performance of students on a test. He records the number of points that each student missed and created a frequency distribution. This is provided below:

Points missed	Number of students
0-under 10	2
10-under 20	4
20-under 30	10
30-under 40	8
40-under 50	6

What is the variance for this population?

- a) 11.43
- b) 135.17
- c) 130.67
- d) 180.67
- e) 198.07

21. The following box and whisker plot was constructed for the age of accounts receivable.



The box and whisker plot reveals that the accounts receivable ages are _____.

- a) skewed to the left
- b) skewed to the right
- c) not skewed
- d) normally distributed
- e) symmetrical

22. A sample was taken of the salaries of four employees from a large company. The following are their salaries (in thousands of dollars) for this year: 33, 40, 25, and 45.

The median of their salaries is approximately

- a) 36.5
- b) 32.5
- c) 40
- d) 35.75
- e) 25

23. A sample was taken of the salaries of four employees from a large company. The following are their salaries (in thousands of dollars) for this year: 33, 40, 25, and 45. The variance of their salaries is approximately

- a) 56.69
- b) 75.58
- c) 227.75
- d) 35.75
- e) 8.7

24. Pinky Bauer, Chief Financial Officer of Harrison Haulers, Inc., suspects irregularities in the payroll system, and orders an inspection of "each and every payroll voucher issued since January 1, 1993." Each payroll voucher was inspected and the following frequency distribution was compiled.

Errors per Voucher	Number of Vouchers
0-under 2	500
2-under 4	400
4-under 6	300
6-under 8	200
8-under 10	100

The median number of errors per voucher is _____.

- a) 3.67
- b) 5
- c) 3.25
- d) 400
- e) 3

The number of phone calls arriving at a switchboard each hour has been recorded, and the following frequency distribution has been developed.

Class Interval	Frequency
20-under 40	30
40-under 60	45
60-under 80	80
80-under 100	45

Answer the questions 25-27 based on above information.

25. What is the midpoint of the last class?

- a) 80
- b) 100
- c) 95
- d) 90
- e) 85

- c) 7
- d) 2
- e) 1

26. What is the relative frequency of the second class?

- a) 0.455
- b) 0.900
- c) 0.225
- d) 0.750
- e) 0.725

30. What is the cumulative frequency for the 30-under 40 class interval?

- a) 5
- b) 9
- c) 13
- d) 14
- e) 18

27. What is the cumulative frequency of the third class?

- a) 80
- b) 0.40
- c) 155
- d) 75
- e) 105

31. A person has decided to construct a frequency distribution for a set of data containing 60 numbers. The lowest number is 23 and the highest number is 68. If 7 classes are used, the class width should be approximately _____.

- a) 5
- b) 7
- c) 9
- d) 11
- e) 12

Consider the following stem and leaf plot:

Stem	Leaf
1	0, 2, 5, 7
2	2, 3, 4, 8
3	0, 4, 6, 6, 9
4	5, 8, 8, 9
5	2, 7, 8

Suppose that a frequency distribution was developed from this, and there were 5 classes (10-under 20, 20-under 30, etc.).

Answer the questions 28-30 based on above information.

28. What was the highest number in the data set?

- a) 50
- b) 58
- c) 59
- d) 78
- e) 98

29. What was the lowest number in the data set?

- a) 0
- b) 10

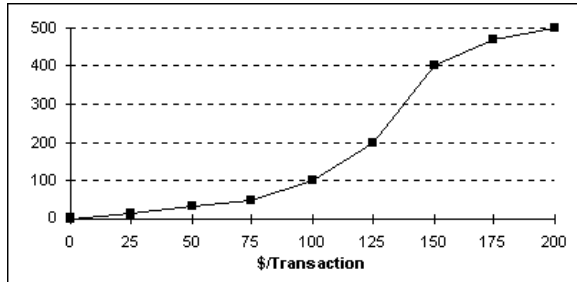
32. The following class intervals for a frequency distribution were developed to provide information regarding the starting salaries for students graduating from a particular school:

Salary (\$1,000s)	Number of Graduates
18-under 21	-
21-under 25	-
24-under 27	-
29-under 30	-

Before data was collected, someone questioned the validity of this arrangement. Which of the following represents a problem with this set of intervals?

