



Start-Tech Academy

Frequency distribution

A **frequency distribution for qualitative** data lists all categories and the number of elements that belong to each of the categories.

EXAMPLE

Branch/ Specialization	Number of students
Computer Science	100
Mechanical Engineering	80
Electrical Engineering	130
Biotechnology	60
Mathematics	50
Total	420

$$\text{Relative frequency of a category} = \frac{\text{Frequency of that category}}{\text{Sum of all frequencies}}$$

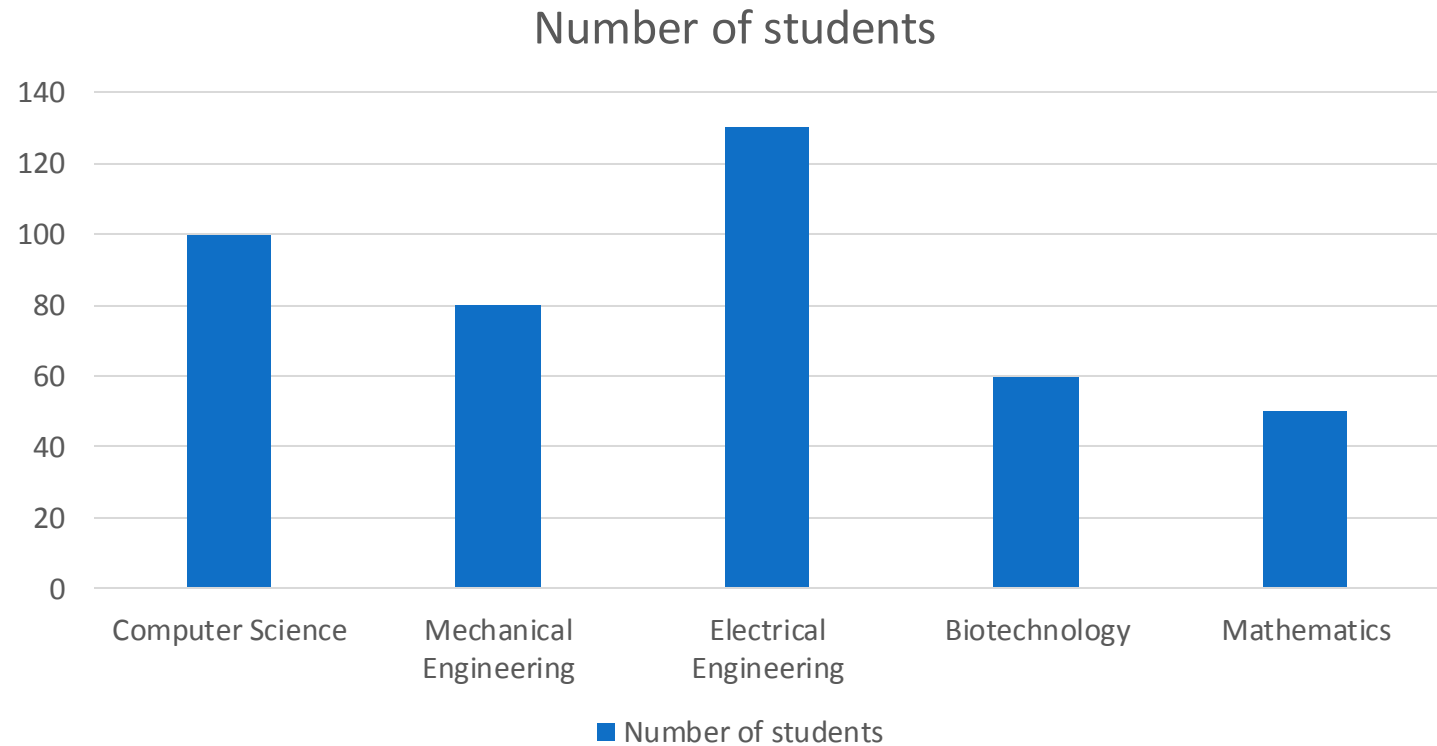
Therefore, relative frequency of Biotechnology is equal to $60/420 = 0.142 \sim 14.2\%$



BAR GRAPH

A **BAR graph** is a graph made of bars whose heights represent the frequencies of respective categories is called a bar graph

TYPES



Frequency distribution

A **frequency distribution for quantitative** data lists all the classes and the number of values that belong to each class. Data presented in the form of a frequency distribution are called **grouped data**.

