

Chapter 8: Statistics

Interpreting graphs and tables

1.
 - a. Quantitative, Discrete
 - b. Qualitative, Nominal
 - c. Quantitative, Continuous
 - d. Quantitative, Continuous
 - e. Qualitative, Nominal
 - f. Quantitative, Continuous
 - g. Quantitative, Discrete
 - h. Quantitative, Continuous

2.
 - a. 22 fruits
 - b. 12 fruits
 - c. 1.55kg, 3.11kg and 5.22kg
 - d. 3 fruits
 - e. No, a line graph is not appropriate because the data is not continuous. A stem-and-leaf plot is better for displaying individual data points of discrete quantities like these fruit weights.

3.
 - a. every 3 months (Be careful: the months are not in order)
 - b. July: \$150
 - c. you can compare the cost for each quarter
 - d. $(80+130+120+150+100) \div 12 = \48.3 (Use calculator)
 - e. Make sure the month are in order and indicate the cost figure on top of the column which can help customers read the graph easily.

4.
 - a. 3 hours
 - b. 4 hours
 - c. Work
 - d. $\frac{2}{24} = \frac{1}{12}$

Frequency tables and tallies

1. a.

Value	Frequency
0	5
1	6
2	5
3	3
4	1

b. 20 students

c. 11 students

d. 1 snack

e. 4 students

f. $\frac{5}{20} = \frac{1}{4}$

2. a.

Class Interval	Frequency
0-1	6
2-3	8
4-5	6
6-7	4
8-9	1

b. 25 adults

c. 2-3 hours

d. 8-9 hours

3. a.

Score	Frequency
0-9	3
10-19	8
20-29	15
30-39	16
40-50	7

4. a.

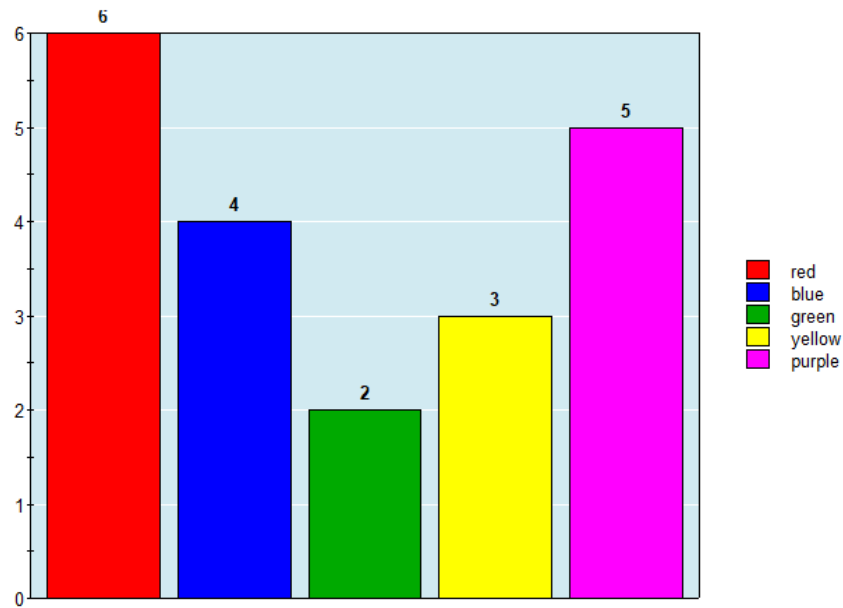
Time (sec)	Frequency
20-29	1
30-39	7
40-49	10
50-59	6
60-69	1

b.

