

Statistical Literacy ... "Now We're Reading into Things"

interpret statistics presented in the media, and explain how the media, the advertising industry, and others use and misuse statistics to promote a certain point of view



A. MINDS ON MATH

1. What's your opinion on the following statement?

Some part of an advertisement must be literally untrue to constitute misleading advertising.

2. Consider this article re: advertising by Bell Canada.



WEB-LINK



What's the point trying to be made here?



B. ACTION

- In this part of the lesson, you will be circulating through stations within the classroom.
- At each station, there will be a problem concerning misleading statistics.
- Your task is to, with the help of a partner, come up with a reason (or reasons) as to how or why each problem has the ability to mislead the reader.
 - > Record your reason(s) on stick-it-notes--one for each problem.
 - Make sure that your reason(s) can be read clearly.
 - > Keep your notes until the end of this part of the lesson.
 - At the end of the lesson, you will be asked to go back to each problem and label it with its stick-it-note.

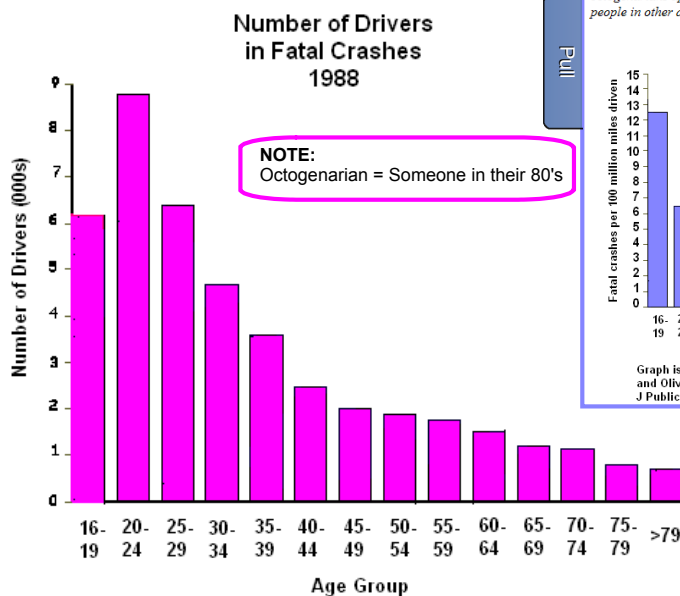
Example

Misleading Graphs

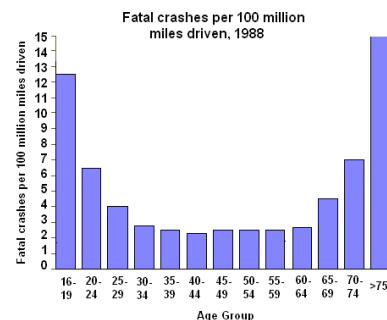
Problem Set

Example

1. The following statistics suggest that 16-year-olds are safer drivers than people in their twenties, and that octogenarians are very safe. Is this true?



Solution: No. As the following graph shows, the reason 16-year-old and octogenarians appear to be safe drivers is that they don't drive nearly as much as people in other age groups.



Graph is based on data from this study: Williams, Allan F., Ph.D., and Oliver Carston, Ph.D., "Driver Age and Crash Involvement," Am J Public Health 1989; 79: 326-327.

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Source:

<http://www.econoclass.com/misleadingstats.html>

STATION 1

Decide whether a mall is a good place to find a sample for a survey about the amount of allowance received by people ages 10 to 15.

NOTE: A *sample* is a subset (study or focus group) of the *population*. In this example, the sample is people ages 10 to 15 in a mall while the population is people of all ages in the same mall.

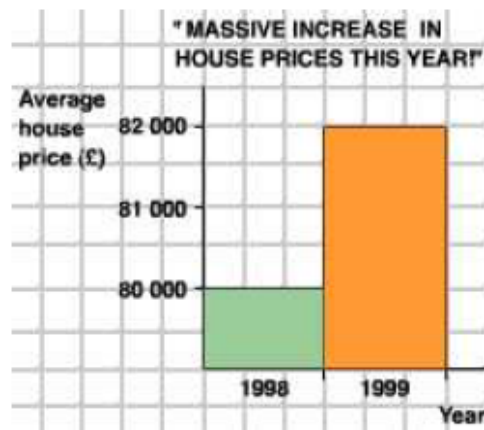
Pull

Solution.

