

Stats Review

Chapters 1 and 2

Note:

This review is composed of questions similar to those found in the chapter review and/or chapter test. This review is meant to highlight basic concepts from the course. It does not cover all concepts presented by your instructor. Refer back to your notes, unit objectives, handouts, etc. to further prepare for your exam.

The questions are displayed on one slide followed by the answers are displayed in **red** on the next.

This review is available in alternate formats upon request.

Is the underlined value a parameter or statistic?

- a) 28.2% of the mayors of cities in a certain state are from minority groups.
- b) A study of 1200 college students in the city of Aberdeen found that 1% had been victims of violent crimes.

Classify the variable as qualitative or quantitative.

- c) The bank account numbers of the students in a class
- d) The temperatures of cups of coffee served at a restaurant

Classify the variable as continuous or discrete.

- e) The age of the oldest employee at SCTCC
- f) The number of pills in an aspirin bottle

Is the underlined value a parameter or statistic?

- a) 28.2% of the mayors of cities in a certain state are from minority groups.
- b) A study of 1200 college students in the city of Aberdeen found that 1% had been victims of violent crimes.

a) **Parameter** –comes from a population

b) **Statistic** – comes from a sample

Classify the variable as qualitative or quantitative.

- c) The bank account numbers of the students in a class
- d) The temperatures of cups of coffee served at a restaurant

c) **Qualitative**

d) **Quantitative**

Classify the variable as continuous or discrete.

- e) The age of the oldest employee at SCTCC
- f) The number of pills in an aspirin bottle

e) **continuous**

f) **discrete**

Determine the level of measurement of each variable

- a) Number of pets
- b) Military Rank (Private, Sergeant, Captain, Major)
- c) Native Language of speaker
- d) Temperature measured in Celsius

Observational Studies and Designed Experiments: True or False

- a) Observational studies are not as useful as experiments to learn about the characteristics of a population.
- b) Experiments assist the researcher in isolating the causes of the relationships that exist between two variables.

Determine the level of measurement of each variable

a) Number of pets

Ratio; zero means an absence of pets

b) Military Rank (Private, Sergeant, Captain, Major)

Ordinal; order matters, can be arranged in a specific order

c) Native Language of speaker

Nominal; as order doesn't matter

d) Temperature measured in Celsius

Interval; zero doesn't mean an absence of temperature, can add and subtract temperatures

Observational Studies and Designed Experiments: True or False

a) Observational studies are not as useful as experiments to learn about the characteristics of a population.

False

b) Experiments assist the researcher in isolating the causes of the relationships that exist between two variables.

True

Find the sample of 4 cities. Use the random table provided and start from the first column and move down.

St. Cloud	1
Minneapolis	2
Brooklyn Park	3
Morris	4
Alexandria	5
Winona	6

Random Table	
5	3
4	2
7	8
1	9
4	6

Find the sample of 4 cities. Use the random table provided and start from the first column and move down.

St. Cloud	1
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Random Table	
5	3
4	2
7	8
1	9
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Procedure:

- List the cities 1-6
- Starting on the first column and working our way down, we have a 5 so Alexandria is chosen.
- 4, Morris is chosen.
- 7 is outside our range of numbers so we skip it
- 1, St. Cloud is chosen
- 4 has already been used so we skip it
- Going to the next column we have a 3 so Brooklyn Park is chosen
- We have four cities which are **Alexandria, Morris, St. Cloud, Brooklyn Park**

Determine the Sampling Method

- a) A market researcher randomly selects 250 homeowners under 50 years old and 250 homeowners over 50 years old.
- b) A plant foreman inspects the first 30 toasters produced that day.
- c) A sample consists of every 14th worker from a group of 900 workers.

Name the Type of Bias

- a) An online magazine conducted a survey by asking, "Do you support the lowering of air quality standards if it could cause the death of millions of innocent people from pollution related diseases?"
- b) A store wants to know if its customers are satisfied with the service they receive. The store posts an interviewer at the front of the store to ask the first 200 shoppers who leave the store, "How satisfied, on a scale of 1 to 5, were you with this store's service?"
- c) An auto manufacturer wants to gather information about car ownership and driving habits of the local residents. The marketing manager randomly selects 1000 households from all households in the area and mails a questionnaire to them. Of the 1000 surveys mailed, she receives 100 back.

Determine the Sampling Method

a) A market researcher randomly selects 250 homeowners under 50 years old and 250 homeowners over 50 years old.

Stratified

b) A plant foreman inspects the first 30 toasters produced that day.

