



Building Concepts: Tables and Measures of Center and Spread

TEACHER NOTES

Lesson Overview

In this TI-Nspire lesson students will focus on how to find measures of center and spread when data are organized in a frequency table. Students are presented with a scenario with fixed data and they investigate strategies for finding median and IQR as well as mean and MAD. Then students are given an opportunity to collect their own frequency data and use these strategies to analyze their own data sets.



Summary measures of center and spread for a distribution of data can be determined from data presented in frequency tables.

Learning Goals

1. Find summary measures of center and spread using data presented in frequency tables;
2. understand and interpret data presented in tables;
3. recognize the difference between a dot plot and a frequency table.

Prerequisite Knowledge

Tables and Measures of Center and Spread Mean is the sixth lesson in a series of lessons that investigates the statistical process. In this lesson, students investigate measures of center and spread. This lesson builds on the concepts of the previous lessons. Prior to working on this lesson students should have completed *Medians and Interquartile Range*, *Box plots*, and *Mean as a Balance Point*. Students should understand:

- how to identify the interquartile range;
- how to identify the median of a set of data;
- how to create and interpret a box plot.

Vocabulary

- **frequency table** shows the total for each category or group of data
- **mean**: the sum of all the data values in a set of data divided by the number of data values
- **median**: the value that separates the upper half of the distribution of a set of data values from the lower half
- **interquartile range**: the difference between the upper quartile and the lower quartile
- **mean absolute deviation**: the mean of the absolute values of all deviations from the mean of a set of data

Lesson Pacing

This lesson should take 50–90 minutes to complete with students, though you may choose to extend, as needed.

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Lesson Materials

- Compatible TI Technologies:



TI-Nspire CX Handhelds,



TI-Nspire Apps for iPad®,



TI-Nspire Software

- Tables and Measures of Center and Spread_Student.pdf
- Tables and Measures of Center and Spread_Student.doc
- Tables and Measures of Center and Spread.tns
- Tables and Measures of Center and Spread_Teacher Notes
- To download the TI-Nspire activity (TNS file) and Student Activity sheet, go to <http://education.ti.com/go/buildingconcepts>.

Class Instruction Key

The following question types are included throughout the lesson to assist you in guiding students in their exploration of the concept:



Class Discussion: Use these questions to help students communicate their understanding of the lesson. Encourage students to refer to the TNS activity as they explain their reasoning. Have students listen to your instructions. Look for student answers to reflect an understanding of the concept. Listen for opportunities to address understanding or misconceptions in student answers.



Student Activity: Have students break into small groups and work together to find answers to the student activity questions. Observe students as they work and guide them in addressing the learning goals of each lesson. Have students record their answers on their student activity sheet. Once students have finished, have groups discuss and/or present their findings. The student activity sheet can also be completed as a larger group activity, depending on the technology available in the classroom.



Deeper Dive: These questions are provided for additional student practice and to facilitate a deeper understanding and exploration of the content. Encourage students to explain what they are doing and to share their reasoning.

Mathematical Background

As noted in Lesson 2, *Medians and Interquartile Ranges*, organizing data is an important step in understanding the stories the data may convey. Some data are presented in a long list of values, sometimes in graphs, but often data are presented using a frequency table where repeated data values are summarized by a count. In earlier lessons students learned two approaches to finding measures of center and spread; the median and interquartile range and the mean and mean absolute deviation. This lesson focuses on how to find these measures when the data are presented in a frequency table.

A graphical representation of the data in frequency tables can help students interpret the rows and columns in the tables. Students need time to internalize what is being counted and which value is the count.

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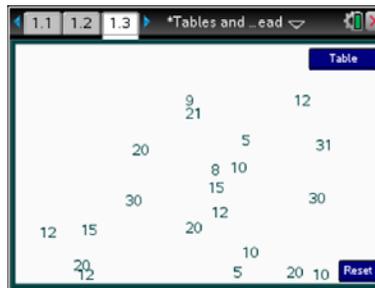
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Part 1, Page 1.3

Focus: Data summarized in frequency tables can be used to find the mean, median and interquartile range.