The mall is probably not a representative place to find a fair sample of people in this age range. Taking a sample at the mall might not represent fairly those people who receive a small allowance, or none

STATION 2

Why does the bar chart below misleading? How should the information be represented?



Solution

Solution.

The bar chart indicates that house prices have tripled in one year. The scale of vertical must start at 0 and that's not the case. A less misleading graph would look like the one in Figure 31.2. This gives a much more accurate picture of what has happened.



Figure 31.2

STATION 3

What is wrong with the information represented on this graph?

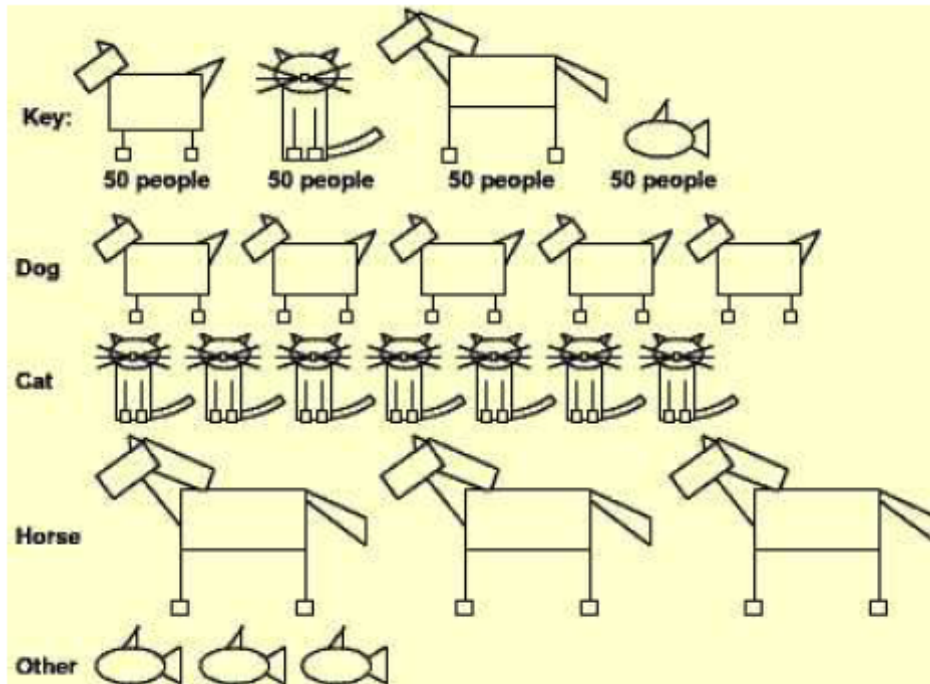


Solution.

Although the vertical scale starts at 0, it does not go up in even steps. This distorts the graph, and makes it look as though the biggest jump is between 1 and 2 rather than 3 and 4. Also, there are no labels on the axes so we have no idea what this graph represents!

STATION 4

What is wrong with this pictogram showing the number of people who own different types of pets?



Solution

Solution

On this pictogram there isn't a category for those people who do not own a pet. The pictures are different sizes and it appears that more people own a horse than any other animal.

An improvement would be to redraw the pictogram with each of the animals the same size and aligned with one another as shown in Figure 31.4.

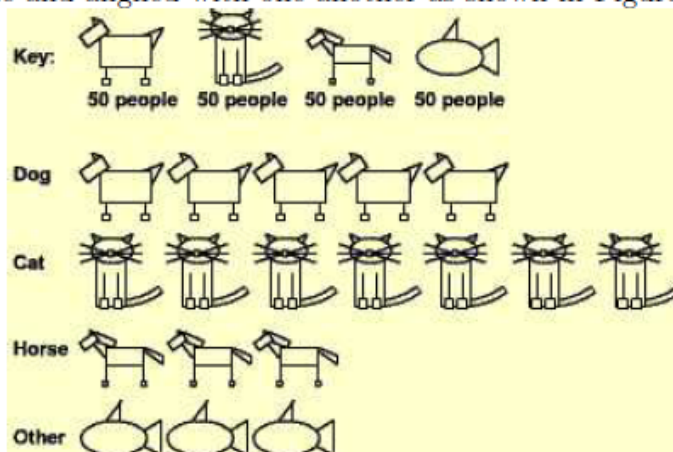
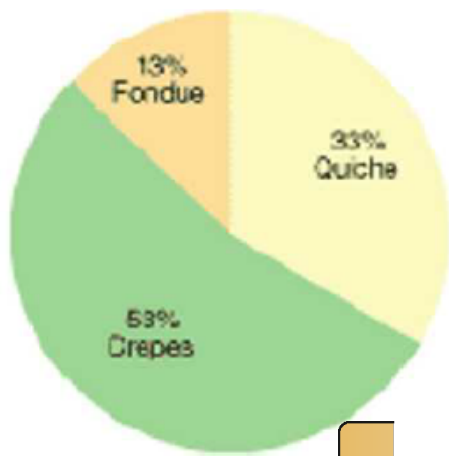


