Task 11

Overview

Analyze and interpret a graph.
Reason about measures of center.

Library Books

Short Task

Task Description

Students are given a bar graph depicting the number of books students have checked out from the library. They are to use the graph to answer questions. They are also asked to reason about measures of center.

Assumed Mathematical Background

It is assumed that students have had experience with interpreting graphs and using and reasoning about statistical measures.

Core Elements of Performance

- interpret a bar graph
- explain differing values for mean and median
- reason about measures of center

Circumstances

Grouping:	Students complete an individual written response.
Materials:	No special materials are needed for this task.
Estimated time:	15 minutes

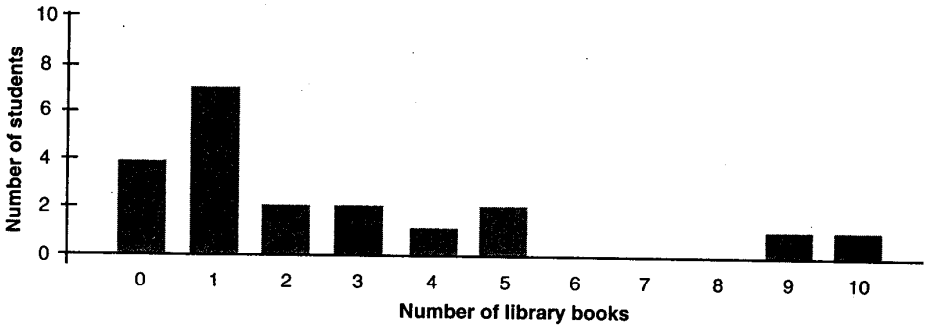
Name Date

Library Books

This problem gives you the chance to

- *use knowledge of statistics to analyze and interpret data in a graph*
- *justify choice of measure of center*

Nigel made a graph showing how many books were taken from the library by students in his class in the last week.



1. How many books have been taken out of the library by Nigel's class? Explain how you got your answer.

2. Mika and Jose are the only students in the class who have started working on a big report. How many books do you think that Mika and Jose have each checked out?

   Mika: _____ Jose: _____

   Explain your reasoning.

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Name Date

3. Nigel said, "The mean number of library books that students have is 2.5." Jose said, "The median number of library books that students have is 1!"

   Ms. Estaphan said, "You are both correct!"
   Why are these two averages different?

4. Which average would you choose to tell what is the typical number of books checked out by the students? Explain why.

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Task 11 A Sample Solution

1. Fifty books have been taken out of the library by Nigel's class.

(0 books per student)	× (4 students)	=	0 books
(1 book per student)	× (7 students)	=	7 books
(2 books per student)	× (2 students)	=	4 books
(3 books per student)	× (2 students)	=	6 books
(4 books per student)	× (1 student)	=	4 books
(5 books per student)	× (2 students)	=	10 books
(6 books per student)	× (0 students)	=	0 books
(7 books per student)	× (0 students)	=	0 books
(8 books per student)	× (0 students)	=	0 books
(9 books per student)	× (1 student)	=	9 books
(10 books per student)	× (1 student)	=	10 books
		Total =	50 books

2. Mika may have checked out 9 books and Jose 10 books or vice versa. It is reasonable to assume this since they are the only ones working on reports.

3. The mean and median are different because they are two different measures of center, two different types of average. The mean is the number of books each student would have if books were distributed and each student had the same number of books. To find the mean number of books you could divide the total number of books by the number of students: 50 books ÷ 20 students = 2.5 books per student.

   The median is the number of books that half the class has more than (or equal to) and half the class has less than (or equal to). To find the median, one could list in order the number of books checked out by the students. Since there are an even number of students in this class, 20, halfway between the 10th and 11th entry is the median. Since both the 10th and 11th entries are 1 book, 1 is the median. (If the middle two entries were different amounts, then the median would be halfway between them.)

4. Response A: I would choose 2.5 books as the typical number of books checked out because the mean spreads everything out evenly. Thus, 2.5 represents the number of books each student would have if the books were equally distributed.

   Response B: I would choose 1 book as the typical number of books checked out because 1 book represents the middle of the data set. Half the students have 1 or fewer books checked out and half the students have 1 or more books checked out. Also, the two students who checked out 9 and 10 books skewed the mean upward. In this class they are like outliers.