Convenience

c) A sample consists of every 14th worker from a group of 900 workers.

Systematic

Name the Type of Bias

a) An online magazine conducted a survey by asking, "Do you support the lowering of air quality standards if it could cause the death of millions of innocent people from pollution related diseases?"

Response bias; poorly worded question

b) A store wants to know if its customers are satisfied with the service they receive. The store posts an interviewer at the front of the store to ask the first 200 shoppers who leave the store, "How satisfied, on a scale of 1 to 5, were you with this store's service?"

Sampling bias; the customers are not chosen through a random sample.

c) An auto manufacturer wants to gather information about car ownership and driving habits of the local residents. The marketing manager randomly selects 1000 households from all households in the area and mails a questionnaire to them. Of the 1000 surveys mailed, she receives 100 back.

Nonresponse bias

Design of Experiments Keywords

A drug company wanted to test a new acne medication. The researchers found 500 teens aged 13-19 and randomly assigned them to two groups. The first group received the new drug, while the second received a placebo. After one month of treatment, the percentage of each group whose acne outbreaks decreased was recorded and compared.

- a) What type of experimental design is this?
- b) What is the response variable in this experiment?
- c) What is the treatment in this experiment?
- d) How many levels does the treatment in this experiment have?
- e) Identify the experimental units.

Design of Experiments Keywords

A drug company wanted to test a new acne medication. The researchers found 500 teens aged 13-19 and randomly assigned them to two groups. The first group received the new drug, while the second received a placebo. After one month of treatment, the percentage of each group whose acne outbreaks decreased was recorded and compared.

a) What type of experimental design is this?

completely randomized design

b) What is the response variable in this experiment?

The percentage who had decreased acne outbreaks

c) What is the treatment in this experiment?

The drug

d) How many levels does the treatment in this experiment have?

2 (placebo and drug)

e) Identify the experimental units.

500 teens aged 13-19

Construct a relative frequency distribution.

Response	Frequency
Never	125
Rarely	324
Sometimes	552
Most of the Time	1257
Always	2518

Construct a relative frequency distribution.

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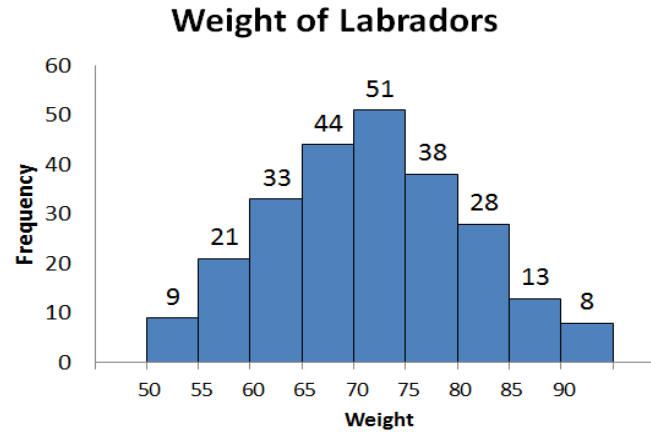
- 1) Find the total number of responses (i.e. add up the frequencies).

Total=4776

- 1) Divide each frequency by the total
ex. $125/4776=0.0262$

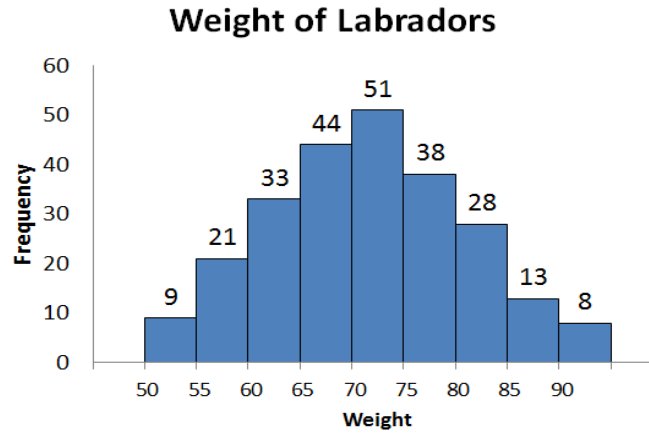
Response	Relative Frequency
Never	0.0262
Rarely	0.0678
Sometimes	0.1156
Most of the Time	0.2632
Always	0.5272

Histogram Interpretation



- a) How many Labradors were weighed?
- b) Determine the class width
- c) Determine the shape
- d) Which class has the lowest frequency?
- e) What percent of Labradors have a weight of at least 80?

