

1. How is a sample related to a population?

A sample is a subset of a population.

العينة هي جزء من المجتمع

2. Why is a sample used more often than a population?

1. bring the population to a manageable number
2. To reduce cost
3. To help in minimizing error from the despondence due to large number in the population.
4. Sampling helps the researcher to save time.

تقليل حجم المجتمع

تقليل التكلفة

تقليل خطأ

توفير لوقت

3. What is the difference between a parameter and a statistic?

Parameter:- describes characteristic from a population.

Statistic:- " " " " Sample.

4. What are the two main branches of statistics?

1) Descriptive Statistics. الوصفية

2) Inferential " استدلالية "

**True or False?** In Exercises 5–10, determine whether the statement is true or false. If it is false, rewrite it as a true statement.

5. A statistic is a measure that describes a <sup>Sample</sup> population characteristic. False
6. A sample is a subset of a population. True
7. It is impossible for the Census Bureau to obtain all the census data about the population of the United States. True
8. Inferential statistics involves using a <sup>Sample</sup> population to draw a conclusion about a corresponding <sup>Population</sup> sample. False
9. A population is the collection of <sup>all</sup> some outcomes, responses, measurements, or counts that are of interest. False
10. A sample statistic will <sup>Change</sup> not change from sample to sample. False

**Classifying a Data Set** In Exercises 11–20, determine whether the data set is a population or a sample. Explain your reasoning.

11. The height of each player on a school's basketball team Population
12. The amount of energy collected from every wind turbine on a wind farm Population
13. A survey of 500 spectators from a stadium with 42,000 spectators Sample
14. The annual salary of each pharmacist at a pharmacy Population
15. The cholesterol levels of 20 patients in a hospital with 100 patients Sample
16. The number of televisions in each U.S. household Population
17. The final score of each golfer in a tournament Population
18. The age of every third person entering a clothing store Sample
19. The political party of every U.S. president Population
20. The soil contamination levels at 10 locations near a landfill Sample

Population ← all / each / every إذا و جبت كل شيء (كل شيء)

18 سنة | 18

Every + ترتيب → sample



## 1.2 EXERCISES



**Classifying Data by Type** In Exercises 7–18, determine whether the data are qualitative or quantitative. Explain your reasoning.

7. telephone numbers in a directory

- qualitative - [nominal]

Reason:- Can not do mathematical calculations لا يمكن إجراء عمليات حسابية

8. heights of hot air balloons

quantitative [Continuous]

Reason:- takes numerical value and can do mathematical calculations تأخذ قيم عددية ويمكن إجراء عمليات حسابية

9. body temperatures of patients

quantitative [Continuous]

Reason:- takes numerical value and can do mathematical calculations تأخذ قيم عددية ويمكن إجراء عمليات حسابية

10. eye colors of models

qualitative [nominal]

Reason:- Can not do mathematical calculations لا يمكن إجراء عمليات حسابية

14. student ID numbers

qualitative [nominal]

Reason:- Can not do mathematical calculations لا يمكن إجراء عمليات حسابية

15. weights of infants at a hospital

quantitative [Continuous]

Reason:- takes numerical value and can do mathematical calculations تأخذ قيم عددية ويمكن إجراء عمليات حسابية

18. wait times at a grocery store

quantitative [Continuous]

Reason:- takes numerical value and can do mathematical calculations تأخذ قيم عددية ويمكن إجراء عمليات حسابية

## 2.1 EXERCISES

In Exercises 11–14, use the given minimum and maximum data entries and the number of classes to find the class width, the lower class limits, and the upper class limits.

$w$

11. min = 9, max = 64, 7 classes

Sol  
\*  $R = \max - \min$   
 $= 64 - 9 = 55$

\*  $k = 7$

\*  $w = \frac{R}{k} = \frac{55}{7} = 7.85$

$w \approx 8$

lower limit	upper limit
9	16
17	24
25	32
33	40
41	48
49	56
57	64

12. min = 12, max = 88, 6 classes

Sol  
\*  $R = \max - \min$   
 $= 88 - 12 = 76$

\*  $k = 6$

\*  $w = \frac{R}{k} = \frac{76}{6} = 12.67$

$w \approx 13$

lower limit	upper limit
12	24
25	37
38	50
51	63
64	76
77	89

14. min = 54, max = 247, 10 classes

Sol

$$* R = \text{max} - \text{min} \\ = 247 - 54 = 193$$

$$* K = 10$$

$$* W = \frac{R}{K} = \frac{193}{10} = 19.3$$

$$W \approx 20$$

lower limit	upper limit
54	73
74	93
94	113
114	133
134	153
154	173
174	193
194	213
214	233
234	253

**Constructing a Frequency Distribution and a Frequency Histogram**  
 In Exercises 31–34, construct a frequency distribution and a frequency histogram for the data set using the indicated number of classes. Describe any patterns.

