Chapter 02: Creating and Using Frequency Distributions

Multiple Choice

1. One benefit to using a frequency distribution table or graph is it makes it easier to
   a. see the raw scores.
   b. identify the variables.
   c. see a relationship hidden in the data.
   d. determine the sample size.

   ANSWER: c
   DIFFICULTY: Easy
   REFERENCES: p. 20
   Some New Symbols and Terminology
   KEYWORDS: frequency distribution

2. In statistical notation, *f* stands for the
   a. number of times a given score occurs in a sample.
   b. total number of scores in a data set.
   c. relative frequency of a given score.
   d. cumulative frequency of a given score.

   ANSWER: a
   DIFFICULTY: Easy
   REFERENCES: p. 21
   Some New Symbols and Terminology
   KEYWORDS: f | frequency

3. In statistical notation, *N* stands for the
   a. number of times a given score occurs in a sample.
   b. total number of scores in a data set.
   c. relative frequency of a particular score.
   d. cumulative frequency of a particular score.

   ANSWER: b
   DIFFICULTY: Easy
   REFERENCES: p. 21
   Some New Symbols and Terminology
   KEYWORDS: N

4. What is wrong in the following table?

Score	*f*
20	4
19	6
18	2
15	1
10	8

a. The scores and the frequencies must be reversed.

b. The relative frequencies are reported in the *f* column.

c. Not all possible scores between the highest and lowest observed scores are reported.

d. Nothing is wrong.

ANSWER: c
DIFFICULTY: Easy
REFERENCES: p. 22
Understanding Frequency Distributions
KEYWORDS: frequency distribution table

5. What is the *N* for the following frequency distribution?

Score	*f*
15	1
14	2
13	3
12	4
11	5

a. 5

b. 10

c. 15

d. 65

ANSWER: c
DIFFICULTY: Moderate
REFERENCES: p. 22
Understanding Frequency Distributions
KEYWORDS: N

6. What is the most frequently occurring score in the following frequency distribution?

Score	*f*
15	1
14	2
13	3
12	4
11	5

a. 1

b. 5

c. 11

d. 15

ANSWER: c
DIFFICULTY: Moderate
REFERENCES: p. 22
Understanding Frequency Distributions
KEYWORDS: frequency

7. Using the frequency distribution below, what is the *total frequency* of the scores 6 and 7?

Score	***f***	***Relative Frequency***	***Percent***
10	5	0.11	11
9	10	0.22	22
8	13	0.29	29
7	10	0.22	22
6	5	0.11	11
5	1	0.02	2
4	1	0.02	2

a. 0.33

b. 13

c. 15

d. 17

ANSWER: c
DIFFICULTY: Moderate
REFERENCES: p. 22
Understanding Frequency Distributions
KEYWORDS: frequency

8. A graph of a frequency distribution shows the frequencies on the
   a. *X* axis.
   b. *Y* axis.
   c. top of the graph.
   d. bottom of the graph.

   ANSWER: b
   DIFFICULTY: Easy
   REFERENCES: p. 23
   Understanding Frequency Distributions
   KEYWORDS: frequency distribution

9. Which graphing techniques are appropriate for interval and ratio data?
   a. Histograms and frequency polygons
   b. Bar graphs and frequency polygons
   c. Bar graphs and histograms
   d. Bar graphs, histograms, and frequency polygons

   ANSWER: a
   DIFFICULTY: Easy
   REFERENCES: p. 24
   Understanding Frequency Distributions
   KEYWORDS: frequency distribution | graph

10. The distinguishing characteristic of the frequency polygon is
    a. the bars are shaded in.
    b. the graph is created by connecting the dots with straight lines.
    c. the graph does not center the bars over the scores on the *X* axis.
    d. the graph centers the bars over the scores on the *X* axis.

