

Hwk: Pg. 203: #7.

| | House 1 | House 2 | House 3 |
|-----------------|---------|---------|---------|
| List price (\$) | 324 500 | 379 000 | 299 900 |
| Sale price (\$) | 315 000 | 370 000 | 295 000 |

Find the mean, median and range?

Solution:

$$\text{Mean}_{LP} = \frac{324500 + 379000 + 299900}{3} = \$334466.67$$

$$\text{Mean}_{SP} = \frac{315000 + 370000 + 295000}{3} = \$326666.67$$

$$\text{Median}_{LP} = \$324500$$

$$\text{Median}_{SP} = \$315000$$

$$\text{Range}_{LP} = 379000 - 299900 = \$79100$$

$$\text{Range}_{SP} = 370000 - 295000 = \$75000$$

b) Since we don't know whether there are any outliers, then either the mean or the median could be used for estimating what the client's house might sell for.

Sampling Techniques and Bias

Population - entire group about which data are being collected

Sample - part of a population selected so as to gain information about the whole population

Note that if the sample is not representative of the population, it is biased and the survey results are invalid.

Sample size - can affect survey/study results. If the sample is too small, the survey results may not be reliable. If it is too great, the survey may be costly and difficult to administer.

Primary Source - a person who collects data for their own use.

Secondary Source - a database or research collected by someone else.

Sampling Techniques - Some sampling techniques are random meaning each member of the population has the same chance of being selected. A non-random technique may not yield a representative sample.

Random techniques (Look for the definitions in the glossary on Pg. 535)

- Simple random sampling
- Stratified sampling
- Cluster sampling
- Systematic sampling

Non-random Techniques

- Convenience sampling
- Judgement sampling
- Voluntary sampling

Bias - a survey contains bias if it does not reflect the population, may be caused by an unrepresentative sample, the wording of the survey questions, and/or the interpretation and presentation of the results.

Ex 1: A city has a population of 50000 people. The town council conducts a vote at a public meeting about constructing a new ice-hockey rink.

- 250 people attend the meeting.
- 200 of the people at the meeting vote in favour of the hockey rink.
- The council decides to build the hockey rink based on the number of people that support the idea.

a) What percent of the people at the meeting voted for the rink?
 b) What percent of the people in the city attended the meeting?
 c) Is the sample representative of population? Explain.

Solution:

a) $(\frac{200}{250}) \times 100\% = 80\%$ of the people at the meeting voted for the rink

b) $(\frac{250}{50000}) \times 100\% = 0.5\%$ of the people in the city attended the meeting

c) No, the sample is not representative of the population since

- * the sample is too small
- * only people who had positive feelings/attitudes about hockey attended the meeting

Example 2: A parent council survey is conducted to learn if an after-school music program should be offered. The survey question reads: Early musical training helps develop brain areas involved in language and reasoning. Should the school offer an after-school music program? Explain why this question may result in response bias.

Solution: By stating an opinion before a question has been asked, results in a response bias. Clearly, the school council wants the parents to be in favour of offering the after-school music program.

Example 3: At a new restaurant, wait staff ask every fifth customer to answer a questionnaire about food quality and service once they have finished their meal. About 30% of customers surveyed fill out the questionnaire complain about poor service. The restaurant manager concludes that the wait staff need more training. Is her conclusion reasonable?

Solution: Since we don't know how customers were selected and since only 30% of the customers surveyed filled out the questionnaire, her conclusion is not valid. This results in a non-response bias.

Homework: Pg. 214: #2,4,5,7,9,13