Histogram Interpretation



a) How many Labradors were weighed?

Add up the frequencies = **245**

b) Determine the class width

5 ($55-50=5$ or $60-55=5$)

c) Determine the shape

Bell-shaped

d) Which class has the lowest frequency?

90-100

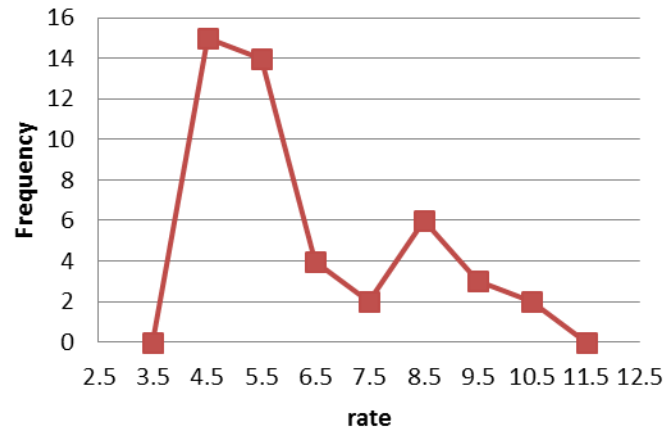
e) What percent of Labradors have a weight of at least 80?

i) Add up frequencies for classes 80 and above. This total =49

ii) Divide by the total number of labs $49/245=.2$

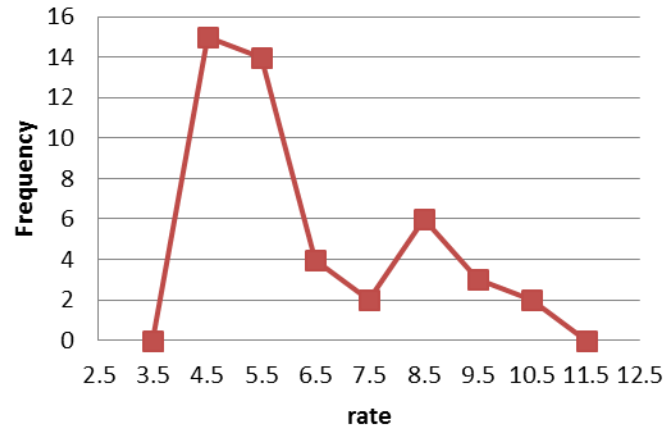
iii) **20%**

Graphical Interpretation



- a) What type of graph is this?
- b) What is the class width?
- c) How many classes are represented?
- d) What is the midpoint of the first class? The last class?
- e) What are the upper and lower limits of the first class? The last class?
- f) Estimate the relative frequency for the class 6-6.99. (Hint the total is 46)

Graphical Interpretation

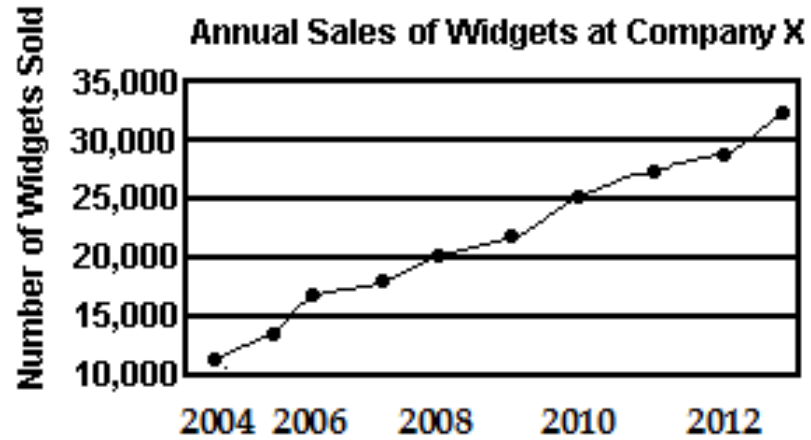


- a) What type of graph is this?
Frequency polygon
- b) What is the class width?
1
- c) How many classes are represented?
7 (the first and last dots do not count when using a frequency polygon)
- d) What is the midpoint of the first class? The last class?
4.5; 10.5 (the dots are on the midpoints for frequency polygon)
- e) What are the upper and lower limits of the first class? The last class?
4-4.99, 10-10.99
- f) Estimate the relative frequency for the class 6-6.99. (Hint the total is 46)
 $=4/46=.087$

What is misleading about the graph?



What is misleading about the graph?



The vertical axis does not start at zero.