    ANSWER: b
    DIFFICULTY: Easy
    REFERENCES: p. 24
    Understanding Frequency Distributions
    KEYWORDS: frequency polygon

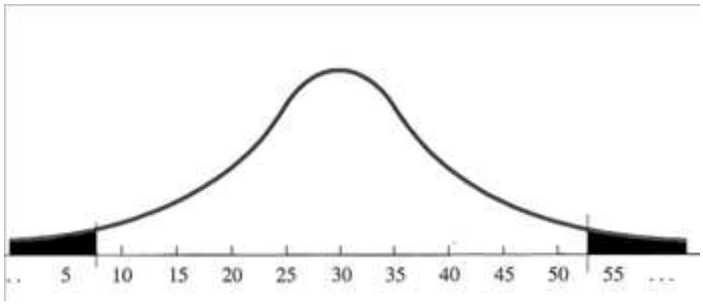
11. A grouped frequency distribution is used when
    a. there are too many *different* scores to produce an efficient frequency table or graph.
    b. there are too many scores to produce an efficient frequency table or graph.
    c. one wants more detailed information about frequencies than one can get from a frequency table.
    d. there are about 10 rows in a frequency table.

    ANSWER: a
    DIFFICULTY: Easy
    REFERENCES: pp. 25
    Understanding Frequency Distributions
    KEYWORDS: grouped frequency distribution

12. In statistics, a symmetrical, bell-shaped polygon is called a/an
    a. histogram.
    b. bimodal distribution.
    c. percentile.
    d. normal curve.

    ANSWER: d
    DIFFICULTY: Easy
    REFERENCES: p. 26
    Types of Frequency Distributions
    KEYWORDS: normal curve

13. What are the shaded areas in the following distribution called?



    a. Ends
    b. Tails
    c. Legs
    d. Edges

    ANSWER: b
    DIFFICULTY: Easy
    REFERENCES: p. 26
    Types of Frequency Distributions
    KEYWORDS: tails

14. The distinguishing characteristic of an idealized bimodal distribution is
    a. all the scores are the same.
    b. all the frequencies are the same.
    c. two scores have the same and the highest frequency.
    d. it is always symmetrical.

    ANSWER: c
    DIFFICULTY: Easy
    REFERENCES: p. 27
    Types of Frequency Distributions
    KEYWORDS: bimodal distribution

15. The very first step when examining data is to
    a. determine if a relationship exists.
    b. identify the shape of the distribution.
    c. generate a polygon.
    d. calculate the relative frequencies.

    ANSWER: b
    DIFFICULTY: Easy
    REFERENCES: p. 28
    Types of Frequency Distributions
    KEYWORDS: distribution shape

16. A distribution that is *not* a perfectly shaped normal distribution should be labeled as a/an
    a. imperfect distribution.
    b. normal distribution.
    c. skewed distribution.
    d. model distribution

    ANSWER: b
    DIFFICULTY: Moderate
    REFERENCES: p. 28
    Types of Frequency Distributions
    KEYWORDS: Labeling distributions

17. *Relative frequency* is defined as the
    a. number of times a given score occurs in a sample.
    b. proportion of the total *N* at a given score value.
    c. frequency of all scores at or below a score.
    d. total number of scores divided by the frequency of a given score.

    ANSWER: b
    DIFFICULTY: Easy
    REFERENCES: p. 29
    Relative Frequency and the Normal Curve
    KEYWORDS: relative frequency

18. To obtain the relative frequency, we would
    a. count the total number of scores.
    b. add the frequencies below a score to the score's frequency.
    c. divide the total number of scores by the frequency for a score.
    d. divide the frequency for a score by the total number of scores.

    ANSWER: d
    DIFFICULTY: Easy
    REFERENCES: Relative Frequency and the Normal Curve
    p. 29
    KEYWORDS: relative frequency

19. The relative frequency of a score must be
    a. a value between 0 and 100.
    b. represented using a histogram chart.
    c. a value equal to or greater than the score's frequency.
    d. a value between 0 and 1.

