

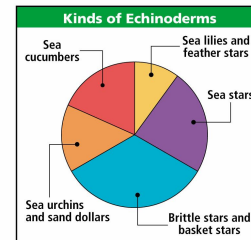
Circle Graphs and Misleading Graphs

1-5: Circle Graphs

A **circle graph**, also called a pie chart, shows how a set of data is divided into parts.

The entire circle contains 100% of the data.

Each **sector**, or slice, of the circle represents one part of the entire data set.



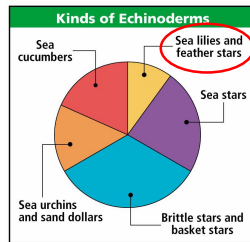
The circle graph compares the number of species in each group of echinoderms. Echinoderms are marine animals that live on the ocean floor. The name *echinoderm* means "spiny-skinned."

Additional Example 1A: *Life Science Application*

Use the circle graph to answer the question.

A. Which group of echinoderms includes the fewest number of species?

The sector for **sea lilies and feather stars** is the smallest, so this group includes the fewest number of species.

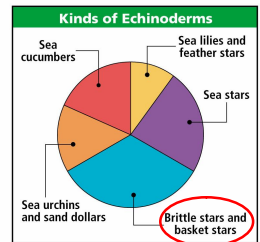


Additional Example 1B: *Life Science Application*

Use the circle graph to answer the question.

B. Approximately what percent of echinoderm species are brittle stars and basket stars?

about $\frac{1}{3}$, so approximately 33%

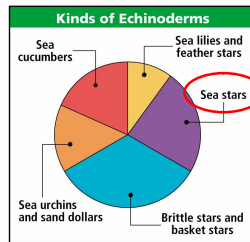


Additional Example 1C: *Life Science Application*

Use the circle graph to answer the question.

C. Which group is made up of a greater number of species, sea cucumbers or sea stars?

The sector for sea stars is larger than the sector for sea cucumbers. This means there are **more kinds of sea stars than sea cucumbers**.

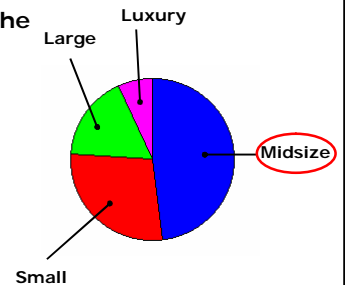


Try This: Example 1A

Use the circle graph to answer each question.

A. Which size car sold the most?

midsize

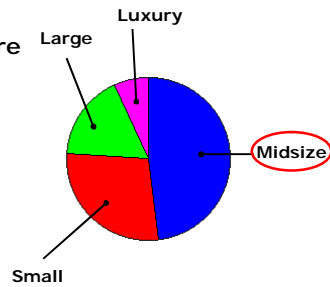


Try This: Example 1B

Use the circle graph to answer each question.

B. Approximately what percent of cars sold were midsize?

about 50%

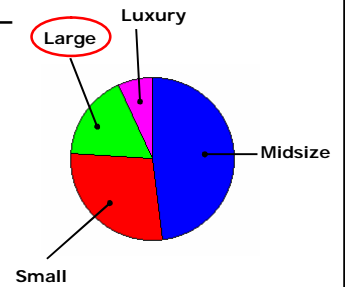


Try This: Example 1C

Use the circle graph to answer each question.

C. Which size sold less—large or small?

large

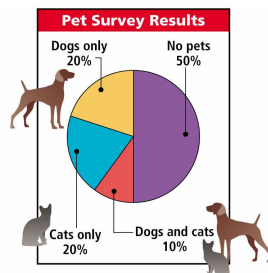


Additional Example 2A: Interpreting Circle Graphs

Leon surveyed 30 people about pet ownership. The circle graph shows his results. Use the graph to answer each question.

A. How many people own dogs only?

The circle graph shows that 20%, or one-fifth, of the people own dogs only. One-fifth of 30 is 6, so six people own dogs only.

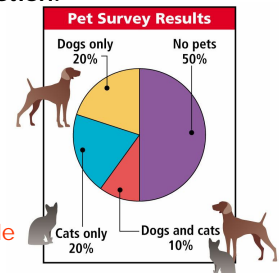


Additional Example 2B: Interpreting Circle Graphs

Leon surveyed 30 people about whether they own pets. The circle graph shows his results. Use the graph to answer each question.

B. If 60 people were surveyed and 12 people said they own dogs only, how many people own both cats and dogs?

Since 20% is 12 people, 10% is 6 people. Six people own both cats and dogs.

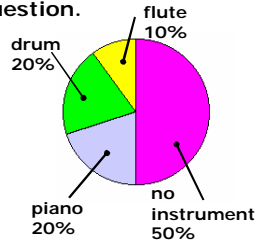


Try This: Example 2A

Fifty students were asked which instrument they could play. The circle graph shows the responses. Use the graph to answer each question.