- a) There are too many intervals.
- b) The class widths are too small.
- c) Some numbers between 18,000 and 30,000 would fall into two different intervals.
- d) The first and the second interval overlap.
- e) There are too few intervals.

Each day, the office staff at Oasis Quick Shop prepares a frequency distribution and an ogive of sales transactions by dollar value of the transactions. Saturday's cumulative frequency ogive follows.



Answer the questions 33-35 based on above information.

33. The percentage of sales transactions on Saturday that were under \$100 each was _____.

- a) 100
- b) 10
- c) 80
- d) 20
- e) 15

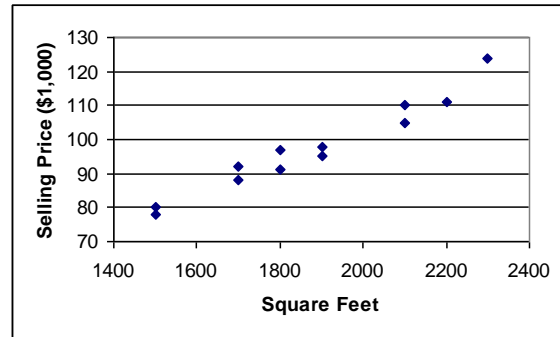
34. The percentage of sales transactions on Saturday that were at least \$100 each was _____.

- a) 100
- b) 10
- c) 80
- d) 20
- e) 15

35. The percentage of sales transactions on Saturday that were between \$100 and \$150 was _____.

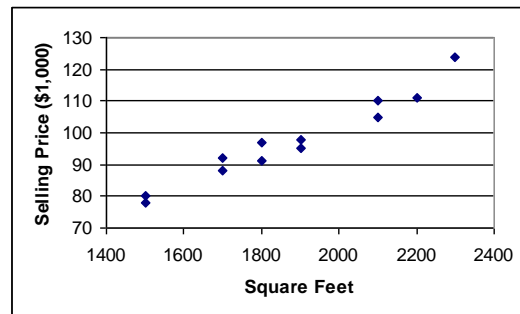
- a) 20%
- b) 40%
- c) 60%
- d) 80%
- e) 10%

36. The following graphic of residential housing data (selling price and size in square feet) is a _____.



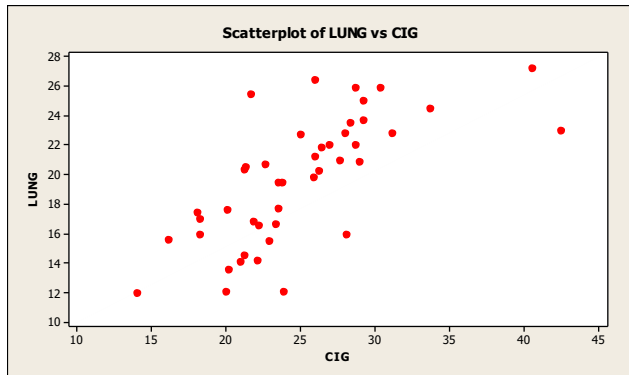
- a) scatter plot
- b) Pareto chart
- c) pie chart
- d) cumulative histogram
- e) cumulative frequency distribuion

37. The following graphic of residential housing data (selling price and size in square feet) indicates _____.



- a) an inverse relation between the two variables
- b) no relation between the two variables
- c) a direct relation between the two variables
- d) a negative exponential relation between the two variables
- e) a non-linear relationship between the two variables

38. The following graphic of cigarettes smoked (sold) per capita (CIG) and deaths per 100K population from lung cancer (LUNG) indicates _____



- a) a weak relation between the two variables
- b) a pretty strong relation between the two variables
- c) when the number of cigarettes smoked (sold) per capita (CIG) increases the deaths per 100K population from lung cancer (LUNG) decreases
- d) a negative relation between the two variables
- e) no relation between the two variables

39. Belinda Bose is reviewing a newly proposed advertising campaign. Based on her 15 years of experience, she believes the campaign has a 75% chance of significantly increasing brand name recognition of the product. This is an example of assigning probabilities using the _____ method.