Time (sec)	Frequency
20-34	3
35-49	15
50-64	7
65-79	0

Graphs of frequency tables

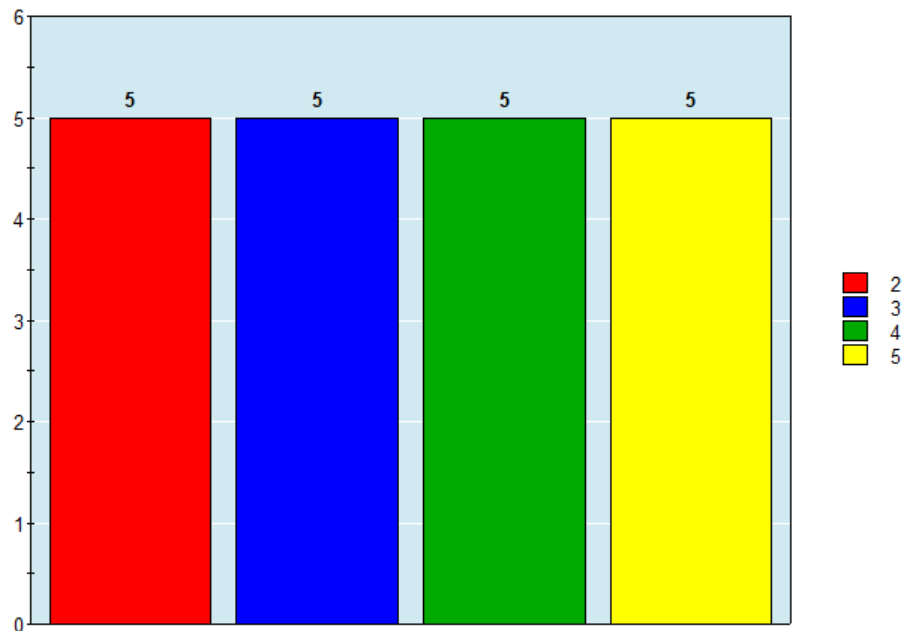
1.



2. a.

Value	Frequency
2	5
3	5
4	5
5	5

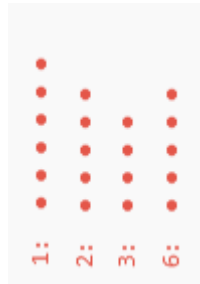
b.



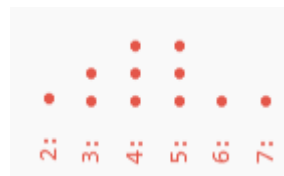
3. a.

Value	Frequency
1	6
2	5
3	4
6	5

b.



4. a.



b.



c.



5. a.

Stem	Leaf
2	8
3	3 4 7
4	2 7 9
5	1 3
6	2

Key: 2|8 means 28

b.

Stem	Leaf
1	1 4 6 8
2	1 4 8 9
3	2 7

Key: 1|4 means 1.4

c.

Stem	Leaf
0.0	5 8
0.1	2 5 8 9
0.2	2 6 7
0.3	1

Key 0.0|5 means 0.05

You can also make the stem 0, 1, 2, 3

Measures of Centre

1.
 - a. 5
 - b. 15
 - c. 1
 - d. 8
 - e. 20
 - f. 4
 - g. 16
 - h. 3

2.
 - i)
 - a. 8
 - b. 7
 - c. 4
 - d. 10

 - ii)
 - a. 2 and 3
 - b. 5
 - c. 12
 - d. 7

3.
 - a. 500
 - b. 10
 - c. 40

4.
 - a.
 - i. mean 23.86; median 23; mode 22; range 14
 - ii. 35
 - iii. mean 23; median 23; mode 22; range 5
 - iv. mean slightly decrease, median unchanged, mode unchanged, range decrease

 - b.
 - i. mean 69; median 55; mode 55; range 250
 - ii. 300
 - iii. mean 55.08; median 55; mode 55; range 15
 - iv. mean decrease, median unchanged, mode unchanged, range decrease

 - c.
 - i. mean 23.67; median 18; mode 18; range 75
 - ii. 90
 - iii. mean 19.64; median 18.5; mode; 18; range 10
 - iv. mean decrease, median increase, mode unchanged, range decrease

- d. i. mean 227.77; median 125; mode 120 and 130; range 1400
- ii. 1500
- iii. mean 121.75; median 122.5; mode 120 and 130; range 40
- iv. mean decrease, median decrease, mode unchanged, range decrease

- 5. a. 35
- b. remove 2 outliers: 25

- 6. a. \$36000
- b. \$80000
- c. \$27200

Measure of spread

1.