On page 1.3, the data represent the number of caps owned by each student in a seventh-grade classroom.

Table shows a table of the data.



Graph shows a dot plot of the data, and is only available once the table is displayed.

Add Column displays a frequency count of the data, then the total number of caps, then the cumulative frequency, and finally the cumulative sum.

Selecting a value in C. Freq. or C. Sum highlights the values in Freq. or Tot. Sum that led to the one selected. (Note that C. Freq. stands for cumulative frequency and C. Sum for cumulative sum.)

Up/Down arrows show the values in frequency or total sum that lead to the cumulative frequency or cumulative sum that is selected.

Reset displays a new set of data.

TI-Nspire Technology Tips

menu accesses page options.

tab moves between C. Frequency and Relative Frequency

enter moves between Table/Add Graph/Add Column.

ctrl del resets the page.

Class Discussion

The following questions revisit measures of center and spread (median/interquartile range and mean/mean absolute deviation).

The data on page 1.3 represent the number of caps owned by each student in a seventh grade classroom. For example, the number 9 represents a student who owns 9 caps.

- **Do any students in the class have the same number of caps?** Answer: Yes, for example, two own five caps and four own 20 caps.
- **What is the most number of caps owned by any student?** Answer: 31
- **What is the range in the number of caps students own?** Answer: $31 - 5 = 26$ caps

Organizing data can make it easier to answer question like those above as well as help you get a better sense of the distribution of the data. One way to do this is to make a table.

Select Table.

- **How many students owned 8 caps?** Answer: 1 student.



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Class Discussion (continued)

- **Tami said that a table was the same as a dot plot but on its side. What would you say to Tami?**
- **Select Graph. How does the dot plot compare to the frequency table?**
- **Explain what the dots at 30 represent.**

Answer: A dot plot is organizing data on a number line. The vertical axis for the frequency table is not a number line; for example, 21 and 30 are right next to each other but so are 30 and 31 so the spacing is different.

Answer: It still shows the frequency of the number of caps students had, but the dots are spaced out on a number line.

Answer: Two students in the class each had 30 caps.

Select Add Column.

- **Explain what the two new columns represent.**
- **Select Add Column again. What do the three columns represent?**
- **Select Add Column once more. Select the cell in the third row labeled C. Freq. Steph noted that the 4 in this cell was the sum of the cells up to the third row in the column labeled Freq. Is she correct?**
- **The Cs in the fourth and fifth columns stand for Cumulative. Find the total number of caps for the first two rows of the table. How does the total compare to the second cell in the column Cumulative Sum?**

Answer: The first column represents a number of caps, and the second column represents the number of students who have that number of caps. For example, 4 students have 12 caps.

Answer: The first column is a number of caps and the second column is the number of students who have that many caps (2 students each have 5 caps). The third column represents the total number of caps owned by the students in that row; for example, two students have five caps for a total of ten caps.

Answer: Yes, $2 + 1 + 1 = 4$.

Answer: The total number of caps in the first two rows is 18; when you select the cell in the second row of the C. Sum column, it is 18 and highlights the first two rows in the total caps column.

Answer each of the following. Explain how the table helped you find your answer.

- **What is the total number of caps owned by the students in the class?**

Answer: The total number of caps is 327; it is the last cell in the column C. Sum, and when you select that cell, all of the cells in the total caps column are highlighted.



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Class Discussion (continued)

- **How many students are in the class?**

Answer: The class has 21 students. When you select the last cell, 21, in the C. Freq column, all of the cells in the Freq column are highlighted. There are also 21 dots on the dot plot.

