3.4 Measures of Central Tendency

Student Text Pages
130–139

Suggested Timing
80–160 min

Tools
- calculators
- graphing calculators
- computers
- Microsoft® *Excel*
- *Fathom*™

Related Resources
BLM 3-9 Section 3.4 Measures of Central Tendency
BLM 3-10 Section 3.4 Achievement Check Rubric

Link to Prerequisite Skills

Students should complete questions 1 to 3 in the Prerequisite Skills prior to starting this section.

Warm-Up

1. a) List the first nine even integers greater than zero.
b) Find the mean of the first nine even integers greater than zero.
c) Does this result surprise you? Explain why or why not.
2. Refer to question 1, part a). Which integer can be described as the middle value?
3. Repeat question 1 for the first ten even integers greater than zero. Compare your results for part b) to question 1, part b).

Warm-Up Answers

1. a) 2, 4, 6, 8, 10, 12, 14, 16, 18
b) 10
c) No. The numbers are symmetrically surrounding the middle value of 10.
2. 10
3. a) 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
b) 11
c) Yes. It was a surprise that adding one extra integer produced a mean that was not in the list. In this data set, the mean is not one of the data values, as it was in question 1, part b).

Teaching Suggestions

Warm-Up

- Write the Warm-Up questions on the board or on an overhead. Have students complete the questions independently. Then, discuss the solutions as a class.

Section Opener

- Discuss the concept of statistics in sports. The photograph may start students thinking about the number of averages quoted in professional sports. From a bowling average, to a batting average in baseball, to the average number of minutes played by a particular player in a hockey game, sports are loaded with statistics. Have students list some other examples of statistics in sports.

Investigate

- Review the three definitions in the margin before starting the Investigate.
- Have students calculate each measure of central tendency without using the statistics macro on their calculators so that they can develop an understanding of each measure.

Investigate Answers (page 130)

1. 13 employees
2. $47 385
3. $43 000
4. $43 000
5. Answers may vary. Sample answer: The median or the mode best describes a typical employee salary, since it is the salary that the majority of employees earn.

Examples

- In Example 1, part b), the average between the two data values in the middle is used to find the median. Point out this is only necessary with an even number of values; the median for an odd number of values is the middle value.
- Example 2 can also be done with a regular calculator if none of the technology tools shown is available. Remind students that the programmers needed to understand how to do these calculations by hand before they could write the programs. Some students may ask why they need to know this if they can use technology instead. It is important for the students to realize that without a full understanding of a process, short cut technologies would not be possible.
- For Example 3, you can extend the discussion to the answer question 5 from the Investigate in more detail.

Key Concepts

- Check that students understand all the Key Concepts.

Discuss the Concepts

- Give students time to formulate their answers before discussing the questions as a class.

Discuss the Concepts Suggested Answers (page 135)

D1. Yes. For example, the set 10, 20, 20, 30 has the same mean (20), median (20), and mode (20).

D2. mode

D3. The mode can be used for categorical data. For example, if the favourite sports of students in a class are recorded, the mode should indicate the most popular sport.

Practise (A)

- Encourage students to refer to the Examples before asking for assistance.
- Have students compare their answers in pairs. Emphasize the importance of showing each step for a full solution. Do not allow students to do all the work on a calculator and simply write down an answer.

Apply (B)

- **Question 6** is a Literacy Connect. Tell students what measure of class average is used on their report cards and offer an explanation of why the school uses this average. You may wish to assign this question as a journal entry or to discuss the question as a class.

Common Errors

- Some students may still be unclear on whether the mean, median, or mode best describes a data set.

R_x Have students review the meanings of the terms. If question 12 is assigned as a class project, look at students' displays to clarify the concept.

Accommodations

Memory—prepare a K.I.M. chart to help remember new terms (K–key idea, I-information, M-memory clue)

Visual—help students develop a pictorial representation of the three measures of central tendency

Language—have a reading buddy assist with the exercises

- **Question 8** links to the Chapter Problem. Suggest students think beyond the numbers when answering part c). Remind students to keep the solution to this question handy as the methods they used may help them with the Chapter Problem Wrap-Up.
- **Question 11** is an Achievement Check question. It can be used as a summary of the work done in class and can either be done in class or at home. You may wish to use **BLM 3-10 Section 3.4 Achievement Check Rubric** to assist you in assessing your students.

Extend (C)

- Assign the Extend questions to students who are not being challenged by the questions in Apply.
- **Question 12** can be done as a small class project. Have students create a display of their findings.

Achievement Check Answers (page 139)

11. a) mean $425; median $250; mode $250

b) Answers may vary. Sample answer: The mode best represents the company salaries, since it is the salary received the most often.

Mathematical Process Expectations

Process Expectation	Questions
Problem Solving	6–9
Reasoning and Proving	3–8, 9, 11–13
Reflecting	9–11
Selecting Tools and Computational Strategies	1–4, 7–14
Connecting	3, 10
Representing	7
Communicating	3, 4, 6–9, 11, 12

Extra Practice

- You may wish to use **BLM 3-9 Section 3.4 Measures of Central Tendency** for remediation or extra practice.