

1. A sociology professor wants to know the hometowns of students attending the school of Engineering at U of I Champaign. He obtains a list of 40 freshmen, 40 sophomores, 40 juniors, and 40 seniors to survey.

(a) State the population.

Solution: Population is all students attending the school of Engineering at U of I Champaign.

(b) State the sample.

Solution: Sample is the 160 students surveyed.

(c) State the sampling type.

Solution: Sampling type is stratified because first the students are split into year of school then choose equal amount from each group.

(d) State the type of data collected (qualitative or quantitative).

Solution: Data type is qualitative since the answers to hometowns is non-numeric (e.g., Grayslake, Round Lake, Libertyville, etc.).

2. 87% of all clients at a mental health facility report having an alcohol or drug addiction. Identify if the numerical value in the statement describes a parameter or a statistic.

Solution: 87% is a parameter since it is of “all clients”.

3. A study of 50 students in the CLC cafeteria were given an IQ test. The IQ scores were recorded.

(a) State the sampling type.

Solution: Sampling type is convenience sampling.

(b) Based on the study, 20% of CLC students' IQ scores are above average. Decide if the statement is descriptive or inferential statistics.

Solution: This is descriptive since the value is describing the current study. It is not a prediction or an inference.

(c) State the type of data (quantitative or qualitative).

Solution: The data is quantitative.

4. What characteristic of a Pareto diagram distinguishes it from other bar graphs?

a. Bars arranged by height in descending order

b. Bars arranged by height in ascending order

c. There is no gap between bars

5. Classes and Frequency:

Class	Frequency
15 - 19	7
20 - 24	8
25 - 29	10
30 - 34	2
35 - 39	3

(a) State the class width.

Solution: Class width = $20 - 15 = 5$

(b) State the class boundaries of the 4th class.

Solution: Class boundaries = 29.5 to 34.5

(c) Find the midpoint of the 3rd class.

Solution: Midpoint = 27

(d) Find the relative frequency of the 1st class.

Solution: Relative frequency = $7/30 = 23.3\%$

- (e) Find the cumulative frequency of the 2nd class.

Solution: Cumulative frequency = $7 + 8 = 15$

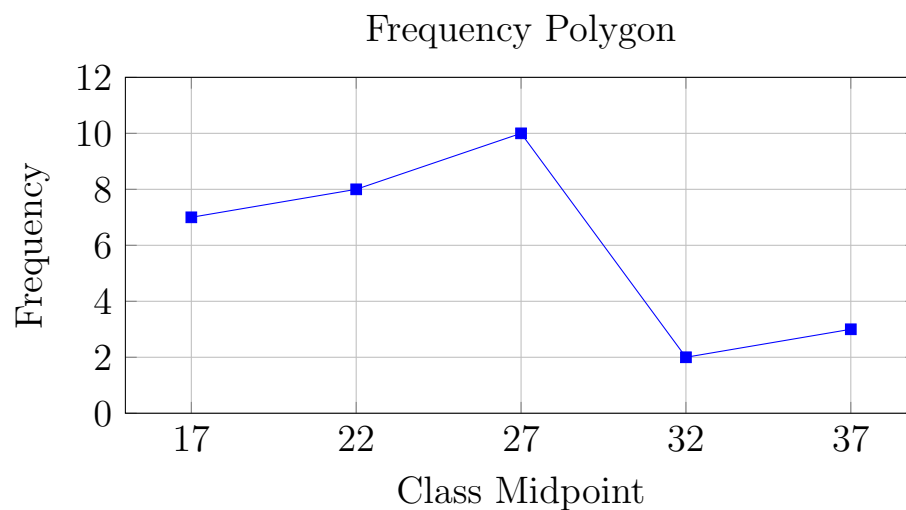
- (f) Estimate the mean of this grouped frequency distribution using your calculator.