    ANSWER: d
    DIFFICULTY: Easy
    REFERENCES: p. 29
    Relative Frequency and the Normal Curve
    KEYWORDS: relative frequency

20. What is the relative frequency for the score of 14 in the following simple frequency distribution?

Score	*f*
15	1
14	2
13	3
12	4
11	5

a. 0.10
b. 0.11
c. 0.13
d. 0.16

ANSWER: c
DIFFICULTY: Moderate
REFERENCES: p. 29
Relative Frequency and the Normal Curve
KEYWORDS: relative frequency

21. In a normal distribution with a mean of 30, what percentage of the scores would be above the mean?
a. 0%
b. 25%
c. 50%
d. 75%

ANSWER: c
DIFFICULTY: Moderate
REFERENCES: p. 33
Understanding Percentile and Cumulative Frequency
KEYWORDS: percentage of scores

22. What is the percent for the score "7" in the following distribution?

Score	***f***
10	2
9	4
8	7
7	5
6	3
5	1
4	1

a. .22

b. 5

c. 22

d. 30

ANSWER: c
DIFFICULTY: Moderate
REFERENCES: p. 32
Understanding Percentile and Cumulative Frequency
KEYWORDS: percent

23. In a normal curve, the proportion of the area under the curve between two scores represents

a. the frequency of the lower score.

b. the relative frequency of the lower score.

c. the relative frequency of all scores between the two scores.

d. the relative frequency of all scores below the upper score.

ANSWER: c
DIFFICULTY: Easy
REFERENCES: p. 31
Relative Frequency and the Normal Curve
KEYWORDS: proportion of the area under the curve

24. Which of the following statements about bar graphs is *false*?

a. Adjacent bars touch.

b. It can be used with nominal scores.

c. It can be used with ordinal scores.

d. It has a vertical bar centered over each *X* score.

ANSWER: a
DIFFICULTY: Moderate
REFERENCES: p. 23
Understanding Frequency Distributions
KEYWORDS: frequency distribution/graph

25. Another term for a "dot" placed on any graph is called a
    a. data point.
    b. scattergram.
    c. histogram.
    d. distribution.

    ANSWER: a
    DIFFICULTY: Easy
    REFERENCES: p. 24
    Understanding Frequency Distributions
    KEYWORDS: graphing

26. _____distributions contain low-frequency, extreme low scores without low-frequency extreme high scores.
    a. Negatively skewed
    b. Positively skewed
    c. Bimodal
    d. Normal

    ANSWER: a
    DIFFICULTY: Easy
    REFERENCES: p. 27
    Types of Frequency Distributions
    KEYWORDS: skewed distributions

27. _____distributions contain low-frequency, extreme high scores without low-frequency extreme low scores.
    a. Positively skewed
    b. Negatively skewed
    c. Bimodal
    d. Normal

    ANSWER: a
    DIFFICULTY: Easy
    REFERENCES: p. 27
    Types of Frequency Distributions
    KEYWORDS: skewed distributions

28. In which type of distribution will the lowest scores be found on the lower left-hand side of the *X* axis?
    a. In any distribution
    b. Only in a normal distribution
    c. Only in a positively skewed distribution
    d. Only in a negatively skewed distribution

    ANSWER: a
    DIFFICULTY: Moderate
    REFERENCES: p. 28
    Types of Frequency Distributions
    KEYWORDS: frequency distributions

29. If a score appears 20 times in a sample of 80 scores, what is its relative frequency?
    a. .25
    b. 4
    c. 20
    d. .20

    ANSWER: a
    DIFFICULTY: Moderate
    REFERENCES: p. 29
    Relative Frequency and the Normal Curve
    KEYWORDS: relative frequency

30. If a score's relative frequency is .6 when *N* is 50, what is the score's frequency?
    a. 30
    b. 3
    c. 20
    d. It cannot be determined from this information.