25th Percentile: 4 50th Percentile: 7 75th Percentile: 10 Interquartile Range: 6	25th Percentile: 3 50th Percentile: 3.5 75th Percentile: 5 Interquartile Range: 2
25th Percentile: 3 50th Percentile: 5.5 75th Percentile: 7 Interquartile Range: 4	25th Percentile: 12.5 50th Percentile: 20 75th Percentile: 27.5 Interquartile Range: 15
25th Percentile: 1.05 50th Percentile: 2.5 75th Percentile: 4.35 Interquartile Range: 3.3	25th Percentile: -6 50th Percentile: -3 75th Percentile: 2 Interquartile Range: 8
25th Percentile: 15 50th Percentile: 19 75th Percentile: 22 Interquartile Range: 7	25th Percentile: 0.5 50th Percentile: 2 75th Percentile: 4 Interquartile Range: 3.5
25th Percentile: 105 50th Percentile: 120 75th Percentile: 145 Interquartile Range: 40	25th Percentile: 30 50th Percentile: 65 75th Percentile: 80 Interquartile Range: 50

If the first question in the second column is 7, 7, 3, 1, 9, 4, change it into 1, 3, 4, 3, 5, 5

2. a. 5
b. 9
c. 4

3. IQR=2

4. a i. range = $17 - 10 = 7$

ii. IQR = $15 - 11 = 4$

b. i. range = $24 - 10 = 14$

ii. IQR = $15 - 11 = 4$

c. The IQR is calculated as the difference between the third quartile (Q3) and the first quartile (Q1), representing the middle 50% of the data. This means it ignores the extreme values and outliers, providing a better measure of the spread of the "core" data. By focusing on the central data, the IQR gives a more accurate representation of how spread out the data is under normal conditions.

Surveying and sampling

1. a. Do you prefer organic food or non-organic food?

Not biased – This is a straightforward question asking for a preference without suggesting which option is better.

- b. What do you usually do to relax after a stressful day?

Not biased – This is an open-ended question asking about personal behavior without leading the respondent to a particular answer.

- c. Do you think this pair of eco-friendly shoes is worth the price?

Biased – The phrase "eco-friendly" carries a positive connotation, which may lead respondents to favor the product, thus influencing their response.

- d. Which of these two brands of sunscreen do you trust more?

Biased – The question limits the choice to two specific brands and may lead respondents to favor one, even if they don't trust either.

- e. Should the government ban the use of plastic bags in all supermarkets?

Biased – The phrasing suggests a specific action (ban), which may influence respondents toward agreeing, especially given the negative environmental connotations of plastic bags.

- f. Do you find it more informative to read articles online or in print?

Not biased – This is a balanced comparison between two options without suggesting which is better.

- g. Have you considered using supplements to achieve your fitness goals?

Biased – This question assumes that the respondent has fitness goals and implies that supplements are a common solution for achieving them.

- h. Would you choose a career that involves travel or one that allows you to work from home?

Not biased – This presents two career options without implying that one is better than the other.

- i. Do you agree that there should be stricter regulations on industrial pollution?

Biased – The phrasing suggests that stricter regulations are necessary, which may influence respondents to agree.

2.
 - a. Census
 - b. Sample
 - c. Census
 - d. Sample
 - e. Census
 - f. Sample
 - g. Sample
 - h. Census

3.
 - a. Sample – Surveying a sample of employees would be more efficient and less time-consuming than surveying every employee, while still providing useful insights about overall employee satisfaction.

 - b. Sample – A sample is better for studying the effects of sleep deprivation because testing the entire population would be impractical and potentially unethical. A well-chosen sample can provide meaningful data.

 - c. Census – To ensure safety and accuracy, examining every batch of supplies is necessary to identify the defective one. A census ensures no defective batches are overlooked.

4.
 - a. Do you prefer exercising alone or with others?
Appropriate – This question is relevant to understanding exercise habits, as it explores whether students prefer solo or group activities.

 - b. Is Physical Education your favorite subject?
Not appropriate – This question is unrelated to current exercise habits and focuses on a specific academic preference, which doesn't directly contribute to understanding students' exercise routines.

 - c. How many hours per week do you spend exercising?
Appropriate – This is directly relevant to the goal of understanding exercise habits, as it quantifies the time students spend exercising.

 - d. Do you prefer indoor or outdoor activities?
Appropriate – This question helps to identify the type of exercise environment students prefer, which is useful for understanding their habits.

5.
 - a. True
 - b. true
 - c. true
 - d. true