- **Remember how to find a mean (see the lesson Mean as Fair Share). Find the mean number of caps for students in the class. Explain what the number tells you. (You may want to use the scratchpad for the arithmetic.)**

Answer: The mean would be the Cumulative Sum divided by the Cumulative Frequency, $\frac{327}{21} \approx 15.57$ caps per student. On average, students in the class have between 15 and 16 caps each.

Another measure of center for a set of data is the median (see the Lesson Median and Interquartile Range).

- **Use the plot to find the median number of caps for students in the class. Explain what this number tells you.**

Answer: The class has 21 students so the median would be the number of caps the 11th student has when they are in order. So, the median is 12 caps, for the 11th student from the top. Half of the students have 12 or few caps and half of them have 12 or more caps.

- **Maree used the table to find the median number of caps. She counted down the frequency column until she reached the 11th student. Will her strategy work?**

Answer: Yes, because the numbers of caps per student are in order, so counting 2 people for the five caps plus 1 for the 8 caps plus 1 for the 9 caps plus 3 for the 10 caps and 4 people for the 12 caps is 11, so the median number of caps would be 12.

- **Timon rewrote the numbers so they went 5, 5, 8, 9, 10, 10, 10, 12, 12, 12, 12, and the last 12 was the 11th so it is the median number of caps. Will Timon's strategy always be an efficient strategy? Why or why not?**

Answer: If you had a lot of students with caps, like 150, it would take a long time to write out the whole list. It would be more efficient to use the frequencies for counting to the middle.

- **Lily used the cumulative frequency column in the table, until she found a cell with 11. The number of caps associated with 11 (the first cell in the row) was the median. Which of the strategies described in the questions above do you prefer? Give a reason for your answer.**

Answers will vary. Some students might prefer Lily's strategy as the fastest and most efficient. The strategy where the plot is used to find the median number of caps will only work if you have a dot plot and will be hard to use if there are a lot of data points.

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Class Discussion (continued)

The Interquartile Range (IQR) is a way to measure the spread of the middle data values in a set.

- Use information in the table to find the IQR. Explain your reasoning.

Answer: The LQ will be the median of the lower half of the data. For 21 students, this will be the median number of caps of the bottom 10 students, which is half way between the number of caps for the 5th and 6th students, both having 10 caps. The UQ will be the median of the top half of the data, which will be half way between the number of caps for the 16th and 17th students both having 20 caps, so the UQ is 20 caps. The IQR = UQ - LQ = 20 - 10 = 10 caps. The span of the number of caps for the middle half of the students is 10.

- Tom claims that the IQR should be 21 – 9. Do you agree? Why or why not?

Answer: Tom is not right. He is using the position of the number of caps a student has in the order (of the 10 entries in the number of caps column, he is thinking of the 7th number down minus the fifth number down) rather than the number of caps in that position.

- Anita says the IQR should be from 10 to 20 caps. What would you say to Anita?

Answer: She is giving the interval from the LQ to the UQ. The IQR is a number, UQ - LQ .

Part 1, Page 1.5

Focus: Data summarized in frequency tables can be used to find the mean, median and interquartile range.

On page 1.5, a dot plot of the cap data can be displayed along with summary values.

Dot Plot displays a dot plot of the data.

Show Mean and **Show Median** display the respective statistics.



TI-Nspire Technology Tips

menu accesses page options.

tab moves between show mean and show median.

enter displays a dot plot, and activates summary measures.

ctrl **del** resets the page.



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Student Activity Questions—Activity 1

1. Page 1.5 shows the original data in a table and dot plot.

a. Estimate the balance point of the distribution.

Answers may vary. Students should remember that the mean is the balance point and so the distribution should balance between 15 and 16.

b. Select **Show Median** and **Show Mean**. How do the two measures of center compare? Give a reason for the difference.

Answer: The median is about 3.5 caps smaller than the mean, probably because of the three students who own 30 and 31 caps.