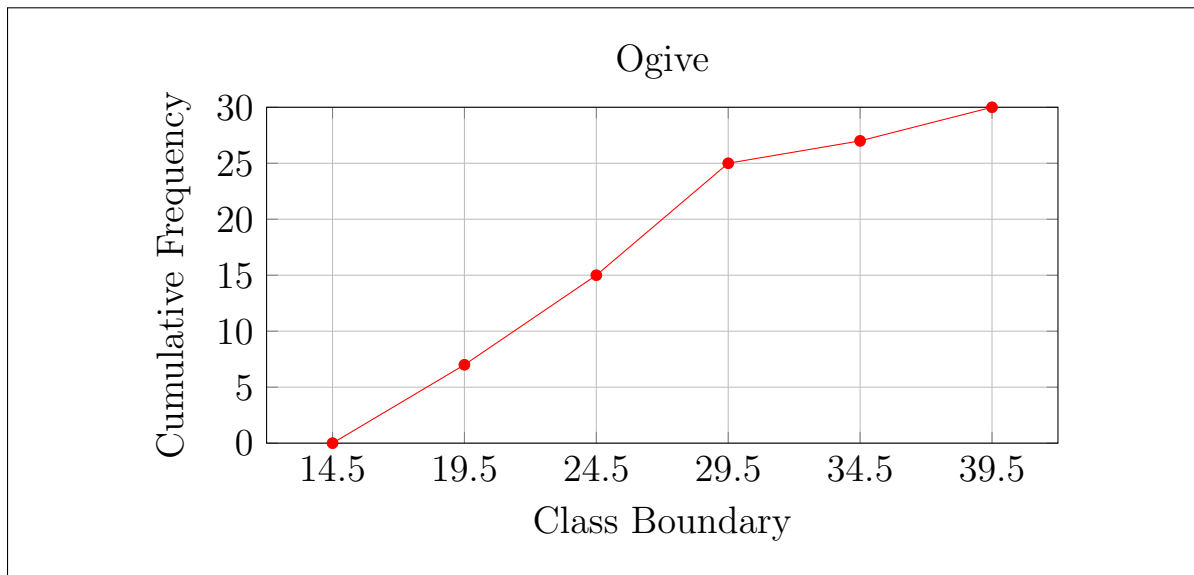
Solution: Mean = 24.7

Solution: Standard deviation = 6.1

- (g) Create a frequency polygon and Ogive.

Solution:





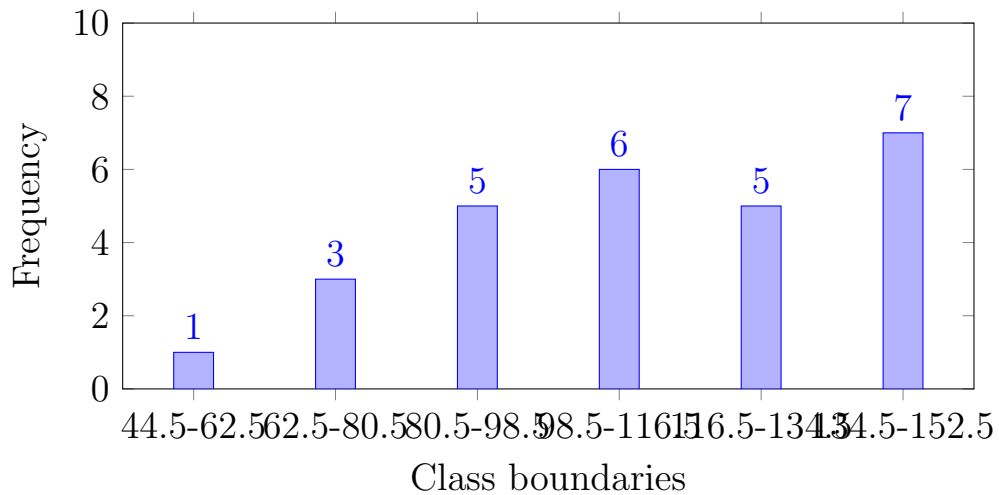
6. Create a grouped frequency distribution using 6 classes. Create a histogram. Describe the histogram.

Data:

- 145, 137, 138, 112, 137, 100, 78, 127, 97
- 70, 143, 133, 150, 124, 115, 110, 45, 141
- 119, 92, 84, 94, 105, 71, 95, 117, 104

Solution:

Class	Frequency
45 - 62	1
63 - 80	3
81 - 98	5
99 - 116	6
117 - 134	5
135 - 152	7



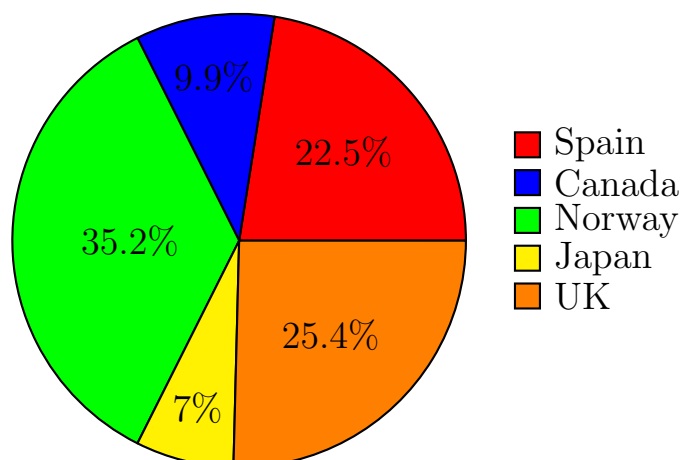
Please ignore the spaces between the bars. They should touch.
The histogram is skewed left.

7. The number of exchange students in fall 2019 semester from the following countries:

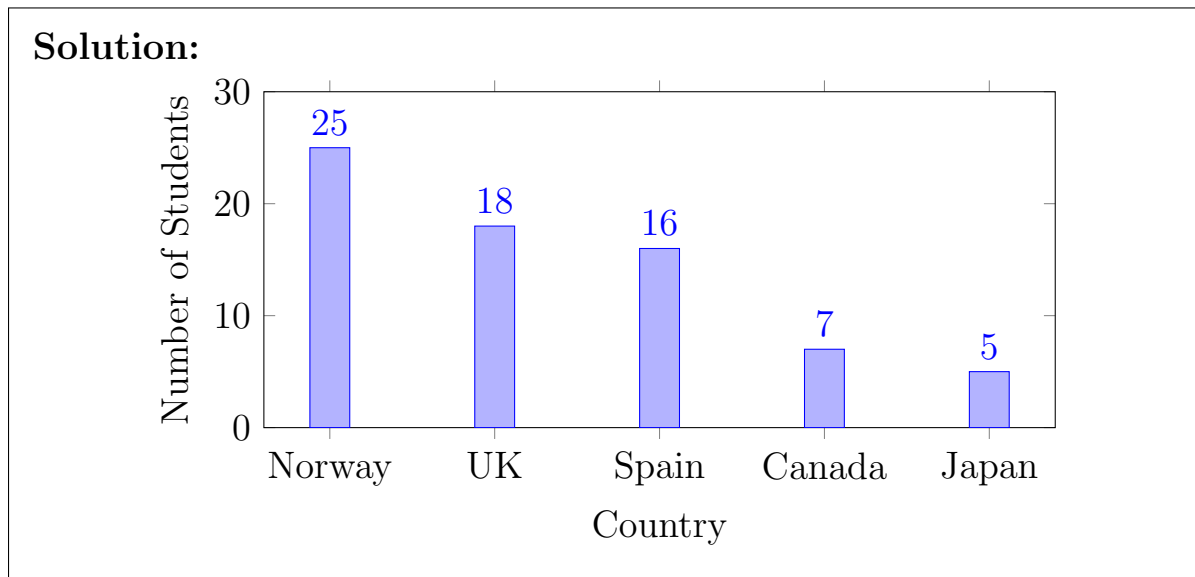
Country	Students	% of total
Spain	16	22.5%
Canada	7	9.9%
Norway	25	35.2%
Japan	5	7%
UK	18	25.4%

- (a) Create a Pie chart.

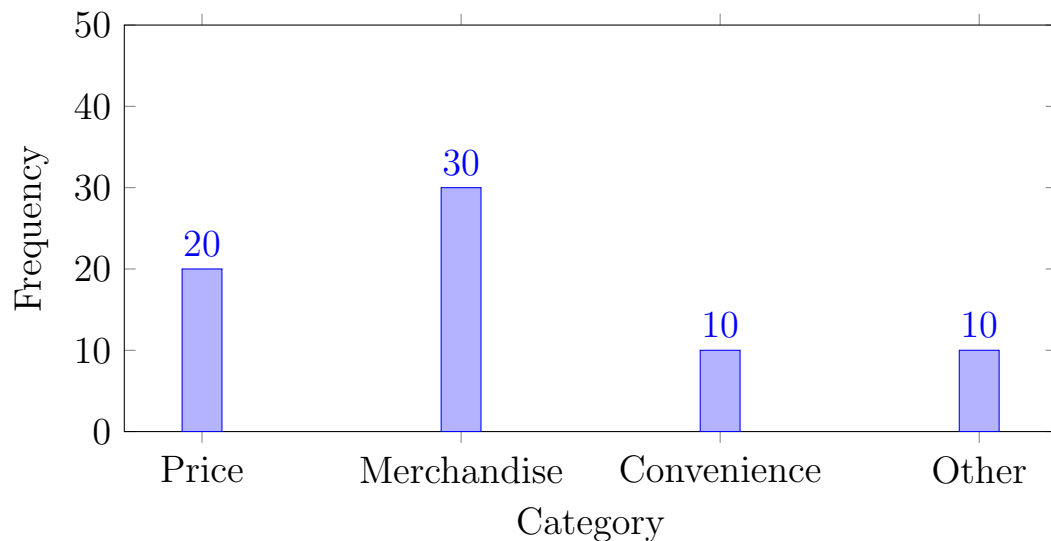
Solution:



(b) Create a Pareto chart.

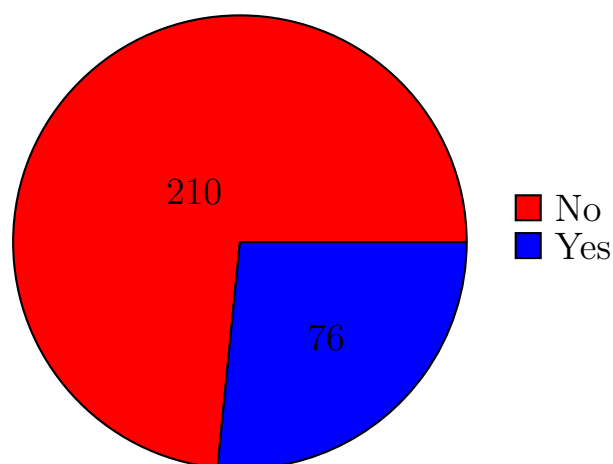


8. The manager of a store conducted a customer survey to determine why customers shopped at the store. The results are shown in the figure. What proportion of customers responded that merchandise was the reason they shopped at the store?



- a. 30
- b. $\frac{3}{7}$
- c. $\frac{2}{7}$
- d. $\frac{1}{2}$

9. In a distribution that is skewed to the right, what is the relationship of the mean and median?
- a. Mean < Median
 - b. Mean = Median
 - c. Mean > Median**
 - d. None
10. One of the questions posed to a sample of 286 incoming freshmen at a large public university was, “Do you have any tattoos?” Their responses are shown below in the pie chart. Please note that the values shown represent the number of responses in each category.



- Based on the responses shown in the pie chart, what percentage of the freshmen responded “Yes”?
- a. 76
 - b. 76%
 - c. 26.6%**
 - d. 73.4%
11. A survey was conducted to determine how people feel about the quality of programming available on television. Respondents were asked to rate the overall quality from 0 (no quality at all) to 100 (extremely good quality). The stem-and-leaf display of the data is shown below.

What percentage of the respondents rated overall television service quality as very good (regarded as ratings of 80 and above)?

- a. 4%
- b. 12%
- c. 3%
- d. 1%

Stem	Leaves
3	3 6
4	0 3 4 7 8 9 9 9
5	0 1 1 2 3 4 5
6	1 2 5 6 6
7	5 8
8	
9	3

12. The amount spent on textbooks for the fall term was recorded for a sample of five hundred university students. The mean expenditure was calculated to be \$500 and the median expenditure was calculated to be \$425. Which of the following interpretations of the median is correct?

- a. **50% of the students sampled had textbook costs that were less than \$425**
- b. The average of the textbook costs sampled was \$425
- c. 50% of the students sampled had textbook costs equal to \$425
- d. The most frequently occurring textbook cost in the sample was \$425

13. The temperature fluctuated between a low of 73°F and a high of 89°F. Which of the following could be calculated using just this information?

- a. Mean
- b. Median
- c. **Range**
- d. **Midrange**

14. The following data represents the number of curl ups completed in 60 seconds by a group of 2nd grade students:

31, 34, 41, 36, 37, 29, 18, 33 31, 28, 34, 22, 26, 28, 36, 42

(a) Find the mean.

Solution: $\bar{x} = 31.6$

(b) Find the median.

Solution: median=32

(c) Find the midrange.

Solution: midrange=30

(d) Find the mode(s).

Solution: modes=28, 31, 34, 36