NAME

Module 19 Analyzing Data and Statistics
Lesson 5 Solving Statistics Problems

1. The distance from the mean to each point is called the _____.

a. mean
b. deviation from the mean
c. deviation from the mode
d. mean absolute deviation

2. What is the mean of the distances from the mean to each point is called?

a. mean
b. deviation from the mean
c. deviation from the mode
d. mean absolute deviation

Use the list of data below to answer Questions 3–8.

Average Winning Race Speeds in the Last 12 Years (mi/h):
132, 141, 146, 149, 151, 154, 162, 166, 173, 176

3. What is the mean speed in the list of average race speeds?

a. 151
b. 154
c. 152.5
d. 155

4. Write the deviations from the mean to complete the table.

mi/h	Deviation	mi/h	Deviation
132	–23	154	–1
141	–14	162	7
146	–9	166	11
149	–6	173	18
151	–4	176	21

5. What is the mean absolute deviation for the list of data?

a. 1
b. 155
c. 4
d. 11.4

6. How many of the racers in this group scored within one mean absolute deviation of the mean?

a. 8
b. 7
c. 6
d. 5

7. What does 22.8 represent as it relates to the list of values?

a. Mean
b. One mean deviation
c. Two mean deviations
d. None of the above

8. How many of the players in this group scored within two mean absolute deviations of the mean?

a. 7
b. 8
c. 9
d. 10

Use the list of data below to answer Questions 9–12.

Points in a Basketball Game:
20, 18, 15, 12, 10, 10, 7, 4, 2, 0

Points	Deviation	Points	Deviation
20		10	
18		7	
15		4	
12		2	
10		0	

9. What is the mean?

a. 98.0 **b.** 9.8 **c.** 980 **d.** 10

10. Which table shows the correct deviations from the mean?

a.

Points	Deviation	Points	Deviation
20	78	10	88
18	80	7	91
15	83	4	94
12	86	2	96
10	88	0	98

b.

Points	Deviation	Points	Deviation
20	10	10	0
18	8	7	–3
15	5	4	–6
12	2	2	–8
10	0	0	–10

c.

Points	Deviation	Points	Deviation
20	10.2	10	0.2
18	8.2	7	–2.8
15	5.2	4	–5.8
12	2.2	2	–7.8
10	0.2	0	–9.8

d.

Points	Deviation	Points	Deviation
20	29.8	10	19.8
18	27.8	7	16.8
15	24.8	4	13.8
12	21.8	2	11.8
10	19.8	0	9.8

11. Find the mean absolute deviation.

a. 524
b. 0.524
c. 52.4
d. 5.24

12. How many of the players in this group scored within one mean absolute deviation of the mean?

a. 5
b. 6
c. 4
d. 10

Journal

1. Joli missed the lesson about solving statistical problems. Explain to Joli what a deviation from the mean is and how to find it.
2. What model might best be used to illustrate the concept of deviation from the mean for the data in Journal Question 1 above? Be sure to explain why this model works.
3. Explain the difference between the mean of the deviations from the mean and the mean absolute deviation.
4. Use imaginary data to explain what it means to be within two times the mean absolute deviations of the mean.

Cumulative Review

In Questions 1–3, use the following data to calculate the measures:

33, 35, 38, 41, 45, 52, 55, 55, 57, 59, 65, 68, 75, 79, 83

1. What is the mean of the data set? 56
2. What is the median value in the data set? 55
3. What is the mode of the data set? 55

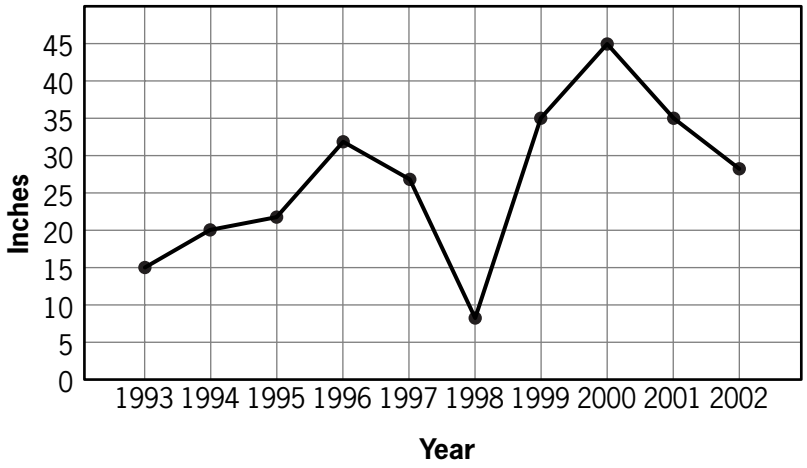
In Questions 4–6, use the following data to calculate the measures:

15, 18, 21, 22, 27, 29, 30, 32, 35, 38, 42, 44, 47, 47, 47, 50, 52, 53, 55, 56

4. What is the mean of the data set? 38
5. What is the median value in the data set? 40
6. What is the mode of the data set? 47

Use the chart to answer Questions 7–10.

Yearly Rainfall in Region A



7. Determine what year rainfall for the region was the greatest?

a. 1998 **c.** 1999
b. 2000 **d.** 2002

8. In what two years was the amount of rainfall the same?

a. 1998, 1999 **c.** 1999, 2000
b. 1996, 1998 **d.** 1996, 2001

9. In what year was rainfall the least?

a. 1 **c.** 4
b. 155 **d.** 11.4

10. In what year was the amount of rainfall between 25 and 30 inches?

a. 8 **c.** 6
b. 7 **d.** 5

Possible Journal Answers

1. **The deviation from the mean is the distance each data point is from the mean value of all the data points in the set. For instance, for the set containing the following five data points: 2, 4, 6, 8, and 10, the mean is the sum of the data points 2 + 4 + 6 + 8 + 10 or 30, divided by the number of data points, five. The mean would be 30 ÷ 5 = 6. For a given point, the deviation from the mean is the difference between the each point and the mean. The deviation from the mean for point 2 is 2 − 6 or –4. The deviation from the mean for the point 8 is 8 − 6 or 2.**
2. **A number line might best be used to illustrate the concept of deviation from mean. Draw a number line from zero to 10. On the number line, put a mark on it for each number in the set and a larger mark over the number representing the mean. Using the data from Journal 1, the mean is at six. Draw an arrow from the mean to each mark. For each of the data points less than six, the arrow would start at the mean and go to the left showing movement in the negative direction. For these data points, the ones less than the mean, the deviation would be negative. Also, draw an arrow from the mean to each of the points to the right of six. These arrows would show movement in the positive direction, and the deviation would be positive.**
3. **To find the mean of the "deviations from the mean," add all the deviations from the means and divide by the number of data points. The sum of all the deviations from the mean is always zero. Zero divided by any number is always zero, so the mean of the deviations from the mean is always zero. The mean absolute deviation is the sum of the absolute values of the deviations from the mean divided by the number of data points. In terms of a number line, this provides the mean (average) distance (deviation) of all the data points from the mean. Distance here is always positive.**
4. **The mean absolute deviation is the mean of all the deviations (distances) of data points from the mean of the data points. To be "within two times the mean absolute deviation" means to be in the area that is from the mean minus the two times the mean absolute deviation to the mean plus the two times the mean absolute deviation. For instance if the mean of the data is 17 and mean absolute value is six, then to be within two times the mean absolute deviation would be to be between 17 − 2(6) and 17 + 2(6) or 5 to 29. Any data in that range is said to be in the range of two times the mean absolute deviation.**