- a) subjective probability
- b) relative frequency
- c) classical probability
- d) *a priori* probability
- e) *a posterior* probability

40. Which of the following is **not** a legitimate probability value?

- a) 0.67
- b) 15/16
- c) 0.23

- d) 4/3
- e) 0.98

41. Which of the following is **not** a legitimate probability value?

- a) 0.67
- b) 15/16
- c) 0.23
- d) 2/3
- e) -0.28

42. The list of all elementary events for an experiment is called _____.

- a) the sample space
- b) the exhaustive list
- c) the population space
- d) the event union
- e) a frame

43. In a set of 15 aluminum castings, two castings are defective (D), and the remaining thirteen are good (G). A quality control inspector randomly selects three of the fifteen castings without replacement, and classifies each as defective (D) or good (G). The sample space for this experiment contains _____ elementary events.

- a) 3,375
- b) 2,730
- c) 455
- d) 15
- e) 3

44. In a set of 10 aluminum castings, two castings are defective (D), and the remaining eight are good (G). A quality control inspector randomly selects three of the ten castings with replacement, and classifies each as defective (D) or good (G). The sample space for this experiment contains _____ elementary events.

- a) 1,000
- b) 720
- c) 100
- d) 10
- e) 3

Consider the following sample space, S , and several events defined on it. $S = \{\text{Albert, Betty, Abel, Jack, Patty, Meagan}\}$, and the events are: $F = \{\text{Betty, Patty, Meagan}\}$, $H = \{\text{Abel, Meagan}\}$, and $P = \{\text{Betty, Abel}\}$.

Answer questions 45-47 based on above information.

45. $F \cap H$ is _____.
- {Meagan}
 - {Betty, Patty, Abel, Meagan}
 - empty, since F and H are complements
 - empty, since F and H are independent
 - empty, since F and H are mutually exclusive

46. $F \cup H$ is _____.
- {Meagan}
 - {Betty, Abel, Patty, Meagan}
 - empty, since F and H are complements
 - empty, since F and H are independent
 - empty, since F and H are mutually exclusive

47. The complement of F is _____.
- {Albert, Betty, Jack, Patty}
 - {Betty, Patty, Meagan}
 - {Albert, Abel, Jack}
 - {Betty, Abel}
 - {Meagan}

Let A be the event that a student is enrolled in an accounting course, and let S be the event that a student is enrolled in a statistics course. It is known that 30% of all students are enrolled in an accounting course and 40% of all students are enrolled in statistics. Included in these numbers are 15% who are enrolled in both statistics and accounting.

Answer questions 48-51 based on above information.

48. Find $P(S)$.
- 0.15
 - 0.30
 - 0.40

- 0.55
- 0.60

49. Find the probability that a student is in accounting and is also in statistics.

- 0.15
- 0.70
- 0.55
- 0.12
- 0.60

50. A student is randomly selected, and it is found that the student is enrolled in accounting. What is the probability that this student is also enrolled in statistics?

- 0.15
- 0.75
- 0.375
- 0.50
- 0.80

51. A student is randomly selected, what is the probability that the student is enrolled in either accounting or statistics or both?

- 0.15
- 0.85
- 0.70
- 0.55
- 0.90

Abel Alonzo, Director of Human Resources, is exploring employee absenteeism at the Plano Power Plant. Ten percent of all plant employees work in the finishing department; 20% of all plant employees are absent excessively; and 7% of all plant employees work in the finishing department and are absent excessively. A plant employee is selected randomly; F is the event "works in the finishing department;" and A is the event "is absent excessively."

Answer the questions 52-54 based on above information.

52. $P(A \cup F) =$ _____.
- 0.07
 - 0.10

- c) 0.20
d) 0.23
e) 0.37

- c) 0.18
d) 0.54
e) 0.78

53. $P(A|F) =$ _____.

- a) 0.37
b) 0.70
c) 0.13
d) 0.35
e) 0.80

57. If one of these consumers is randomly selected and is under 25, what is the probability that the person prefers design A?

- a) 0.22
b) 0.23
c) 0.29
d) 0.18
e) 0.78

54. $P(F|A) =$ _____.