    ANSWER: a
    DIFFICULTY: Difficult
    REFERENCES: p. 30
    Relative Frequency and the Normal Curve
    KEYWORDS: relative frequency

Subjective Short Answer

31. For the following data, construct a frequency distribution table.

8, 8, 8, 7, 5, 5, 5, 5, 4, 4, 3, 3, 3, 2, 1, 1, 1, 1, 1

Score *f*

ANSWER:

Score	*f*
8	3
7	1
6	0
5	4
4	2
3	3
2	1
1	5

DIFFICULTY: Moderate

REFERENCES: p. 22
Understanding Frequency Distributions

KEYWORDS: frequency distribution

32. Using the following data set, complete the frequency distribution table.

9, 8, 8, 7, 7, 7, 5, 5, 4, 4, 4, 4, 3, 2, 2, 1, 0, 0

Score *f*
9 1
8 2

4 4
3 1
2 2
0 2

ANSWER:

Score	*f*
9	1
8	2
7	3
6	0
5	2
4	4
3	1
2	2
0	2

DIFFICULTY: Moderate

REFERENCES: p. 22
Understanding Frequency Distributions

KEYWORDS: frequency distribution

33. Use the following data set to construct a frequency distribution table.

21, 21, 20, 20, 19, 17, 17, 16, 16, 16, 16, 14

ANSWER:

Score	*f*
21	2
20	2
19	1
18	0
17	2
16	4
15	0
14	1

DIFFICULTY: Moderate

REFERENCES: p. 22
Understanding Frequency Distributions

KEYWORDS: frequency

34. For the following data set, generate the frequency distribution table.

8, 8, 7, 7, 6, 6, 6, 6, 6, 6, 5, 5, 5, 5, 5, 4, 4, 4, 3, 3, 2

ANSWER:

Score	***f***
8	2
7	2
6	6
5	5
4	3
3	2
2	1

DIFFICULTY: Moderate

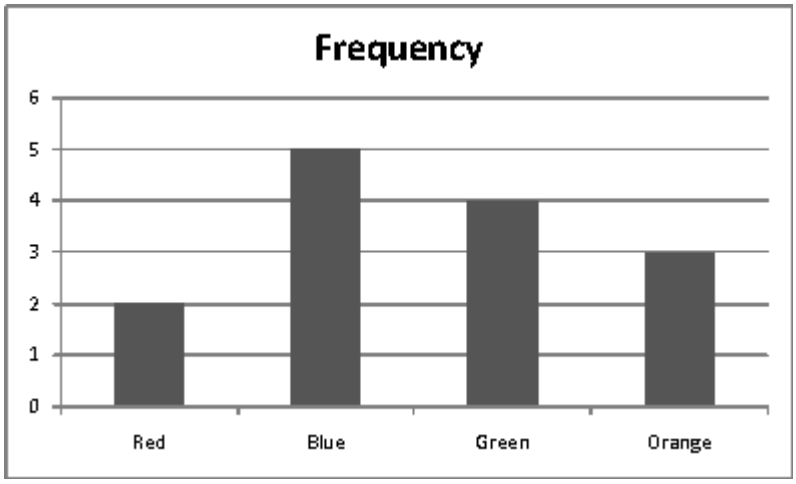
REFERENCES: Understanding Frequency Distributions
p. 22

KEYWORDS: frequency distribution table

35. Draw a bar graph for the following frequency distribution.

Score	*f*
Red	2
Blue	5
Green	4
Orange	3

ANSWER:



DIFFICULTY: Moderate

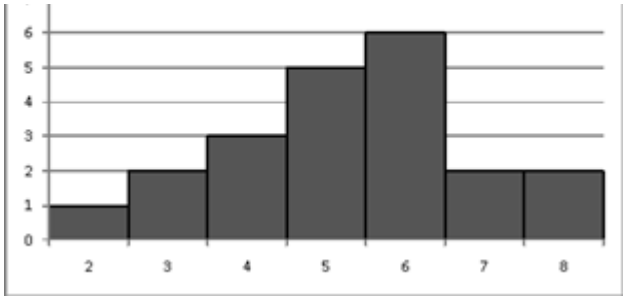
REFERENCES: p. 23
Understanding Frequency Distributions

KEYWORDS: bar graph | frequency distribution

36. For the following data set, draw the appropriate type of graph.

8, 8, 7, 7, 6, 6, 6, 6, 6, 6, 5, 5, 5, 5, 5, 4, 4, 4, 3, 3, 2

ANSWER:



DIFFICULTY: Moderate

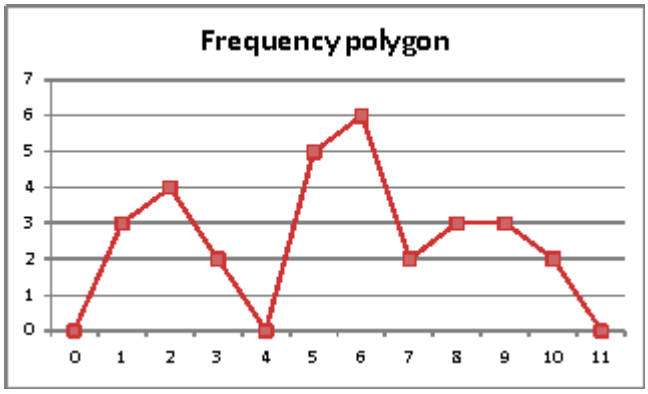
REFERENCES: p. 24
Understanding Frequency Distributions

KEYWORDS: histogram

37. For the following data set, draw a frequency polygon.

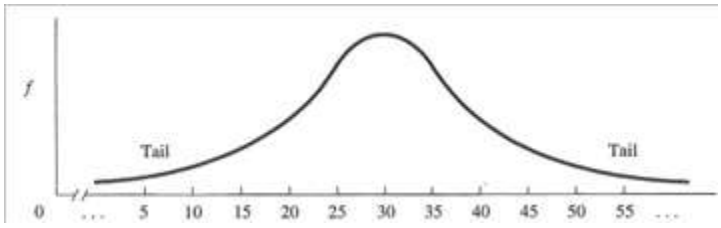
    10, 10, 9, 9, 9, 8, 8, 8, 7, 7, 6, 6, 6, 6, 6, 6, 5, 5, 5, 5, 5, 3, 3, 2, 2, 2, 2, 1, 1, 1

    ANSWER:



    DIFFICULTY: Moderate
    REFERENCES: pp. 24-25
    Understanding Frequency Distributions
    KEYWORDS: polygon

38. What is the shape of the following distribution?



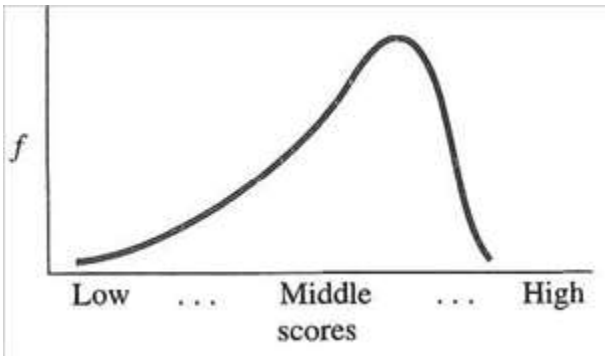
    ANSWER: Normal distribution
    DIFFICULTY: Moderate
    REFERENCES: p. 26
    Types of Frequency Distributions
    KEYWORDS: normal distribution

39. For the following data set, identify the shape of the distribution.

    8, 8, 7, 7, 6, 6, 6, 6, 6, 6, 6, 6, 5, 5, 5, 4, 4, 4, 3, 3, 2

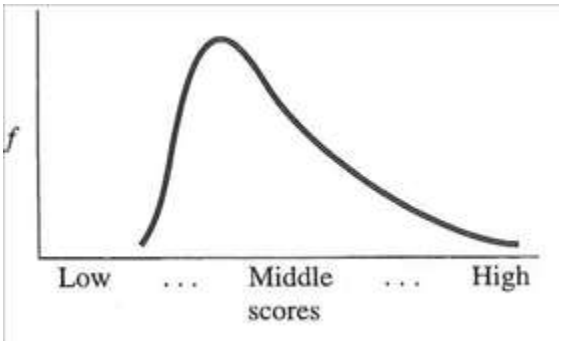
    ANSWER: Negatively skewed
    DIFFICULTY: Difficult
    REFERENCES: p. 27
    Types of Frequency Distributions
    KEYWORDS: frequency distribution table | negatively skewed

