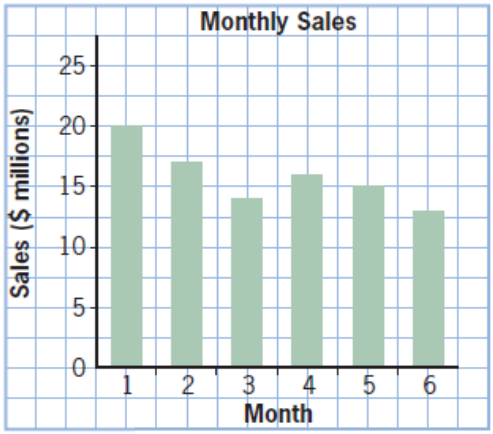
Solutions

1. The graph shows a sales trend over the past six months. Which of the following is the most appropriate title for this graph?



A Sales in sharp decline
B Sales holding steady
C Sales poised to bounce back
D Sales trend over the past six months

D

A/B/C all try to draw a conclusion conclusions

2. On a television commercial, three enthusiastic parents claim that a new home study program has done wonders for their children's progress in math. This correlational evidence is likely subject to which of the following biases?

A sample size bias
B random sample bias
C both
D neither

B

Since only **three** parents (enthusiastic at that) were asked, this is a sample size bias.

3. Which statement is least likely to have been made for a sensational purpose?

A Human and chimpanzee DNA differ by 0.7%.
B 80% of all automobile accidents occur within 40 kilometres of home.
C The unemployment rate rose this month by 0.5%.
D Three out of four people are easily impressed by statistics.

B

A - difference is 1.2% not 0.7%

B - likely to be true

C - need to see actual numbers to see if this sensationalized or not

D - evidence? based upon what?

4. In the supermarket, you see a tabloid newspaper with the following headline: "20% of America convinced the King still lives!" This headline is in reference to Elvis Presley, commonly known as the King of Rock 'n Roll, who died in 1977.

a) How reliable do you consider the data referenced in this headline to be?

b) What questions would you like answered about how the data were collected?

c) What is the likely intended use of the data?

a) Highly likely to be unreliable.

b) What was the sample size used? What sampling technique was used? - We are looking to identify if there was any bias.

c) The data is likely to be used to sell more tabloids or magazines that specialize in sensationalized stories.

The data show monthly reported UFO sightings for the period from January 1, 2010 to October 12, 2013.

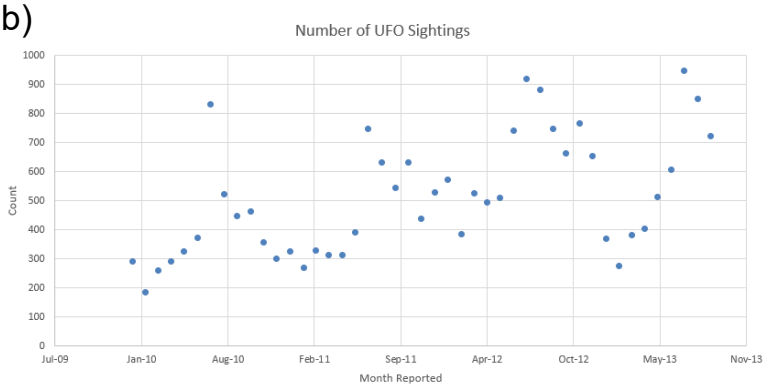
5. a) There is a clear outlier in this data set. Identify it and explain why it should be excluded from the analysis.

b) Create a scatter plot of UFO sightings versus time.

c) Does the number of UFO sightings appear to be on the rise? Explain.

Reports	Count	Reports	Count
Oct-13	34	Nov-11	440
Sep-13	723	Oct-11	634
Aug-13	850	Sep-11	546
Jul-13	947	Aug-11	634
Jun-13	609	Jul-11	749
May-13	515	Jun-11	393
Apr-13	405	May-11	315
Mar-13	383	Apr-11	315
Feb-13	275	Mar-11	328
Jan-13	369	Feb-11	270
Dec-12	654	Jan-11	325
Nov-12	766	Dec-10	302
Oct-12	664	Nov-10	358
Sep-12	747	Oct-10	465
Aug-12	884	Sep-10	448
Jul-12	919	Aug-10	524
Jun-12	741	Jul-10	833
May-12	511	Jun-10	372
Apr-12	495	May-10	327
Mar-12	527	Apr-10	293
Feb-12	387	Mar-10	261
Jan-12	574	Feb-10	186
Dec-11	530	Jan-10	291

b)



a) There is only one month that has a double digit number of sightings (October, 2013). Everything else is triple digits. The datum is significantly lower than all of the others, and as such, should be excluded.

c) It doesn't seem to necessarily be on the rise. It actually seems to rise and fall with a degree of regularity.

The data show monthly reported UFO sightings for the period from January 1, 2010 to October 12, 2013.

6. a) Describe any seasonal trends in the data.

b) Does this suggest that we are more or less likely to be visited by extra-terrestrial beings at different times of the year? Explain your thinking.

a) The count seems to rise in the summer months and then fall again during the winter months. The count of the peak month in each year seems to be increasing though.

b) Being more or less likely to be visited by extra-terrestrials during certain months is unlikely to be true. A possible reason for the cyclical count is that because people are outside more in the summer months, there are more sightings than in the winter months.

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The data show monthly reported UFO sightings for the period from January 1, 2010 to October 12, 2013.

7. a) Do you think there is bias in these data? Why or why not?

b) Identify some questions you would like answered about how the data were collected.

a) There is likely to be a voluntary response bias in the data. Anyone who claims a sighting is more likely to believe in extra-terrestrials and therefore more likely to misinterpret what they saw as a UFO sighting.

b) Is the sample representative of the population? Has the data been verified? How was the data collected? What sampling techniques(s) was used?

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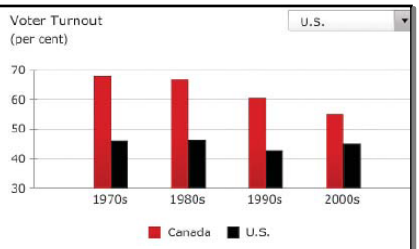
8. Are Canadian citizens politically involved? The graph below compares voter turnout for Canadian and US citizens over time.

a) **Open Question** Write a title for this graph that suggests Canada's political interest is consistently strong.

b) How could you adjust the vertical scale of the graph to emphasize your point?

c) **Open Question** Write a title for this graph that suggests Canada's political interest is declining.

d) How could you adjust the vertical scale of the graph to support your point?



a) Canadian voter turnout is still substantially more than that of the US.

b) You could reduce the y-axis to start at 40% instead of 30% to make the US bars even shorter.

c) Canada's voter turnout continues to decline.

d) Change the y-axis scale by making it bigger (increase the length between each count of 10%). Elongating the bars will give the impression of a more dramatic reduction in voter turnout.