- a) 0.35
b) 0.70
c) 0.13
d) 0.37
e) 0.10

58. If one of these consumers is randomly selected and prefers design B, what is the probability that the person is 25 or older?

- a) 0.28
b) 0.14
c) 0.45
d) 0.27
e) 0.78

A market research firm is investigating the appeal of three package designs. The table below gives information obtained through a sample of 200 consumers. The three package designs are labeled A, B, and C. The consumers are classified according to age and package design preference.

	A	B	C	Total
Under 25 years	22	34	40	96
25 or older	54	28	22	104
Total	76	62	62	200

59. Are “B” and “25 or older” independent and why or why not?

- a) No, because $P(25 \text{ or over} | B) \neq P(B)$
b) Yes, because $P(B) = P(C)$
c) No, because $P(25 \text{ or older} | B) \neq P(25 \text{ or older})$
d) Yes, because $P(25 \text{ or older} \cap B) \neq 0$
e) No, because age and package design are different things

Answer the questions 55-58 based on above information.

55. If one of these consumers is randomly selected, what is the probability that the person prefers design A?

- a) 0.76
b) 0.38
c) 0.33
d) 0.22
e) 0.39

60. A market research firm conducts studies regarding the success of new products. The company is not always perfect in predicting the success. Suppose that there is a 50% chance that any new product would be successful (and a 50% chance that it would fail). In the past, for all new products that ultimately were successful, 80% were predicted to be successful (and the other 20% were inaccurately predicted to be failures). Also, for all new products that were ultimately failures, 70% were predicted to be failures (and the other 30% were inaccurately predicted to be successes). For any randomly selected new product, what is the

56. If one of these consumers is randomly selected, what is the probability that the person prefers design A and is under 25?

- a) 0.22
b) 0.11

probability that the market research firm would predict that it would be a success?

- a) 0.80
- b) 0.50
- c) 0.45
- d) 0.55
- e) 0.95

Everyone is familiar with waiting lines or queues. For example, people wait in line at a supermarket to go through the checkout counter. There are two factors that determine how long the queue becomes. One is the speed of service. The other is the number of arrivals at the checkout counter. The mean number of arrivals is an important summary statistic, but so is the standard deviation. A consultant working for the supermarket counted the number of arrivals (shown below) per hour during a sample of 30 hours.

106	99	109	130	105
97	115	75	84	95
103	111	102	72	98
132	106	94	71	93
91	84	94	88	101
89	101	90	107	98

Answer the questions 61-63 based on above information.

61. The mean is _____.

- a) 2,940
- b) 30
- c) 98
- d) 13.86
- e) 14.098

62. The standard deviation is _____.

- a) 14.098
- b) 13.86
- c) 192.13
- d) 2,940
- e) 198.76

63. Assuming data is normally distributed (i.e. histogram is bell shaped) and given the mean and standard deviation calculated, usually what range of number of arrivals do you expect for this supermarket? (Remember "usually" means 95% of the time).

- a) 84 to 112
- b) 70 to 126
- c) 56 to 140
- d) 71 to 132
- e) 70 to 162

The following sets of sample data represent the distribution of house prices in two counties.

Price Range (\$000s)	No. of houses in Bassetshire sample	No. of houses in Cokeshire sample
65 but under 70	2	4
70 but under 75	5	11
75 but under 80	12	19
80 but under 90	20	15
90 but under 110	14	6
110 but under 140	6	4
140 but under 200	1	1

Answer the questions 64-69 based on above information.

64. The average house price (\$000s) in Bassetshire is _____.

- a) 92.790
- b) 97.092
- c) 99.702
- d) 90.792
- e) 84.750

65. The average house price (\$000s) in Cokeshire is _____.

- a) 84.750
- b) 90.792
- c) 84.570
- d) 84.507
- e) 85.470

66. The standard deviation for house prices (\$000s) in Barsetshire is _____.

- a) 18.426
- b) 18.272
- c) 18.246
- d) 18.227
- e) 18.642

67. The standard deviation for house prices (\$000s) in Cokeshire is _____.

- a) 17.788
- b) 17.938
- c) 18.426
- d) 18.272
- e) 17.878

68. Which of the following statements is true?

- a) House prices are higher in Cokeshire
- b) House prices are lower in Barsetshire
- c) House prices vary more in Barsetshire
- d) House prices are the same in both
- e) None of the above

69. Are summary statistics such as mean and standard deviation appropriate measures for this data set? Why or why not?

- a) No, there are too many intervals.
- b) Yes, the class widths are all the same.
- c) No, the class intervals are not the same
- d) No, there are too few intervals.
- e) Yes, data are distributed evenly.