40. What is the shape of the following distribution?



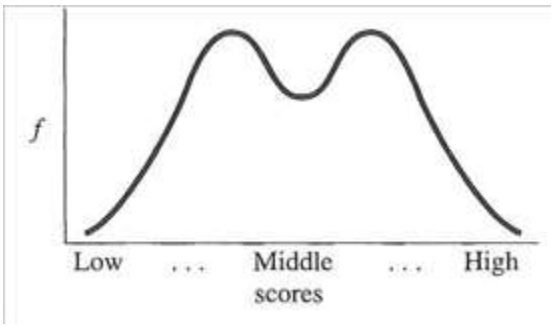
ANSWER: Negatively skewed
DIFFICULTY: Moderate
REFERENCES: p. 27
Types of Frequency Distributions
KEYWORDS: negatively skewed

41. What is the shape of the following distribution?



ANSWER: Positively skewed
DIFFICULTY: Moderate
REFERENCES: p. 27
Types of Frequency Distributions
KEYWORDS: positively skewed

42. What is the shape of the following distribution?



ANSWER: Bimodal distribution
DIFFICULTY: Moderate
REFERENCES: pp. 27-28
Types of Frequency Distributions
KEYWORDS: bimodal distribution

43. What is the relative frequency for the score of 14 in the following simple frequency distribution?

Score	*f*
15	1
14	2
13	3
12	4
11	5

ANSWER: 0.13
DIFFICULTY: Moderate
REFERENCES: p. 29
Relative Frequency and the Normal Curve
KEYWORDS: relative frequency

44. What is the relative frequency for the score of 12 in the following frequency distribution?

Score	*f*
16	1
15	0
14	2
13	3
12	10
11	4

ANSWER: 0.50
DIFFICULTY: Moderate
REFERENCES: p. 29
Relative Frequency and the Normal Curve
KEYWORDS: relative frequency

45. For the following frequencies, what are the correct relative frequencies?

Score	*f*
9	5
8	3
7	9
6	4
5	3
4	6

ANSWER: 0.17
0.10
0.30
0.13
0.10
0.20

DIFFICULTY: Difficult

REFERENCES: p. 29
Relative Frequency and the Normal Curve

KEYWORDS: relative frequency

46. In a data set with 25 scores, if the value 16 occurs 12 times, what is its relative frequency?

ANSWER: 0.48

DIFFICULTY: Difficult

REFERENCES: p. 30
Relative Frequency and the Normal Curve

KEYWORDS: relative frequency

47. If a score's relative frequency is 0.27, what is its percent?

ANSWER: 27%

DIFFICULTY: Moderate

REFERENCES: p. 30
Relative Frequency and the Normal Curve

KEYWORDS: percent

48. If the number of hot lunches sold at school this week was 1,350 and the relative frequency on Friday was 0.22, how many lunches were sold on Friday?

ANSWER: 297

DIFFICULTY: Difficult

REFERENCES: p. 30
Relative Frequency and the Normal Curve

KEYWORDS: relative frequency

49. In the following frequency distribution, the score of 5 would have a percent of_____.

Score	*f*
7	1
6	2
5	4
4	5
3	4
2	0
1	2
0	1

ANSWER: 21%
DIFFICULTY: Moderate
REFERENCES: pp. 32-33
Understanding Percentile and Cumulative Frequency
KEYWORDS: percent

50. Use the following data set to construct a frequency distribution table showing (a) frequency, (b) relative frequency, and (c) percent.

21, 21, 20, 20, 19, 17, 17, 16, 16, 16, 16, 14

ANSWER:

Score	*f*	*rel.f*	%
21	2	.17	17%
20	2	.17	17%
19	1	.08	8%
18	0	.00	0%
17	2	.17	17%
16	4	.33	33%
15	0	.00	0%
14	1	.08	8%

DIFFICULTY: Difficult
REFERENCES: pp. 32-33
Understanding Percentile and Cumulative Frequency
KEYWORDS: frequency | percent | relative frequency

51. For the following data set, generate the frequency distribution table. Provide columns for frequency, relative frequency, and percent.

