

### **Exercise 1**

1. Indicate whether each of the following constitutes data collected from a population or a sample.
  - a. A group of 25 patients selected to test a new drug (sample)
  - b. Total items produced on a machine for each year from 2001 to 2015 (population)
  - c. Yearly expenditures on clothes for 50 persons (sample)
  - d. Number of houses sold by each of the 10 employees of a real estate agency during 2015 (population)
  
2. Classify each sample as simple random, systematic, stratified, cluster, or other.
  - a. In a large school district, all teachers from two buildings are interviewed to determine whether they believe the students have less homework to do now than in previous years. (cluster)
  - b. A group of unmarried men are selected using random numbers (with equal probability being selected for every man) and asked how long it has been since their last date. (simple)
  - c. Every 100th hamburger manufactured is checked to determine its fat content. (systematic)
  - d. Mail carriers of a large city are divided into four groups according to gender (male or female) and according to whether they walk or ride on their routes. Then 10 are selected from each group and interviewed to determine whether they have been bitten by a dog in the last year. (stratified)

3. The following table gives the frequency distribution of times (to the nearest hour) that 90 fans spent waiting in line to buy tickets to a rock concert.

Waiting Time (hours)	Frequency
0 to 6	5
7 to 13	27
14 to 20	30
21 to 27	20
28 to 34	8

Circle the correct answer in each of the following statements, which are based on this table.

- a. The number of classes in the table is: 5, 30, 90.
- b. The class width is: 6, 7, 34.
- c. The midpoint of the third class is: 16.5, 17, 17.5.
- d. The lower boundary of the second class is: 6.5, 7, 7.5.
- e. The upper limit of the second class is: 12.5, 13, 13.5.
- f. The sample size is: 5, 90, 11.
- g. The relative frequency of the second class is: 0.22, 0.41, 0.30.

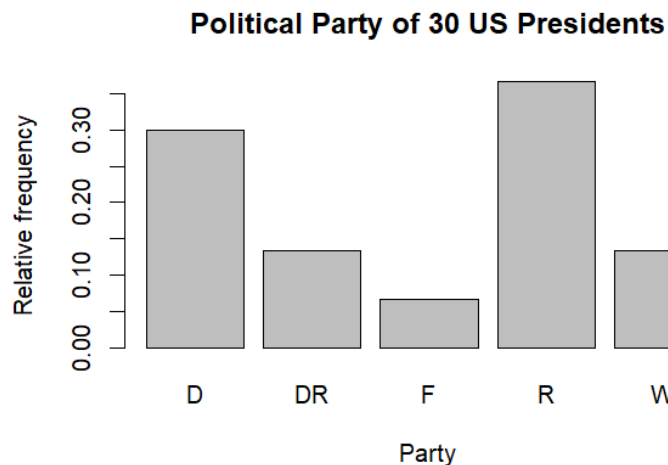
4. The following data give the political party of each of the first 30 U.S. presidents. In the data, D stands for Democrat, DR for Democratic Republican, F for Federalist, R for Republican, and W for Whig.

F	F	DR	DR	DR	DR	D	D	W	W
D	W	W	D	D	R	D	R	R	R
R	D	R	D	R	R	R	D	R	R

- Prepare a frequency distribution table for these data.
- Calculate the relative frequency and percentage distributions.

Party	Frequency	Relative frequency	Percentage (%)
D	9	$9/30 = 3/10$	30.0
DR	4	$4/30 = 2/15$	13.33
F	2	$2/30 = 1/15$	6.67
R	11	$11/30$	36.67
W	4	$4/30 = 2/15$	13.33
Total	30	1	100

- Draw a bar graph for the relative frequency distribution.



- What percentage of these presidents were Whigs?

13.33%

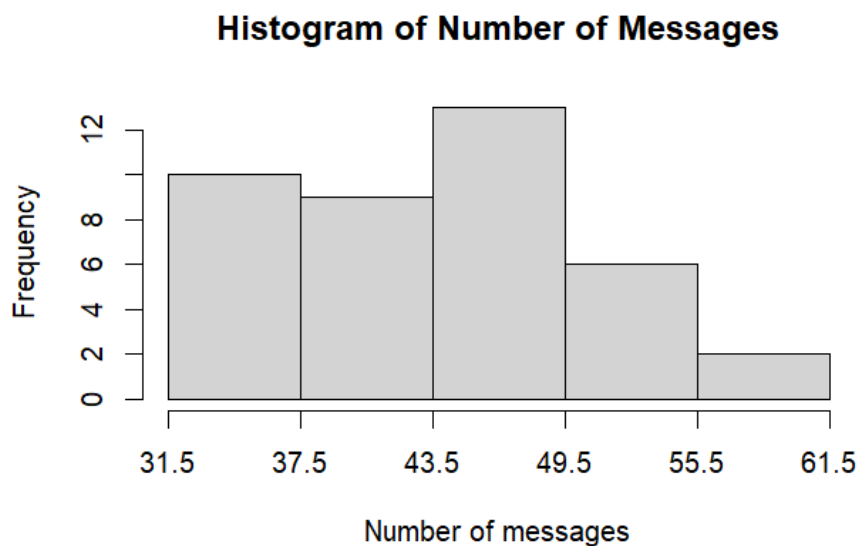
5. The following data give the number of text messages sent on 40 randomly selected days during 2015 by a high school student:

32	33	33	34	35	36	37	37	37	37
38	39	40	41	41	42	42	42	43	44
44	45	45	45	47	47	47	47	47	48
48	49	50	50	51	52	53	54	59	61

- Construct a frequency distribution table. Take 32 as the lower limit of the first class and 6 as the class width.
- Calculate the relative frequency and percentage for each class.

No. of messages	Frequency	Relative frequency	Percentage (%)
32 – 37	10	$10/40 = 1/4$	25
38 – 43	9	$9/40$	22.5
44 – 49	13	$13/40$	32.5
50 – 55	6	$6/40 = 3/20$	15
56 – 61	2	$2/40 = 1/20$	5
Total	40	1	100

- Construct a histogram for the frequency distribution of part a.



- On what percentage of these 40 days did this student send 44 or more text messages?  
 $32.5 + 15 + 5 = 52.5\%$