A. How many students do not play an instrument?

The circle graph shows that 50%, or one-half, of the students play no instrument. One-half of 50 is 25, so **twenty-five students do not play an instrument.**

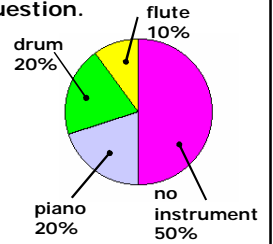


Try This: Example 2B

Fifty students were asked which instrument they could play. The circle graph shows the responses. Use the graph to answer each question.

B. Ten students said they play the piano. How many play the flute?

Since 20% is 10 students, 10% is 5 students. **Five students play the flute.**



Additional Example 3A:
Choosing an Appropriate Graph

Decide whether a bar graph or circle graph would best display the information. Explain your answers.

A. the percent of U.S. population living in the different regions of the country

A **circle graph** is the better choice because it makes it easy to see what part of the U.S. population comes from the different regions of the country.

Additional Example 3B:
Choosing an Appropriate Graph

Decide whether a bar graph or circle graph would best display the information. Explain your answers.

B. the number of tickets sold for each performance of a community play

A **bar graph** is the better choice because it makes it easy to see how the number of tickets sold changed over each performance.

Additional Example 3C:
Choosing an Appropriate Graph

Decide whether a bar graph or circle graph would best display the information. Explain your answers.

C. the comparison between the number of students on the basketball team and the total number of students on all sports teams

A **circle graph** is the better choice because the sector that represents the number of students on the basketball team could be compared to the entire circle, which represents the total number of students on all school sports teams.

Try This: Example 3A

Decide whether a bar graph or circle graph would best display the information. Explain your answers.

A. the percent of people buying a certain color of a new vehicle

A **circle graph** is the better choice. By looking at the sectors, it makes it easy to see what color people prefer.

Try This: Example 3B

Decide whether a bar graph or circle graph would best display the information. Explain your answers.

B. the number of visitors to the Grand Canyon for the last ten years

A **bar graph** is the better choice because it makes it easy to see how the number of visitors has changed over the years.

Try This: Example 3C

Decide whether a bar graph or circle graph would best display the information. Explain your answers.

C. the comparison of different themes voted on for a school party

A **circle graph** is a better choice because it makes it easy to see what theme people prefer.

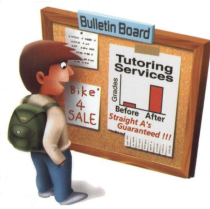
1-9: Misleading Graphs

What does it mean to mislead someone?

Some people who compile statistics and create graphs often present the results in a way that is favorable to their purpose.

What do you think could be misleading about the following statement: "Brand A is preferred two to one over other brand!"

Graphs and statistics are often used to persuade. Advertisers and others may accidentally or intentionally present information in a misleading way.

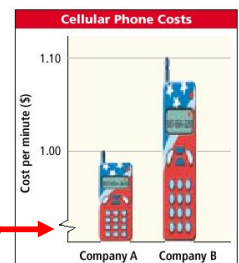


For example, art is often used to make a graph more interesting, but it can distort the relationships in the data.

A data display that distorts information in order to persuade can be *misleading*.

An axis in a graph can be "broken" to make the graph easier to read. However, a broken axis can also be misleading.

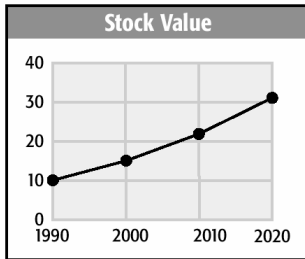
In the graph at right, the cost per minute for service with Company B looks like it is twice as much as the cost for service with Company A. In fact, the difference is only \$0.10 per minute.



Additional Example 1A: Identifying Misleading Graphs

Explain why each graph is misleading.

A.

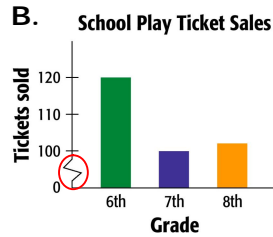


The graph suggests that the stock will continue to increase through 2020, but there's **no way to foresee the future.**

Additional Example 1B: Identifying Misleading Graphs

Explain why each graph is misleading.

B.

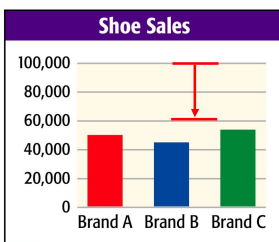


Because the scale leaves out 0 to 100 (**break in the y-axis**), the bar heights make it appear that the sixth grade sold about three times as many tickets as either of the other two grades. In fact, the sixth grade sold only about 20% more.

Additional Example 1C: Identifying Misleading Graphs

Explain why each graph is misleading.

C.



