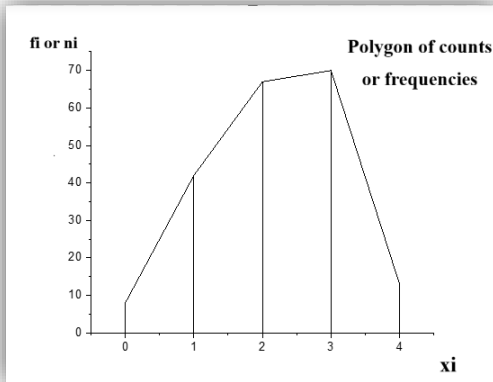
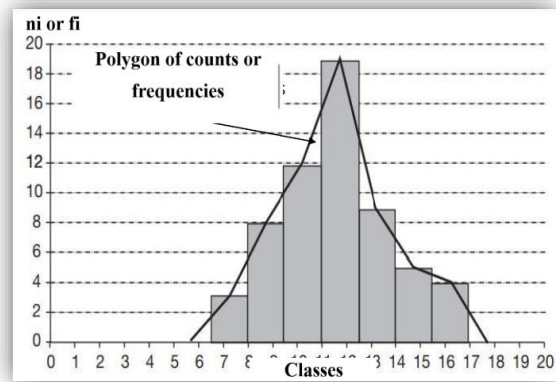


A.2.2.3 Polygon:

The polygon (counts or frequencies) is made from the bar chart or histogram. It is a broken line which joins the upper points of the bars or the midpoints of the upper sides of the successive rectangles of the histogram.



a. Discrete variable



b. Continuous variable

- ❖ For the discrete variable, the polygon of counts or frequencies starts at the top of the stick of the first value (x_1) and ends with the top of the stick of the last value (x_f).
- ❖ For the continuous variable, the polygon of counts or frequencies begins with:
 - **Equal Class sizes:** We start and end the polygon with ($a/2$) and the widths of the bars are equal.
 - **Unequal Class sizes:** We start the polygon with ($a_1/2$) and end it with ($a_f/2$) and the widths of the bars are unequal.

A.2.2.4 Cumulative curves :

a) Discrete variable :

For a discrete variable the cumulative curve of **frequencies or counts** is represented by steps (stairs) curve. It's a continuous curve on the left.

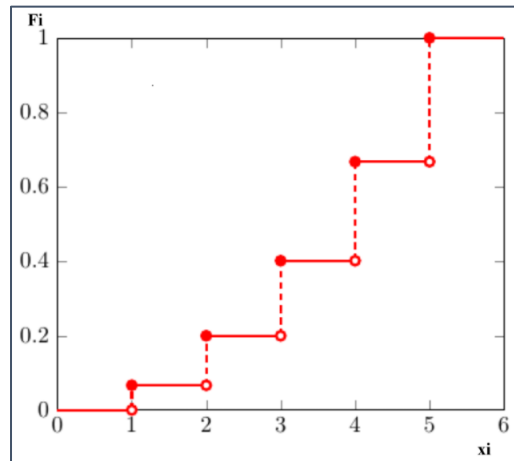


Figure. 2.7: Increasing cumulative curve for discrete variable.

Example 20:

Length (m) X	71	74	77	80	83	Total
Counts (n_i)	6	17	41	27	9	100
Cumulative Count (N_i)	6	23	64	91	100	
Frequencies (f_i)	0.06	0.17	0.41	0.27	0.09	1
Cumulative frequencies (F_i)	0.06	0.23	0.64	0.91	1	

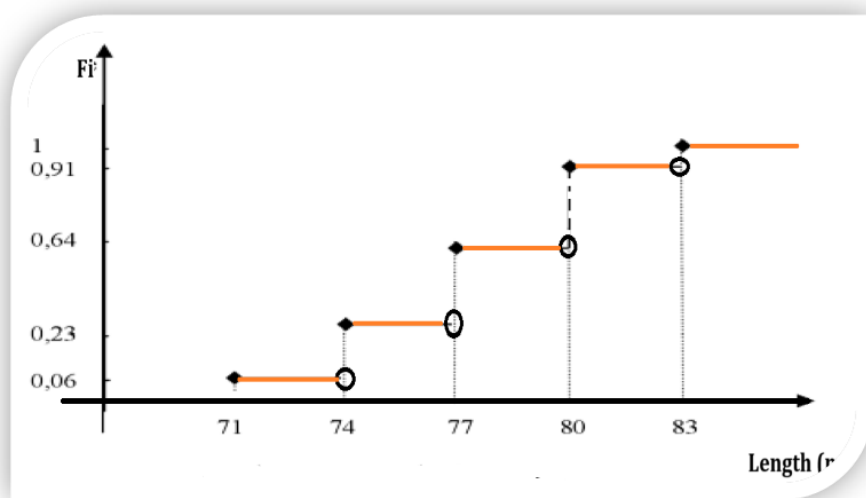


Figure. 2.8: Increasing frequencies cumulative curve for the variable length.