Figure 31.4

STATION 5

A survey was conducted to determine what food would be served at the French club party. Explain how the graph misrepresents the data.



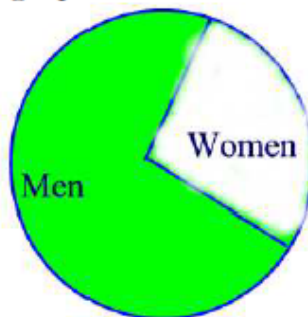
Pull

Solution.

The percents on the circle graph do not sum to 100.

STATION 6

Refer to the following pictograph:



Drivers in Fatal Accident

Ms McNulty claims that on the basis of this information, we can conclude that men are worse drivers than women. Discuss whether you can reach that conclusion from the pictograph or you need more information. If more information is needed, what would you like to know?

STATION 7

Larry and Marc took the same courses last quarter. Each bet that he would receive the better grades. Their courses and grades are as follows:

<u>Course</u>	<u>Larry's Grades</u>	<u>Marc's Grades</u>
Math(4 credits)	A	C
Chemistry(4 credits)	A	C
English(3 credits)	B	B
Psychology(3 credits)	C	A
Tennis(1 credit)	C	A

Marc claimed that the results constituted a tie, since both received 2 A's, 1 B, and 2 C's. Larry said that he won the bet because he had the higher GPA for the quarter. Who is correct?(Allow 4 points for A, 3 points for B, 2 points for C, 1 point for D, and 0 point for F.)

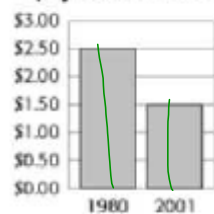
STATION 8

True or false? My rent went down 10% last year and then rose 20% this year. Over the two years my rent went up by 10%. Justify your reasoning.

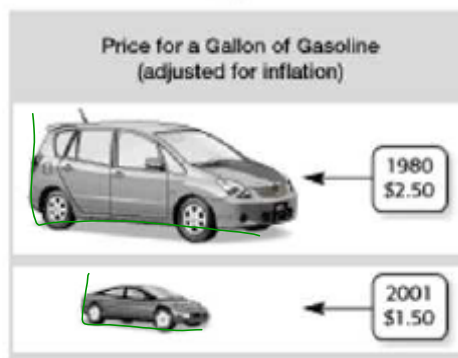
Station 9

Which graph could be used to indicate a greater decrease in the price of gasoline? Explain.

Graph A
Price for a Gallon of Gasoline
(adjusted for inflation)



Graph B



C. Consolidate

In this part of the lesson, you will be reviewing responses brought forward by your peers for each problem to see if they are valid--i.e., They *do* explain what makes the problem misleading.

As your next opportunity to learn, you will be provided with a problem set from which you'll be able to assess your own performance--i.e., How well am I doing/How well did I do?

Go to: <http://www.econoclass.com/misleadingstats.html>

- Complete as many of #2 to 12 as you can.
 - > Read each problem. Don't scroll down too far; you'll reveal the answer.
 - > Think about each problem and discuss a possible answer with your partner.
 - > Scroll down just far enough to see the answer. Were you close?
 - Complete the table below to keep track of all those situations you answered correct OR nearly correctly.
 - > Once you've finished, share your completed table with your teacher.

Problem #	Got it! (Check for 'Yes')	I (We) missed! (Check for 'No')
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Critical Analysis of Graphs

The following things are important to consider when looking at a graph:

1. Title
2. Labels on both axes of a line or bar chart and on all sections of a pie chart
3. Source of the data
4. Key to a pictograph
5. Uniform size of a symbol in a pictograph
6. Scale: Does it start with zero? If not, is there a break shown
7. Scale: Are the numbers equally spaced?

Additional Resource

<http://www.econoclass.com/misleadingstats.html>