EXAMPLE

Science Marks	Number of students
0-35	5
36-55	21
56-70	12
71-85	18
86-100	9
Total	65



Frequency distribution

A **frequency distribution for quantitative** data lists all the classes and the number of values that belong to each class. Data presented in the form of a frequency distribution are called **grouped data**.

Process

1. Select the number of classes, usually between 5 and 20.
2. Calculate the class width.
Class width \approx (maximum data value) - (minimum data value) / number of classes
Round this result to get a convenient number.
3. Choose the value for the first lower class limit by using either the minimum value or a convenient value below the minimum.
4. Using the first lower class limit and the class width, list the other lower class limits.
5. List the lower class limits in a vertical column and then determine and enter the upper class limits.
6. Take each individual data value and put a tally mark in the appropriate class. Add the tally marks to find the total frequency for each class.



Frequency distribution

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EXAMPLE

For the list of numbers below, create the frequency distribution

10 14 26 25 30 34 14 33 33
13 21 25 29 28 7 31 31 30
25 33 31 13 28 33

1. Select the number of classes, we will select 5.

2. Calculate the class width

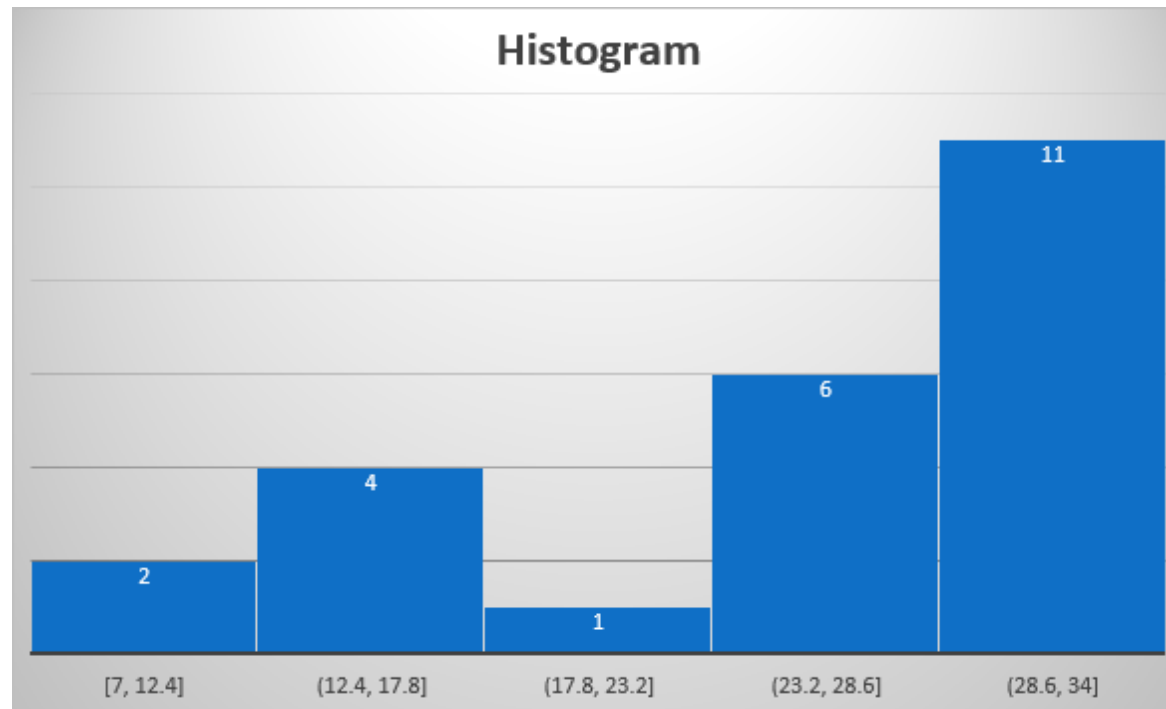
Class width $\approx (34) - (7) / 5 = 27/5 = 5.4 \rightarrow 5$

Groups	Tally	Frequency
7 – 12		2
13 – 18		4
19 – 24		1
25 – 30	\	9
31 – 36	\	8

Histograms

Histogram is a graph consisting of bars of equal width drawn adjacent to each other.
The **horizontal scale** represents classes of quantitative data values and the **vertical scale** represents frequencies.

