Solution

a. As there are only three categories, we will add the grade from each category and divide by three.

$$\frac{0.95+0.85+0.87}{3}=\frac{2.67}{3}=0.89$$

Therefore, your grade based on the arithmetic mean of the three categories is 89%.

b. Note that the weights add to 100%. To determine the weighted mean, we must multiply the assigned weights for each category by each category's grade.

$$(0.10)(0.95)+(0.30)(0.85)+(0.60)(0.87)=0.872$$

Therefore, your grade based on the weighted mean is 87.2%.

Note that the weighted mean is different than the arithmetic mean.

Now work margin exercise 9.

Margin Exercise Answers
1. 82.25 **2.** 50.875 **3.** 4 **4.** 3 **5.** 4 **6.** multimodal: 32 and 45 **7.** There is no mode. **8.** mean: 4.5; median: 5; mode: 5 **9.** 83%

10.3 Exercises

Concept Check

Fill-in-the-blank. Complete the sentences using information found in this section.

1. A measure of _____ _____ describes what a typical value in a data set looks like.

2. The _____ is the sum of all data values divided by the number of data values.

3. The middle value in a ranked data set is called the _____.

4. A data set that has two modes is said to be _____.

5. A data set is multimodal if there are more than _____ data values that qualify as the mode.

6. A _____ _____ is one in which some data values contribute more to the mean than others.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. The median is the data value that occurs most often in a data set.

8. The mean is also called the arithmetic average.

9. The mean must be a value in the data set.

10. There can be more than one median.

Practice

Find the mean, median, and mode for each of the following data sets.

1. 15, 16, 12, 18, 23, 21, 20, 19, 14, 28

2. 43, 49, 49, 41, 43, 45, 46, 48, 46, 42, 44, 45, 47, 49

3. \$6, \$8, \$4, \$9, \$6, \$5, \$7, \$6, \$5, \$9, \$12

4. 3, 3, 3, 3, 3, 3, 3, 3, 3, 3

5. 82, 84, 86, 84, 86, 84, 86, 82

6. 110, 120, 115, 112, 114, 120, 115, 110, 112, 114

7. Use the following statistics regarding yearly salaries at Steppingstone Incorporated.

   Mean: \$110,000 Median: \$78,000 Mode: \$62,000

   a. What is the most common salary?

   b. What salary did half the employees exceed?

8. Suppose you have earned scores 78, 84, 68, and 88 on exams in one of your classes.

   a. What is the mean of the scores?

   b. What score would you need on the next exam to have an overall mean of 80?

   c. If the maximum score on an exam is 100, is it possible to have a mean of 85 after the fifth exam? Explain.

Find the mean, median, and mode for each of the following scenarios.

9. A random sample of the weights of passengers' carry-on luggage was collected. The weights (in pounds) of the luggage pieces were as follows.

   36 44 40 31 33 40 37 40 38 41

10. A random sample of the heights of basketball players at a local tournament was collected. The heights (in inches) of the players were as follows.

    62 78 72 71 74 69 73 74 75 77

11. The number of pacifiers lost each day by babies at the local daycare are as follows.

3 2 0 2 0 2 0 3 4 2 1 2

12. Bowling scores by bowlers in a local recreational league are as follows.

164 185 152 160 163 165 195 185 182 167

13. Golf scores by golfers in a local recreational league are as follows.

82 78 84 98 72 91 77 78 86 90

Find the weighted mean. See Example 9.

14. A teacher computes a student's average using a weighted mean where quizzes count 25%, homework 15%, and exams 60%. If a student's quiz grade is 82%, homework 90%, and exams 88%, what is the student's average?

15. A teacher computes a student's average using a weighted mean where quizzes count 15%, homework 10%, and exams 75%. If a student's quiz grade is 90%, homework 92%, and exams 85%, what is the student's average?

16. A savvy consumer looking to buy a new camera decided to give weighs to the areas she thought were important in the shopping process. She decides to give image quality 50%, build quality 20%, and performance 30%. She has narrowed her decision down to two choices. Camera A scores 8 for image quality, 6 for build quality, and 9 for performance. Camera B scores 7 for image quality, 9 for build quality, and 8 for performance. What is the weighted mean for each camera, and based on the scores, what camera should she purchase?

17. In a local golf tournament, the first and second round score counts for 25% of the average score, and the third round counts for 50%. Lydia scores 76 in the first round, 73 in the second round, and 75 in the third round while Adah scores 78 in the first round, 76 in the second round, and 68 in the third round What is the weighted mean for Lydia and Adah, and based on the scores, who wins the tournament? (In golf, the lower score wins.)

For each frequency distribution, determine the mean, median, and mode of the data set. See Example 8.

18.

Text Messages Sent in a Day	Number Reporting Texts Sent (Frequency)
5	8
6	10
7	8
8	6
9	4
10	4

19.

Number of Siblings in a Family	Frequency
0	2
1	10
2	12
3	5
4	2
5	1

20.

Number of Pets in a Household	Frequency
0	4
1	8
2	12
3	6
4	5
5	5

21.

Number of Work Emails Per Day	Frequency
25	3
26	5
27	6
28	1
29	2
30	8

Find the mode for each of the following scenarios. State if the data set is unimodal, bimodal, multimodal, or has no mode. See Examples 5 through 7.

22. The number of bottles used each day by babies at a local daycare are as follows.

6 4 5 6 5 8 7 10 6 5 9 10

23. A sample of batting averages by players in a local softball recreational league are as follows.

.250 .285 .267 .290 .310 .260

.335 .301 .315 .325 .279 .283

24. The number of free throws taken by team members during a recent basketball game are as follows.

3 2 0 4 6 5 2 8 2 7 1 3 1 4 3

25. The number of pieces of junk mail received each day are as follows.

4 1 3 2 4 2 5 1 2 3 5 1 3 5 4

26. The number of movies seen in a cinema each month are as follows.

8 1 4 3 5 2 3 5 4 7 3

27. The number of pencils lost by teachers during a week are as follows.

1 0 4 3 5 0 2 4 6 2 4 3 2 1 3 5 7

Writing & Thinking

28. Eliana is trying to average 6 made field goals per basketball game for the month. Thus far, she has had made field goals of 8, 4, 9, 5, 7, 6, 8, and 2 over the first eight 8 games. She has two games left. What must she average over the remaining two games to end up with a mean of 6 made field goals per basketball game for the month?

29. Give an example of when it would be better to use the mode than median.