Representing Data Carefully
Extend Your Learning

After watching the video, *Representing Data Carefully*, complete the following problems.

1. Since most people have a strong intuition about the behavior of straight lines, we like it when data form a relatively straight line as opposed to a more complicated curve. It turns out, that for the smooth curves we often encounter, if we restrict our attention to a very small region, they look like lines.

   Over a 12-month period, the assets of a business are approximated by $y = \frac{x^3}{125} - \frac{x}{2} + 10$, where x is the number of months since the start of last year and y is measured in tens of thousands of dollars.

   a. Graph this curve over the interval $0 \le x \le 12$, $0 \le y \le 20$ using a graphing calculator or computer. Is it linear?

   b. Now we are going to examine the first half of month six. Graph this curve over the interval $6 \le x \le 6.5$, $8.65 \le y \le 9$. Does the curve look like a straight line?

   c. Find an x-range centered about x = 10 and an accompanying y-range for which the curve looks linear.

2. When choosing a measure of center, sometimes the mean is the largest number, sometimes the median is the largest, and sometimes the mode is the largest.

   a. Find a small set of data for which mean < median < mode.

   b. Find a small set of data for which mean < mode < median.

   c. Find a small set of data for which median < mean < mode.

   d. Find a small set of data for which median < mode < mean.

   e. Find a small set of data for which mode < median < mean.

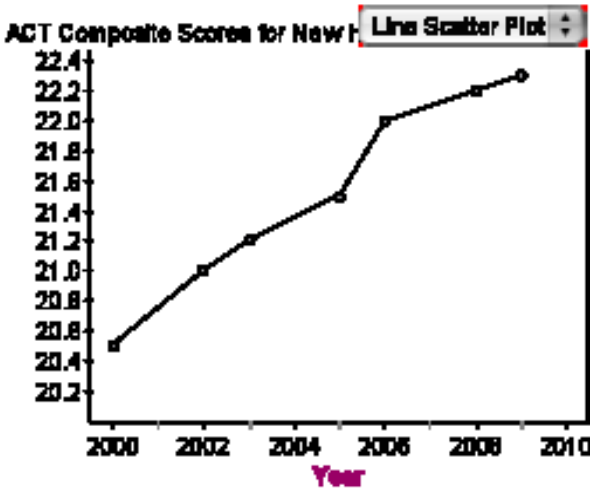
   f. Find a small set of data for which mode < mean < median.

3. A new bakery, called Scratch, recently opened. The second month's revenues have increased by 400% from the first month (from $4,000 to $20,000). The third month is forecasted to be another increase but only an increase of 100%. Should the bakery be worried about this smaller increase?

4. Below are the mean ACT scores for New High School's graduating classes from 2000-2009. The corresponding data is on the right as well. Answer the questions using the graph and the given data.

ACT Composite Scores for New High School

	Year	ACT_coÉ	<new
1	2000	20.5	
2	2001	20.3	
3	2002	21.0	
4	2003	21.2	
5	2004	20.8	
6	2005	21.5	
7	2006	22.0	
8	2007	20.9	
9	2008	22.2	
10	2009	22.3	



MakingSense

a. Is the graph above an accurate representation of the data?

b. Create a graph that would support a claim that ACT scores have held relatively stable over the years.

c. Create a graph that would support a claim that ACT scores have been inconsistent over the years.