Example



The heights of the bars correspond to the frequency values.

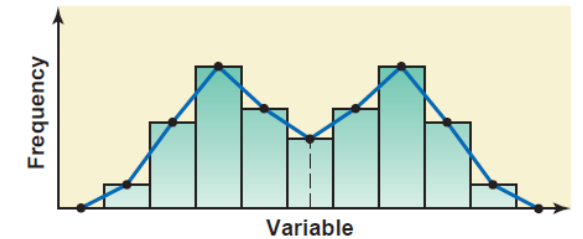
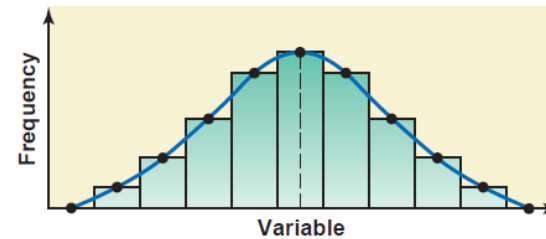


Histogram Shapes

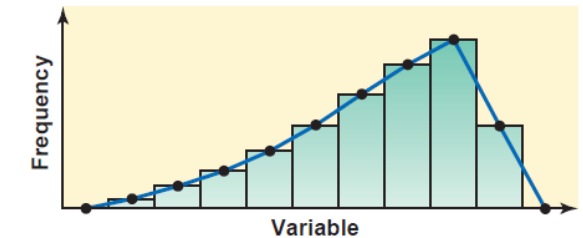
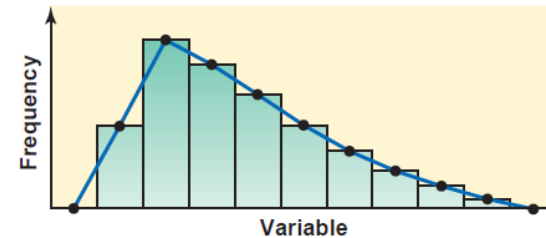
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Example

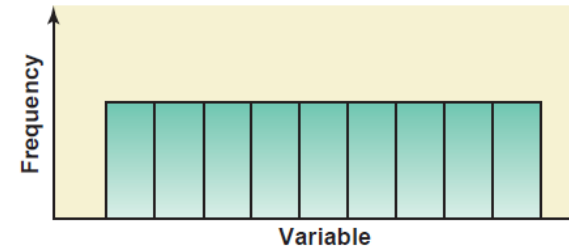
1. Symmetric



2. Skewed (Not symmetric)



3. Uniform or rectangular

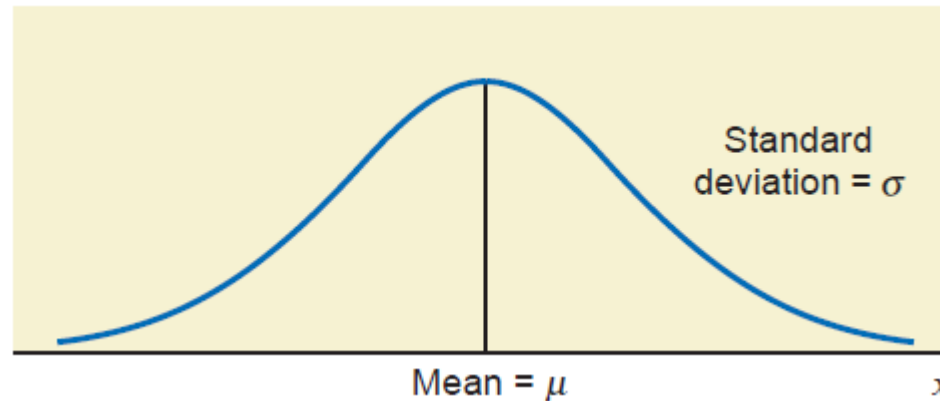


Normal Distribution

If a continuous random variable has a distribution with a graph that is symmetric and bell-shaped, and it can be described by the equation given below, we say that it has a normal distribution

$$y = \frac{e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}}{\sigma\sqrt{2\pi}}$$

Properties



1. The total area under the curve is 1.0.
2. The curve is symmetric about the mean.
3. The two tails of the curve extend indefinitely.