Demand for consumer goods is necessarily variable. Forecasting the demand for consumer goods is an important business activity, as all businesses have to plan ahead. Manufacturer of consumer goods has been studying the demand for one of their products and the level of demand is given in the following stem and leaf plot, where stem unit is 100 and leaf unit is 10.

STEM	LEAF
1	1 2 3 4.5 5 6 7 7 9 9.5
2	0 0 0 0 0 0 0 0 1 1 2 4 5 7 9
3	0 0 0 2 8
4	
5	0
6	
7	
8	0
9	
10	
11	
12	0

Answer the questions 70-79 based on above information.

70. The mean is _____.

- a) 270.61
- b) 27.61
- c) 2700.61
- d) 2.7061
- e) 260.71

71. The standard deviation is _____.

- a) 207.974
- b) 206.591
- c) 209.794
- d) 204.977
- e) 205.691

72. The median is _____.

- a) 200 and 300
- b) 300
- c) 210 and 300
- d) 200
- e) 200 and 210

73. The lower quartile is _____.

- a) 110
- b) 115
- c) 180
- d) 200
- e) 295

74. The upper quartile is _____.

- a) 110
- b) 115
- c) 180
- d) 200
- e) 295

75. The inter quartile range is _____.

- a) 115
- b) 110
- c) 95
- d) 20
- e) 1090

76. The inner fences are _____.

- a) 7.5 to 640
- b) -165 to 467.5
- c) 467.5 to 640
- d) 7.5 to 467.5
- e) 110 to 1200

77. The outer fences are _____.

- a) 7.5 to 640
- b) -165 to 467.5
- c) 467.5 to 640
- d) 7.5 to 467.5
- e) -165 to 640

78. The mild outliers are _____.

- a) 500 only
- b) 380 & 500
- c) 500; 800 and 1200
- d) 800 and 1200
- e) No mild outliers

79. The serious outliers are _____.

- a) 500 only
- b) 380 & 500
- c) 500; 800 and 1200
- d) 800 and 1200
- e) No serious outliers

80. A company's customer service 800 telephone system is set up so that the caller has six options. Each of these six options leads to a menu with four options. For each of these four options, three more options are available. For each of these three options, another three options are

presented. If a person calls the 800 number for assistance, how many total options are possible?

- a) 6
- b) 24
- c) 72
- d) 216
- e) 480

A survey conducted by the Northwestern University Lindquist-Endicott Report asked 320 companies about the procedures they use in hiring. Only 54% of the responding companies review the applicant's college transcript as part of the hiring process, and only 44% consider faculty references. Assume that these percentages are true for the population of companies in the United States and that 35% of all companies use both the applicant's college transcript and faculty references.

Answer the questions 81-83 based on above information.

81. What is the probability that a randomly selected company uses either faculty references or college transcript as part of the hiring process?

- a) 0.44
- b) 0.54
- c) 0.63
- d) 0.37
- e) 0.35

82. What is the probability that a randomly selected company uses either faculty references or college transcript but not both as part of the hiring process?

- a) 0.09
- b) 0.19
- c) 0.63
- d) 0.35
- e) 0.28

83. What is the probability that a randomly selected company uses neither faculty references nor college transcript as part of the hiring process?

- a) 0.37
- b) 0.35
- c) 0.63
- d) 0.28
- e) 0.19

According to the Consumer Electronics Manufacturers Association, 10% of all U.S. households have a fax machine and 52% have a personal computer. Suppose 91% of all U.S. households having a fax machine have a personal computer. A U.S. household is randomly selected.