Part 1, Page 1.7

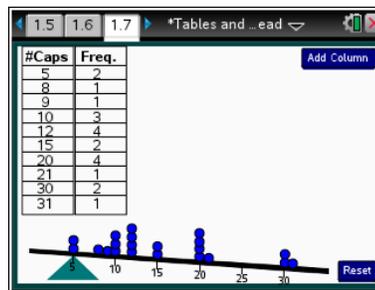
Focus: The mean of the absolute values of the deviations from the mean and the balance point of the distribution can be calculated from data in a frequency table.

On page 1.7, the cap data is displayed in a table and dot plot with a fulcrum.

Add Column shows the deviations, the product of the deviation and the frequency of that deviation and the cumulative deviation.

Selecting a point on the number line will highlight the point, display the deviation, and highlight the deviation in the table.

Dragging or using the right and left arrows will move the fulcrum.



TI-Nspire Technology Tips

menu accesses page options.

tab cycles through the points.

enter adds columns.

ctrl **del** resets the page.



Class Discussion

Have students...

Select **Add Column**.

- **The fulcrum is at 5. Make a conjecture about what the new column represents. How does your conjecture explain the 0 and the 3 in the first two rows of the column?**

Look for/Listen for...

Answers may vary. Students might remember deviations from Activity 5, *Mean as Balance Point*. The 0 could indicate that 5 deviates from the fulcrum 0 units; the 3 could be that 8 is 3 units from the fulcrum.



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Class Discussion (continued)

- **If the fulcrum was at 8, predict the numbers in the first two cells in the column Dev (deviations). Then move the fulcrum to 8 and select one of the 5s in the dot plot to check your prediction.**
- **Select the point representing the number of caps with the largest deviation from 8.**
- **Select Add Column. Explain what the cells in the new column represent.**
- **Select the cell in the C. Dev column with -5. Use the highlighted cells to explain what -5 represents.**
- **Select 159 in the column C. Dev and explain what it represents.**
- **Predict what the first two rows of the table will be if you drag the fulcrum to 10. Then use the TNS activity to check your prediction.**

Caps	Freq	Dev	Dev x Freq	C. Dev

Deselect any highlighted value. Drag the fulcrum until the last cell in C. Dev = 0.

- **Use the information in the Deviation column to find the location of the fulcrum. Explain your reasoning.**

Answers may vary. Students might predict that the cells would be -3 and 0, which would be the deviations from the fulcrum. Selecting the point shows a segment of length 3 from 5 to 8.

Answer: 31, which is 23 away from 8.

Answer: the student with 5 caps was three below the student with 8 caps (-3) and two students had five caps, so the sum of the deviations from 8 for 5 caps is -6, 6 caps below 8.

Answer: -5 is the sum of the deviations below 8 for the two five caps and the 1 above 8 for the 9 caps related to that cell, i.e., $(-6 + 0 + 1 = -5)$ where. -6 is the total deviation of the two 5 caps from 8 caps, 0 is the deviation of 8 caps from 8 caps, and 1 is the deviation of the 9 caps from 8 caps).

Answer: 159 is the last cell in the C. Dev column and represents the sum of all of the deviations from 8 for all of the different numbers of caps.

Answer:

Caps	Freq	Dev	Dev x Freq	C. Dev
5	2	-5	-10	-10
8	1	-2	-2	-12

Answer: At 15, the deviation is -0.57 so the location of the fulcrum is at 15.57.



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Class Discussion (continued)

- **Highlight the point at 21 on the number line. Explain what the segment represents and what the entries in the row corresponding to this point tell you.**
- **Examine the dot plot and highlight points above and below the mean that seem to be about the same distance from the mean. What are these points?**
- **What does cumulative deviation = 0 tell you about the deviations?**

Answer: The segment shows that the difference between the mean and 21 caps is 5.43 caps. The row indicates that one person had 21 caps, which was 5.43 caps above 15.57, the mean number of caps. The sum of the cumulative deviations was -44.26 , which is the total of all the deviations from the mean beginning with the five caps owned by two students.