    8, 8, 7, 7, 6, 6, 6, 6, 6, 6, 5, 5, 5, 5, 5, 4, 4, 4, 3, 3, 2

    ANSWER:

Score	*f*	*rel. f*	%
8	2	.10	10%
7	2	.10	10%
6	6	.29	29%
5	5	.24	24%
4	3	.14	14%
3	2	.10	10%
2	1	.05	5%

    Note: Rounding to 2 decimal places produces relative frequencies that sum to 1.02

    DIFFICULTY: Difficult

    REFERENCES: pp. 32-33
    Understanding Percentile and Cumulative Frequency

    KEYWORDS: frequency | frequency distribution table | percent | relative frequency

52. In a normal distribution, if 5% of the scores are greater than 80, what percentage of the scores are between the mean and 80?

    ANSWER: 45%

    DIFFICULTY: Moderate

    REFERENCES: pp. 31-32
    Understanding Percentile and Cumulative Frequency

    KEYWORDS: percentage of scores

53. If in a grouped distribution, the frequency for the "5-10" group was 7, what should the frequency of a score of "5" be?

    ANSWER: Because a grouped frequency represents combined scores, there is no way to know the frequency of a score of "5" just from knowing a grouped distribution frequency.

    DIFFICULTY: Difficult

    REFERENCES: p. 25
    Understanding Frequency Distributions

    KEYWORDS: grouped distributions

54. Suppose in a normal distribution, where the mean is 50, you have a score of 4. Where in the distribution would this score fall?

    ANSWER: A score of 4 would fall in (the left-hand) tail of the distribution.

    DIFFICULTY: Moderate

    REFERENCES: p. 26
    Types of Frequency Distributions

    KEYWORDS: normal distribution

55. Suppose the test scores from a given exam were as follows: 86, 87, 65, 55, 66, 88, 87, 87, 67, 65, 99, 35, 88, 88, 65, 66. What frequency distribution would you expect this data to have?

ANSWER: This data represents a bimodal distribution.
DIFFICULTY: Moderate
REFERENCES: pp. 27-28
Types of Frequency Distributions
KEYWORDS: bimodal distributions

56. For a given set of data, would it be possible to have the following relative frequencies: .45, .33, .22., .18, .29? Why or why not?

ANSWER: No, this would not be possible since the total sum of relative frequencies cannot exceed 1.0 (or 100%).
DIFFICULTY: Difficult
REFERENCES: pp. 29-30
Relative Frequency and the Normal Curve
KEYWORDS: relative frequency

57. Suppose the scores between 20 and 40 have a relatively frequency of .30. What area under the normal curve do these scores constitute?

ANSWER: .30 or 30%
DIFFICULTY: Moderate
REFERENCES: pp. 31-32
Relative Frequency and the Normal Curve
KEYWORDS: proportion of the area under the curve

58. Suppose you scored on the 63rd percentile on a standardized test. What percent of the population would have scored higher than you?

ANSWER: 100% - 63% = 37%. Thus, 37% scored above you.
DIFFICULTY: Easy
REFERENCES: p. 32
Understanding Percentile and Cumulative Frequency
KEYWORDS: percentile

59. Suppose you scored a 72 on a given test as did 11 other individuals. While no one scored below you, 23 other people scored above you. What is the cumulative frequency for your score?

ANSWER: Your score plus the 11 others equals 12. Since no one scored below you, the cumulative frequency remains at 12.
DIFFICULTY: Moderate
REFERENCES: p. 33
Understanding Percentile and Cumulative Frequency
KEYWORDS: cumulative frequency

60. Suppose you've noted that your score is to the left of your friend's when placed on a normal distribution. What should you infer from this fact?

ANSWER: Because your score is to the left of your friend's score on a normal distribution, by definition, your score is lower than your friend's score.

DIFFICULTY: Moderate

REFERENCES: p. 33
Understanding Percentile and Cumulative Frequency

KEYWORDS: Percentile/cumulative frequency/proportion of the area under the curve