

Unit 4 Review - Statistical Literacy

Text p. 252#1-3, 5-11, 13-15

1. The board members of a provincial organization receive a car allowance for travel to meetings. Here are the distances the board logged last year (in kilometres).

- Determine the mean, median and mode of this data set
- Determine the quartiles for this data set.
- Kelly's mileage is in the 75th percentile.
 - What does this percentile mean?
 - What was Kelly's mileage last year?

44	18	125	80
75	260	96	110
63	42	35	68
72	52	52	150

18 35 42 44
52 52 63 68
 72 75 80 96
 110 125 150 260

a) mean = $\frac{1342}{16} = 83.9$ (Add all the numbers and divide by 16.)
 median = $\frac{68+72}{2} = 70$ (The middle number. If there are two, we find the mean of both.)
 mode = 52 (# that occurs most often)

b) 2nd Quartile = 70 (same as median)
 1st Quartile = $\frac{44+52}{2} = 48$ (middle of bottom 8 numbers)
 3rd Quartile = $\frac{96+110}{2} = 103$ (middle of top 8 numbers)

c) i) 75th percentile \Rightarrow 75% of people had a smaller mileage than Kelly (they drove less)

ii) $0.75(16) = 12 \Rightarrow$ 12 people are less than Kelly
 Kelly drove 110 km (the 13th number)

2. Suppose the price of an item is \$155. Calculate the percent price increase from a base price of \$130. Round to the nearest percent.

+ Increases by 25.
 As a percent this is $\frac{25}{130} \times 100$
 $\% \text{ Increase} = \frac{155-130}{130} \times 100 = \frac{25}{130} \times 100 = 19.2\%$

3. Describe each type of sampling: stratified, systematic, cluster, convenience, volunteer.

Which forms of sampling are unbiased?

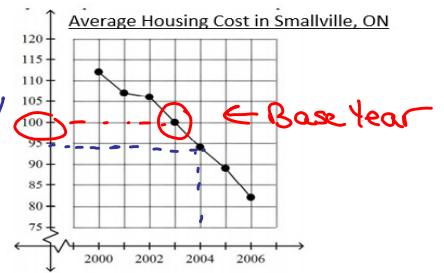
- Unbiased** {
 Stratified Sampling \rightarrow population is put into groups. A few individuals are picked from each group.
 Systematic Sampling \rightarrow Every nth individual is selected (example, every 10th person)
 Cluster Sampling \rightarrow population is put into groups and one group is chosen
- Biased** {
 Convenience Sampling \rightarrow Individuals who are easy to sample are chosen
 Volunteer Sampling \rightarrow Participants volunteer.
- * Random sampling is unbiased (stratified, systematic, cluster)
 * Non-random sampling is biased (convenience, volunteer)

4. An advertisement made the claim, "In a recent side-by-side blind taste test, more people preferred Cool Cola over Choice Cola." List 3 questions you can ask to challenge or validate this claim.

- Who was chosen to be surveyed?
- How were participants asked? (Any leading questions?)
- How many people were asked?

5. Use the graph on the right to answer the questions.

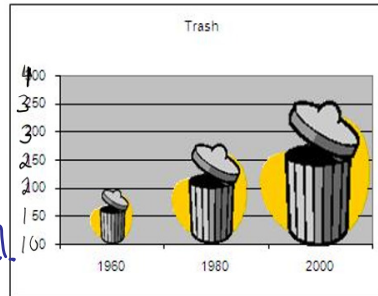
- a) What is the price index measuring? *How housing costs have changed in Smallville, ON*
- b) What was the base year? 2003
- c) What was the index value in 2004? 94%
- d) What does this index value in 2004 mean?



The price in 2004 was 94% of what it was in 2003 (6% decrease)

6. Is the following graph misleading? If so, explain why.

- The graph doesn't start at zero or show a break. This makes the increase look bigger.
- The pictures used are 3 dimensional. This makes them look bigger, and makes it difficult to read the numbers they represent.



7. Is this survey question biased? If it is, explain why.

Soy is a protein source without the cholesterol and saturated fats of meat. Should the government subsidize soy farmers? Yes No

Yes, the question is biased.

This is a leading question. By talking about the benefits of soy before asking the question, they are encouraging respondents to vote yes. They should remove the first sentence.

8. A snack food company wants to evaluate people's responses to a new cereal bar. Which group should collect the data? Why?

- a) The marketing department of the company
- b) An outside agency specializing in market surveys.

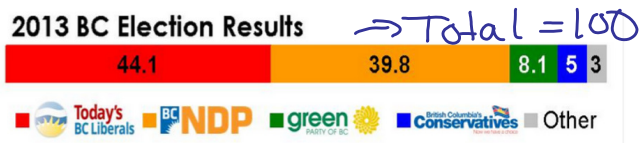
Employees of the company will want people to like their product. They want to promote a particular point of view and may not be objective. Better to have the data collected by an outside organization

9. A mayor wins a town's election with 79% of the vote. However, the election officials announce that only 37% of eligible voters cast ballots. In his victory speech, the mayor says that "79% of the citizens of our town shared my vision for our future." Is the mayor's statement justified? Why?

No, it's not justified since only 37% of eligible voters actually voted, the 79% does not represent the percent of all citizens who picked this mayor. Really only $0.79(37) = 29\%$ voted for this mayor.

10. The graph shows the BC Election Results for 2013.

- a) What percentage of respondents did not vote for the liberals?
- b) The poll's margin of error is 2.1%, 19 times out of 20. Explain what this statement means.



a) $39.8 + 8.1 + 5 + 3 = 55.9$ out of 100 $\Rightarrow 55.9\%$

b) 95% of the time, the numbers given are correct within 2.1%