Answer: The three points at 10 are 5.57 deviations below the mean and the point at 21 is 5.43 deviations above the mean.

Answer: The sum of the deviations of each number of caps from 15.57 is 0. That is, if you find how far each number of caps is from 15.57 and add them all up, the sum will be 0.

Look at the number line.

- **What is the difference in the display of the number line when the fulcrum is at the point where the last cell in C. $Dev = 0$ and when it is at other points on the number line?**
- **Interpret the 0 in the last cell in the cumulative deviations column in terms of the deviations from the mean.**
- **When the number line is balanced on the fulcrum, find the sum of the positive differences. How does it compare to the sum of the negative differences? (You may want to work with a partner, with one of you using the TI-Nspire scratchpad and the other reading the values from the table.)**
- **Explain how the deviations are related to the notion of mean as balance point.**

Answer: The number line is balanced (horizontal) when the last cell is 0, but the right end is lower for numbers below 15.57 and higher for numbers greater than 15.57.

Answer: The 0 indicates that the sums of the positive and negative deviations from the mean are opposite and cancel each other out.

Answer: 67.44 and -67.41 . The two values are almost the same and would be the same except for rounding when calculating with the mean.

Answer: You can think of the positive and negative deviations as balanced around the mean; which is why the number line is horizontal or balanced when the fulcrum is at the mean.

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Class Discussion (continued)

The mean absolute deviation is the sum of the absolute deviations divided by the total number of deviations.

- **What is mean absolute deviation for the number of caps owned by the students in the class? Interpret this value in terms of the students in class.**
- **How does the mean \pm MAD interval length compare to the IQR you found in the question above?**

Answer: The MAD is about 6.42 caps, which indicates that the typical difference in the number of caps students have from the mean of 15.57 caps is about six caps.

Answer: The IQR is 10 caps, going from 10 to 20. The MAD is 6.42 caps. The length of the interval determined by the mean +MAD and the mean-MAD (from 21.99 to 9.15) is 12.84 caps, which is almost 3 caps larger than the IQR.

Part 1, Page 1.9

Focus: The mean of the absolute values of the deviations from the mean, the balance point of the distribution, can be calculated from data in a frequency table.

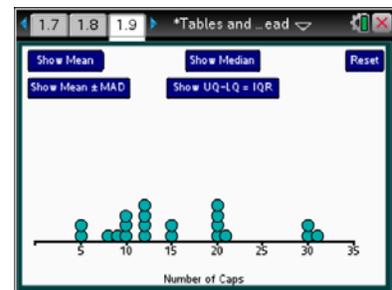
On page 1.9, a dot plot of the data is displayed.

Show Mean shows the mean number of caps.

Show Mean \pm MAD shows a bar stretching one MAD above and below the mean.

Show Median shows the median number of caps.

Show UQ – LQ = IQR shows a bar representing the IQR stretching from LQ to UQ.



Class Discussion

Have students...

Go to page 1.9. Show the Mean, Mean \pm MAD, Median and UQ-LQ=IQR. What do you notice about the graphical representations of the measures of center and spread?

Look for/Listen for...

Answers may vary. The Median is in the far left of the interval determined by the IQR and seems pretty far below the mean number of caps.



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Student Activity Questions—Activity 2

1. Identify the following as always true, sometimes true, or never true. Give an example using the TNS activity to support your thinking.
 - a. When the sum of the deviations from a given point is 0, that point will be the mean of the distribution.

Answer: Always. When the deviations of the number of caps from a given number of caps was 0, the given number was the mean of 15.57.



Student Activity Questions—Activity 2 (continued)

- b. If n people have m objects, the total number of objects is mn .

Answer: Always, this is what happened in the frequency table with the caps.
- c. You can find the median of a set of data using the values given in a frequency table.