**31. Sales**

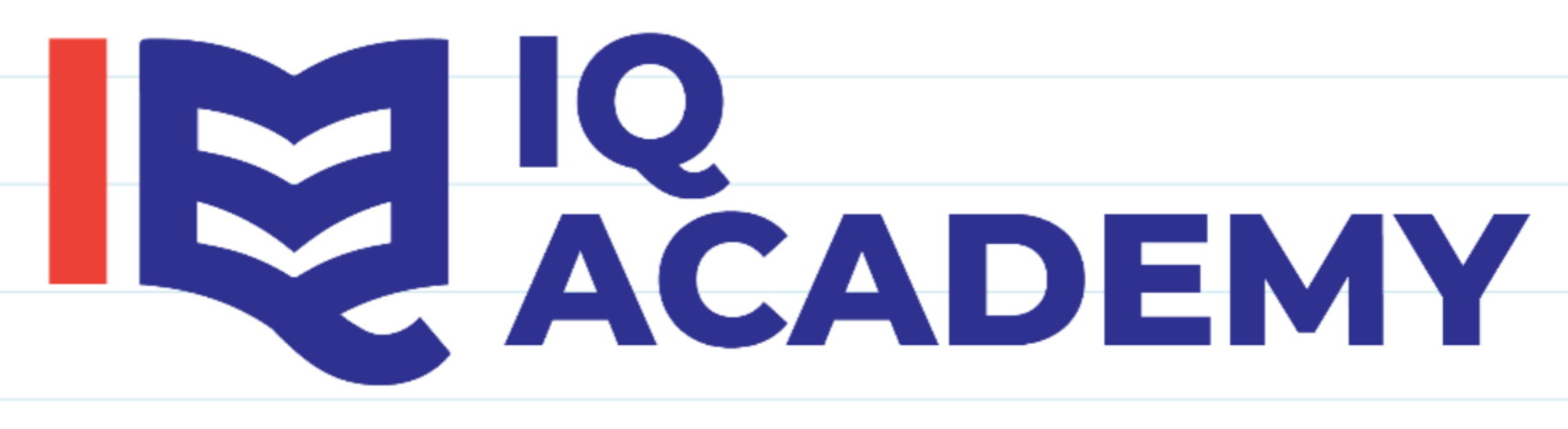
Number of classes: 6  $k = 6$

Data set: July sales (in dollars) for all sales representatives at a company

2114	2468	7119	1876	4105	3183	1932	1355
4278	1030	2000	1077	5835	1512	1697	2478
3981	1643	1858	1500	4608	1000		

Sol  $\rightarrow$   
 $R = 7119 - 1000 = 6119$

$W = \frac{R}{k} = \frac{6119}{6} \approx 1020$



class	Frequency	True class
1000 - 2019	12	999.5 - 2019.5
2020 - 3039	3	2019.5 - 3039.5
3040 - 4059	2	3039.5 - 4059.5
4060 - 5079	3	4059.5 - 5079.5
5080 - 6099	1	5079.5 - 6099.5
6100 - 7119	1	6099.5 - 7119.5
Total	22	