Answer the questions 84-88 based on above information.

84. What is the probability that the household has a fax machine and a personal computer?

- a) 0.091
- b) 0.009
- c) 0.10
- d) 0.91
- e) 0.62

85. What is the probability that the household has a fax machine or a personal computer?

- a) 0.52
- b) 0.10
- c) 0.529
- d) 0.091
- e) 0.429

86. What is the probability that the household has a fax machine and does not have a personal computer?

- a) 0.009
- b) 0.471
- c) 0.48

- d) 0.10
- e) 0.58

87. What is the probability that the household has neither a fax machine nor a personal computer?

- a) 0.471
- b) 0.009
- c) 0.429
- d) 0.091
- e) 0.52

88. What is the probability that the household does not have a fax machine and does have a personal computer?

- a) 0.471
- b) 0.009
- c) 0.429
- d) 0.091
- e) 0.52

In a recent year, business failures in the United States numbered 83,384, according to Dun & Bradstreet. The construction industry accounted for 10,867 of these business failures. The South Atlantic states accounted for 8,010 of the business failures. Suppose that 1,258 of all business failures were construction businesses located in the South Atlantic states. A failed business is randomly selected from this list of business failures.

Answer the questions 89-94 based on above information.

89. What is the probability that the business is located in the South Atlantic states?

- a) 0.13032
- b) 0.21130
- c) 0.09606
- d) 0.01509
- e) 0.90606

90. What is the probability that the business is in the construction industry or located in the South Atlantic states?

- a) 0.13032
- b) 0.21130
- c) 0.09606
- d) 0.01509
- e) 0.90606

91. What is the probability that the business is in the construction industry if it is known that the business is located in the South Atlantic states?

- a) 0.13032
- b) 0.21130
- c) 0.09606
- d) 0.01509
- e) 0.15705

92. What is the probability that the business is located in the South Atlantic states if it is known that the business is a construction business?

- a) 0.11576
- b) 0.21132
- c) 0.13032
- d) 0.01509
- e) 0.90606

93. What is the probability that the business is not located in the South Atlantic states if it is known that the business is not a construction business?

- a) 0.21132
- b) 0.86968
- c) 0.0961
- d) 0.0151
- e) 0.9069

94. Given that the business is a construction business, what is the probability that the business is not located in the South Atlantic states?

- a) 0.13032
- b) 0.86968
- c) 0.8842
- d) 0.0151
- e) 0.9069

In a certain city, 30% of the families have a MasterCard, 20% have an American Express card, and 25% have a Visa card. Eight percent of the families have both a MasterCard and an American Express card. Twelve percent have both a Visa card and a MasterCard. Six percent have both an American Express card and a Visa card.

Answer the questions 84-88 based on above information.

95. What is the probability of selecting a family that has either a Visa card or an American Express card?

- a) 0.25
- b) 0.20
- c) 0.39
- d) 0.37
- e) 0.33

96. What is the probability of selecting a family that has either a Visa card or a MasterCard?

- a) 0.25
- b) 0.30
- c) 0.55
- d) 0.43
- e) 0.12

97. If a family has a MasterCard, what is the probability that it has a Visa card?

- a) 0.40
- b) 0.12
- c) 0.30
- d) 0.20
- e) 0.48

98. If a family has a Visa card, what is the probability that it has a MasterCard?

- a) 0.25
- b) 0.12
- c) 0.39
- d) 0.48
- e) 0.40

99. Is possession of a Visa card independent of possession of a MasterCard? Why or why not?

- a) No, because $P(M | V) \neq P(V)$
- b) Yes, because $P(M) = P(V)$
- c) No, because $P(V | M) \neq P(V)$
- d) Yes, because $P(V \cap M) \neq 0$
- e) No, because Visa and MasterCard are different things

100. Is possession of an American Express card mutually exclusive of possession of a Visa card? Why or why not?

- a) No, because $P(A \cap V) \neq .0000$
- b) Yes, because $P(A \cap V) = .0000$
- c) No, because $P(A \cap V) \neq P(V)$
- d) Yes, because $P(V \cap A) \neq P(A)$
- e) No, because American Express and Visa card are different things