Answer: Always; you can count using the numbers of entries in the frequency table to find the median or middle point.

- d. A frequency distribution is the same as a dot plot.

Answer: Sometimes, if the frequencies are equally spaced like on a number line. The frequency distribution of the data in the cap example was not dot plot.

Part 2, Pages 2.2 and 2.3

Focus: Students analyze their own data by entering the data into a frequency table and using what they learned in their prior work to find the summary measures of center and spread.

This section allows students to revisit the ideas in Part 1. Students might work in pairs to answer the following questions.

On page 2.2, students can enter data in the table; noting the maximum number in the frequency column is 10. The commands behave as they did on page 1.3. On page 2.4, the commands behave as they did on page 1.7.

#Caps	Frequency



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Student Activity Questions—Activity 3

1. A second class had four students who each had 7 caps, six students with 2 caps, one student with no caps, eight students with 10 caps and three students with 5 caps.

- a. How many students were in the class?

Answer: 22 students. (Be sure the one student with no caps is included in the table.)

- b. What was the total number of caps the students in the class owned?

Answer: $28 + 12 + 0 + 80 + 15 = 135$ caps

- c. Enter the data into the table on page 2.2. Use the columns in the table to verify your answers to a and b.

Answer: The columns for cumulative frequency and cumulative caps support (or not) my answers.

- d. Select *Graph*. Describe the distribution.

Answer: The distribution is bimodal; one group of students with 10 caps and then another group of students who have 2 caps. The “middle” looks like it might be around 5 or 6 caps.



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Student Activity Questions—Activity 3 (continued)

2. Use the TNS activity to answer the following.
 - a. Find the median and IQR for the number of caps for this class.
Answer: The median number of caps is 7; the IQR is $10 - 2 = 8$ caps.
 - b. Make a conjecture about the values of the mean and mean \pm MAD and how they will compare to the median and IQR.
Answers will vary. Students might anticipate a mean of 5 because it is “in the middle”, with a IQR of about 3.
 - c. Find the mean and IQR and check your conjecture in b.
Answer: mean = 6.14 and interval determined by the mean \pm MAD would be about 6.24.
3. Enter the data for the number of caps owned by students in your class (note that no one entry can have more than 10 students).
 - a. Describe the distribution.
 - b. Find the measure of center and spread you would like to use to describe the number of caps of students in your class.
Answers will vary.



Deeper Dive

- **Explain why the mean is a “balance point” in a distribution of data. Use an example from the TNS activity to support your reasoning.**
Answers will vary. Students might argue that the “teeter totter” in the TNS activity is balanced at the mean, but they should recognize that is because the sum of the deviations below the mean balances the sum of the deviations above the mean.
- **Which of the following makes sense?**
 - a. *Half of the people in the class own below the mean number of caps.*
 - b. *The average person in the class is female.*
 - c. *The median is the midpoint between the most and least value in the data set.*
 - d. *The number of caps he owns is exceptionally average.*
 - e. *The mean will be the value that is the most common value in a set of data.*
 - f. *The median and the mean will never be the same.*

Answer: All of the statements are false.



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Sample Assessment Items

After completing the lesson, students should be able to answer the following types of questions. If students understand the concepts involved in the lesson, they should be able to answer the following questions without using the TNS activity.

1. The table gives the test scores of a number of students.

Score	Number of Students
95	50
90	120
85	170
80	60
75	10

How many students were tested?