Frequency distribution table

Histogram

### 32. Pepper Pungencies

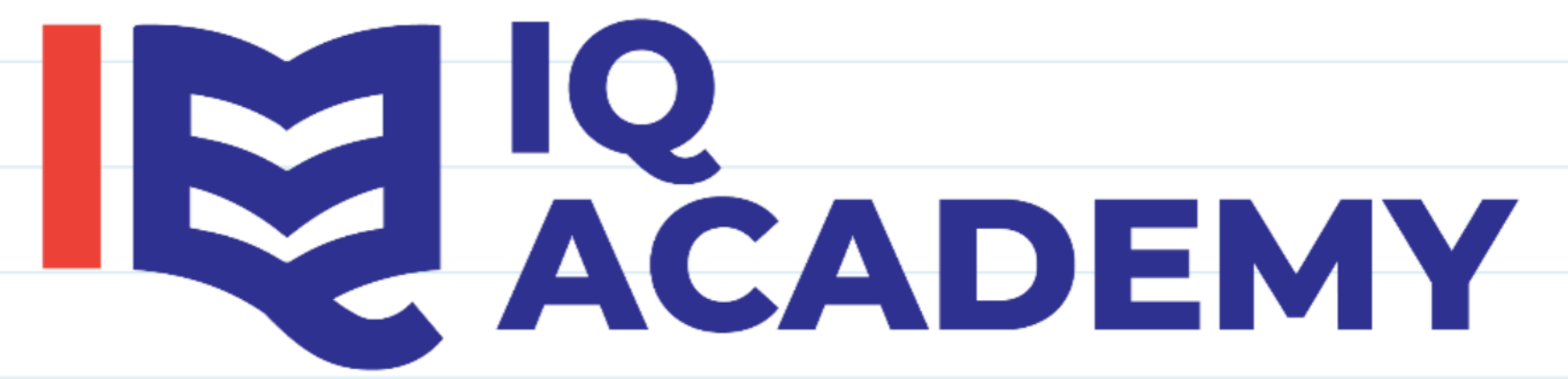
Number of classes: 5

Data set: Pungencies (in 1000s of Scoville units) of 24 tabasco peppers

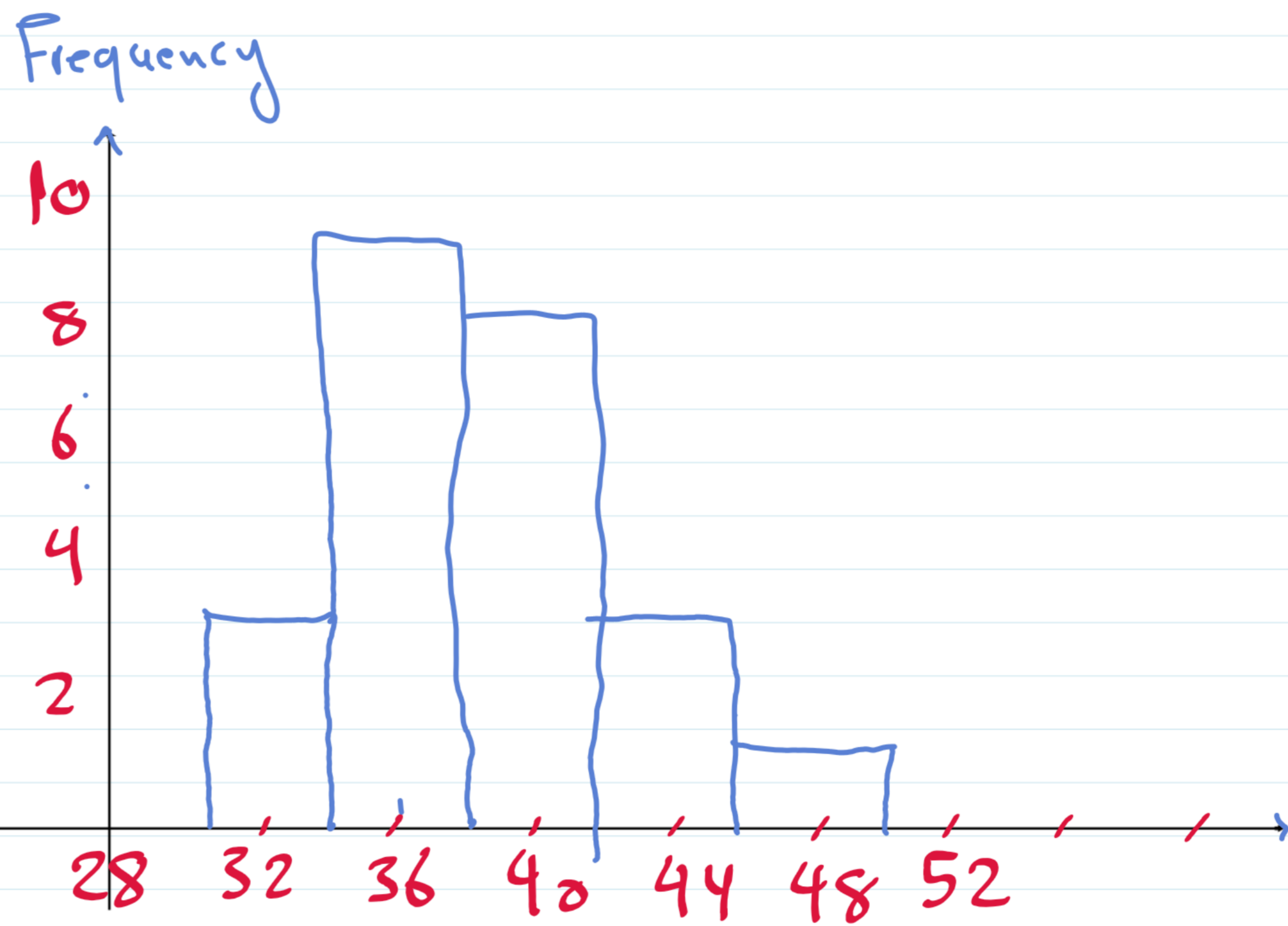
35 51 44 42 37 38 36 39  
44 43 40 40 32 39 41 38  
42 39 40 46 37 35 41 39