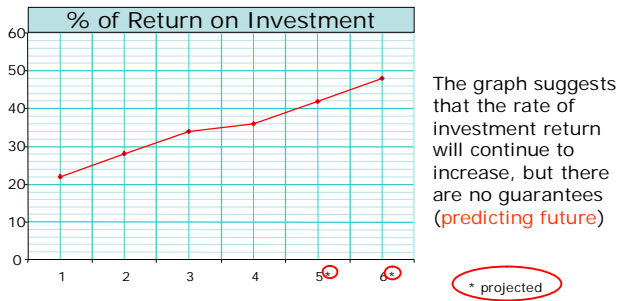
The **scale is so compressed** that it's hard to see any difference among the brands.

Common Reasons Why a Graph Might be Misleading

- There is a break in the y-axis
- The scale on the y-axis does not start at zero
- The scale is compressed
- The graph displays predictions (the future)
- There are no labels

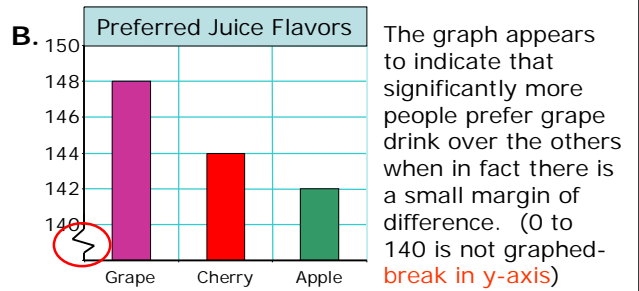
Try This: Example 1A

Explain why each graph is misleading.
A.



Try This: Example 1B

Explain why each graph is misleading.
B.



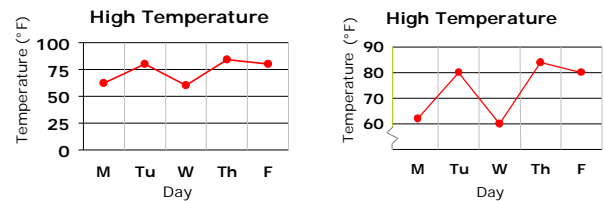
Try This: Example 1C

Explain why each graph is misleading.
C.



Additional Example 1

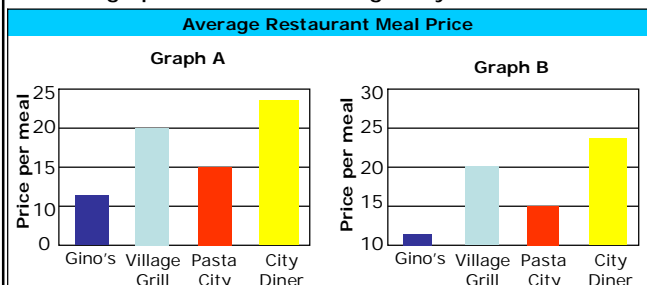
Both line graphs show the high temperature Monday through Friday. Which graph could be misleading? Why?



The graph on the right could be misleading. The vertical axis is broken, so differences in temperature appear greater.

Try This: Example 1

Which graph could be misleading? Why?

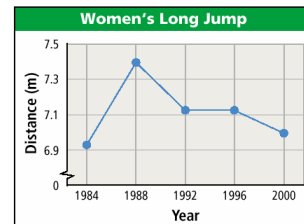


Graph B could be misleading. The vertical axis does not begin with zero, so differences in scales appear greater.

Additional Example 2A: Analyzing Misleading Graphs

Explain how you could redraw the graph so it would *not* be misleading.

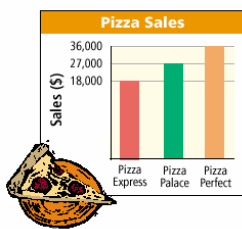
Draw the entire vertical scale on the graph.



Additional Example 2B: Analyzing Misleading Graphs

Explain how you could redraw the graph so it would *not* be misleading.

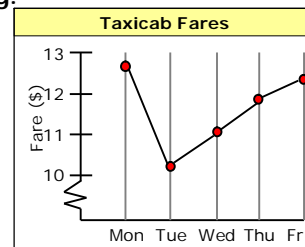
Draw the vertical scale with equal spacing between marks so that the distance between 0 and 18,000 equals the distance between 18,000 and 36,000.



Try This: Example 2A

Explain how you could redraw the graph so it would *not* be misleading.

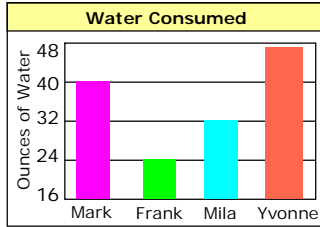
Draw the entire vertical scale on the graph. The vertical axis is broken, so differences in fare appear greater.



Try This: Example 2B

Explain how you could redraw the graph so it would *not* be misleading.

Draw the entire vertical scale on the graph. The vertical axis does not start at zero so differences in water consumed seem greater.



Can you think of any graphs you may have seen that might have been misleading?