b) Continuous variable:

The cumulative curve of a continuous variable is obtained by plotting the points whose x-coordinates represent the upper bound of each class and the y-coordinates the corresponding cumulative **frequencies or counts**, and then connecting these points by line segments.

The cumulative count curve can be thought of as the graph of a function, called the cumulative count function and designated by $N(x)$, defined on \mathbf{R} and with values in the interval $[0, n]$.

$$N : \mathbf{R} \rightarrow [0, n]$$

$$x \mapsto N(x)$$

Similarly, the cumulative frequency curve can be thought of as the graph of a function, called the **cumulative frequency function** and denoted by $F(x)$, defined on \mathbf{R} and with values in the interval $[0, 1]$..:

$$F : \mathbf{R} \rightarrow [0, 1]$$

$$x \mapsto F(x)$$

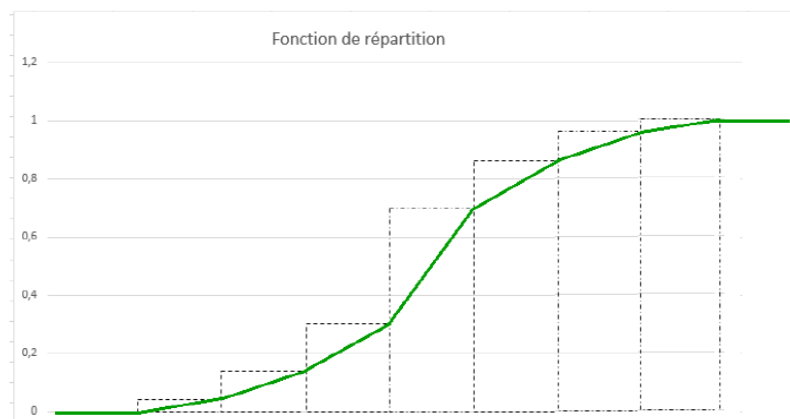


Figure. 2.9: Increasing cumulative curve for continuous variable.

Example 21:

We consider the age of the inhabitants of a neighborhood.

<i>Classes</i>	[11-15[[15-25[[25-30[[30-37[[37-50]	Total
<i>ni (Counts)</i>	20	10	5	15	10	60
<i>Ni (Cumulative Count)</i>	20	30	35	50	60	
<i>fi (Frequencies)</i>	0.34	0.17	0.08	0.25	0.16	1
<i>Fi</i>	0.34	0.51	0.59	0.84	1	
<i>Fi(x)</i>	0	0.34	0.51	0.59	0.84	1

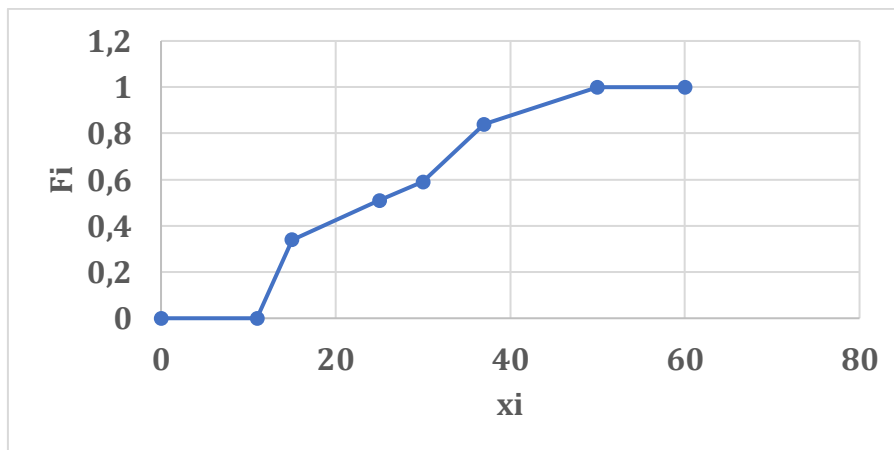


Figure. 2.10: Increasing frequencies cumulative curve.