Sol →  $R = 51 - 32 = 19$

$$W = \frac{R}{K} = \frac{19}{5} \approx 4$$



class	frequency	True class
32-35	3	31.5 - 35.5
36-39	9	35.5 - 39.5
40-43	8	39.5 - 43.5
44-47	3	43.5 - 47.5
48-51	1	47.5 - 51.5
Total	24	///



Pepper Pungencies

Histogram

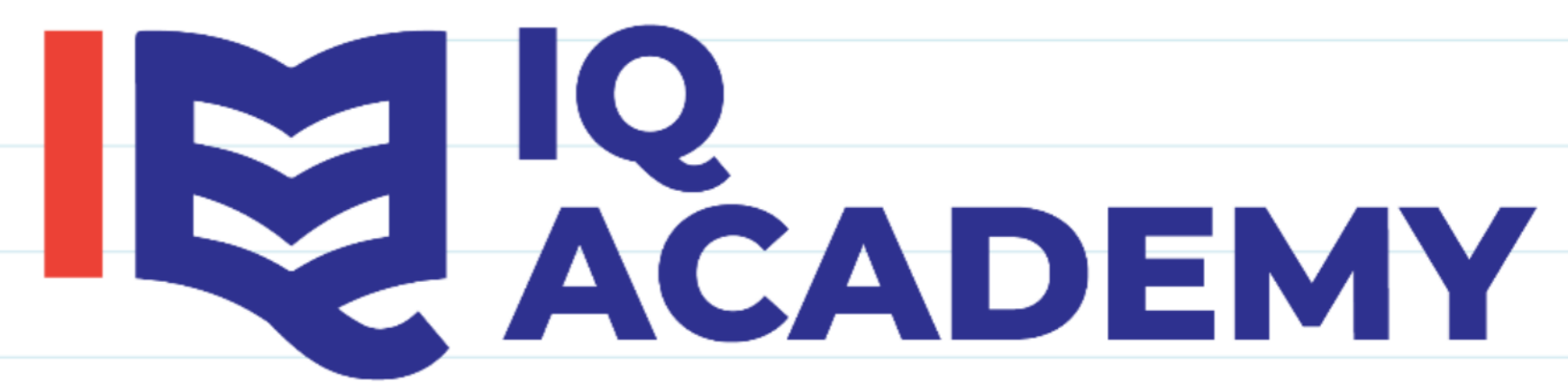
Frequency distribution table

### 33. Reaction Times

Number of classes: 8

Data set: Reaction times (in milliseconds) of a sample of 30 adult females to an auditory stimulus

507 389 305 291 336 310 514 442  
373 428 387 454 323 441 388 426  
411 382 320 450 309 416 359 388  
307 337 469 351 422 413