Answer: 410

2. Which of the following methods will produce the mean score for the students?

a. $\frac{(95 + 90 + 85 + 80 + 75)}{5}$

b. $\frac{(50 + 120 + 170 + 60 + 10)}{5}$

c. $\frac{[95(50) + 90(120) + 85(170) + 80(60) + 75(10)]}{(95 + 90 + 85 + 80 + 75)}$

d. $\frac{[95(50) + 90(120) + 85(170) + 80(60) + 75(10)]}{(50 + 120 + 170 + 60 + 10)}$

Answer: d. $\frac{[95(50) + 90(120) + 85(170) + 80(60) + 75(10)]}{(50 + 120 + 170 + 60 + 10)}$

3. What is the median score for the students?

- a. 90
- b. 80
- c. 82.5
- d. 85

Answer: d. 85



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4. What is the interquartile range?
- a. 5
 - b. 10
 - c. 80 to 90
 - d. 85 to 90

Answer: a. 5

5. The number of books read by students in the last month is given in the table.

Number of books	Number of Students
0	8
1	4
3	6
5	4
12	1

- a. The mean is 2.35. What number of books read will be the largest deviation from the mean?

Answer: 12 will be $12 - 2.35 = 9.65$

- b. What is the sum of the deviations from the mean?

Answer: 0

- c. The sum of the deviations below the mean is -24.2 . What is the sum of the deviations above the mean?

Answer: 24.2



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Student Activity Solutions

In these activities you will interpret data presented in tables and find the mean, median, and interquartile range of a set of data. After completing the activities, discuss and/or present your findings to the rest of the class.



Activity 1 [Page 1.5]

1. Page 1.5 shows the original data in a table and dot plot.

a. Estimate the balance point of the distribution.

Answers may vary. Students should remember that the mean is the balance point and so the distribution should balance between 15 and 16.

b. Select **Show Median** and **Show Mean**. How do the two measures of center compare? Give a reason for the difference.

Answer: The median is about 3.5 caps smaller than the mean, probably because of the three students who own 30 and 31 caps.



Activity 2 [Page 1.9]

1. Identify the following as always true, sometimes true, or never true. Give an example using the TNS activity to support your thinking.

a. When the sum of the deviations from a given point is 0, that point will be the mean of the distribution.

Answer: Always. When the deviations of the number of caps from a given number of caps was 0, the given number was the mean of 15.57.

b. If n people have m objects, the total number of objects is mn .

Answer: Always, this is what happened in the frequency table with the caps.

c. You can find the median of a set of data using the values given in a frequency table.

Answer: Always; you can count using the numbers of entries in the frequency table to find the median or middle point.

d. A frequency distribution is the same as a dot plot.

Answer: Sometimes, if the frequencies are equally spaced like on a number line. The frequency distribution of the data in the cap example was not a dot plot.



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Activity 3 [Page 2.2]

1. A second class had four students who each had 7 caps, six students with 2 caps, one student with no caps, eight students with 10 caps and three students with 5 caps.

- a. How many students were in the class?

Answer: 22 students. (Be sure the one student with no caps is included in the table.)

- b. What was the total number of caps the students in the class owned?

Answer: $28 + 12 + 0 + 80 + 15 = 135$ caps

- c. Enter the data into the table on page 2.2. Use the columns in the table to verify your answers to a and b.

Answer: The columns for cumulative frequency and cumulative caps support (or not) my answers.

- d. Select **Graph**. Describe the distribution.

Answer: The distribution is bimodal; one group of students with 10 caps and then another group of students who have 2 caps. The “middle” looks like it might be around 5 or 6 caps.

2. Use the TNS activity to answer the following.

- a. Find the median and IQR for the number of caps for this class.

Answer: The median number of caps is 7; the IQR is $10 - 2 = 8$ caps.

- b. Make a conjecture about the values of the mean and mean \pm MAD and how they will compare to the median and IQR.

Answers will vary. Students might anticipate a mean of 5 because it is “in the middle”, with a IQR of about 3.

- c. Find the mean and IQR and check your conjecture in b.

Answer: mean = 6.14 and interval determined by the mean \pm MAD would be about 6.24.

3. Enter the data for the number of caps owned by students in your class (note that no one entry can have more than 10 students).

- a. Describe the distribution.

Answers will vary.

- b. Find the measure of center and spread you would like to use to describe the number of caps of students in your class.

Answers will vary.