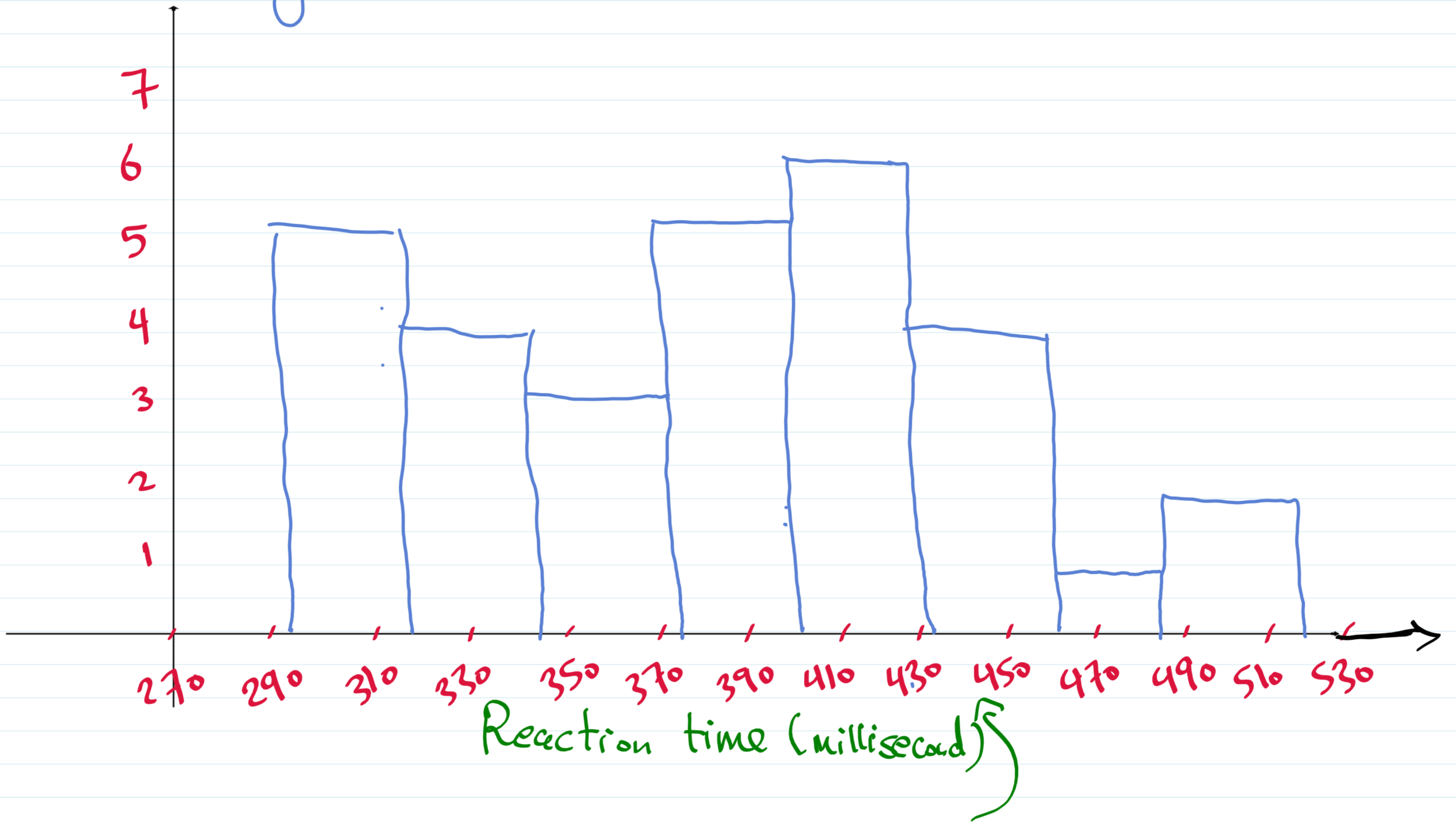
Sol  $\rightarrow R = 514 - 291 = 223$

$$W = \frac{R}{K} = \frac{223}{8} \approx 28$$

class	frequency	True class
291 - 318	5	290.5 - 318.5
319 - 346	4	318.5 - 346.5
347 - 374	3	346.5 - 374.5
375 - 402	5	374.5 - 402.5
403 - 430	6	402.5 - 430.5
431 - 458	4	430.5 - 458.5
459 - 486	1	458.5 - 486.5
487 - 514	2	486.5 - 514.5
Total	30	

Frequency distribution table

Frequency



Histogram