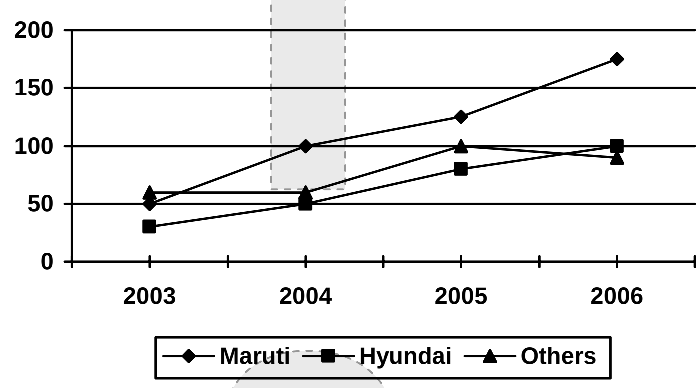
3. Two-Variable Graphs

Here the data will be represented in the form of a graph. Generally it represents the change of one variable with respect to the other variable.

Look at the following graph.

Car sales in India in different years (in 000's)

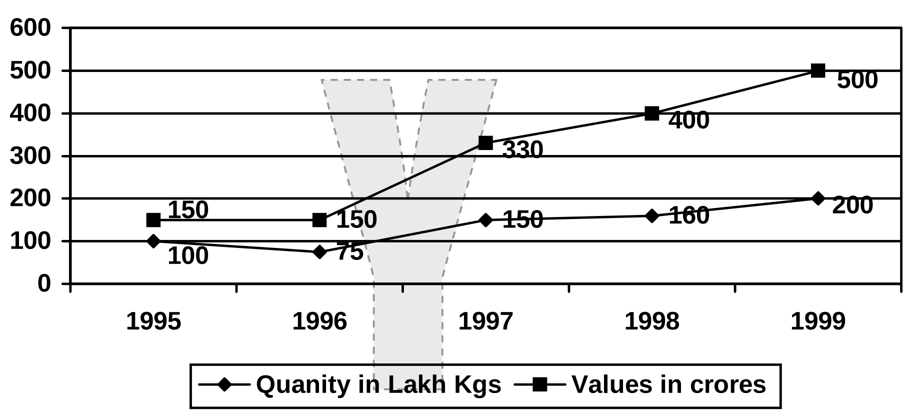


From the above graph, we can calculate.

1. Percentage change in the sales of any brand in any year over the previous year.
2. Rate of growth of total sales of the cars (all the brands) in a given period.
3. Proportion of the sales of any brand with respect to those of any other brand in the given year.

Example :

INDIA'S CASHEWNUT EXPORTS



1. In which year was the value per kg minimum

(A) 1995 (B) 1996 (C) 1997 (D) 1998

Sol. Value per kg for the years given in options

1995	**1996**	**1997**	**1998**
150/100	150/15	360/150	400/160

From the above values it is clear that value per kg is minimum for the year 1995. **Answer: (A)**

2. What was the difference in volume exported in 1997 and 1998?

(A) 10000 kg (B) 1000 kg (C) 100000 kg (D) 1000000 kg

Sol. Difference = $(160 - 150)\, 10^5 = 1000000$ kg **Answer: (D)**

3. What was the approximate percentage increase in export value from 1995 to 1999?

(A) 350 (B) 330 (C) 430 (D) 230

Sol. Percentage increase in export value from1995 to 1999 = $\frac{500 - 150}{150} \times 100 = 230\%$ approx.

Answer: (D)

4. What was the percentage drop in export quantity from 1995 to 1996?

(A) 75% (B) $3^1/_3$% (C) 25% (D) 0%

Sol. Percentage decrease in export quantity from 1995 to 1996 = $\frac{75 - 100}{100} = 25\%$ **Answer: (C)**

5. If in 1998 cashew nuts were exported at the same rate per kg. as that in 1997what would be the value of exports in 1998

(A) Rs. 400 Crores (B) Rs. 352 Crores (C) Rs. 375 Crores (D) Rs. 330 Crores

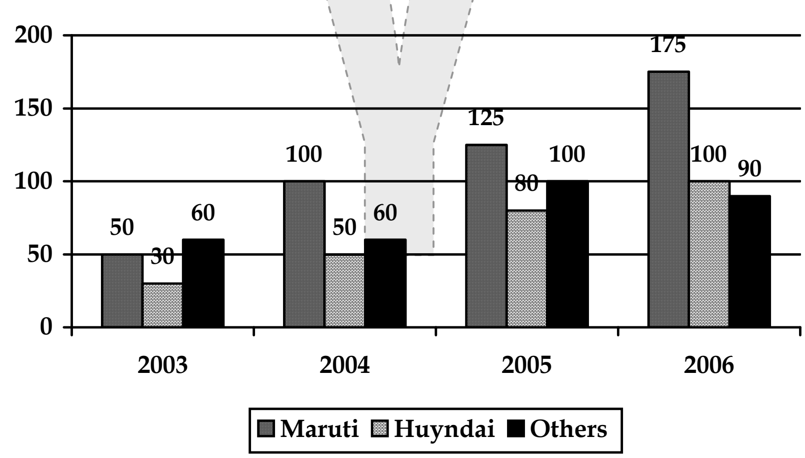
Sol. Rate per kg of cashew nut in 1998 = $(330 \times 10^7)/(150 \times 10^5)$ = Rs. 220.

Value of exports in 1998 = $160 \times 10^5 \times 220$ = Rs. 352 crores. **Answer: (B)**

Bar Chart

Bar Chart is also one of the ways to represent data.

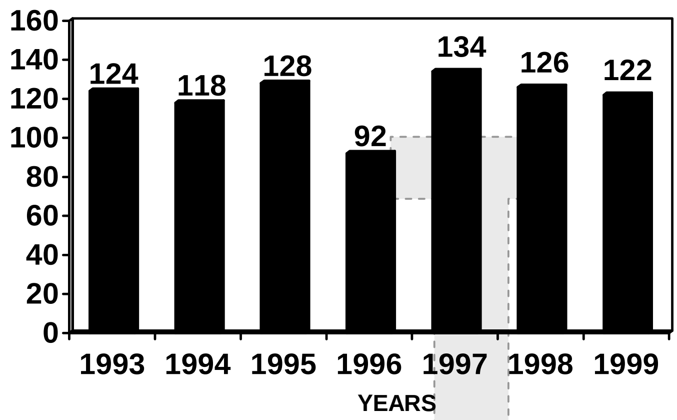
The data given in the above graph can also be represented in the form of bar chart as shown below.



Here also we can deduce all the parameters as we could do in the case of two-variable graph.

Example:

CONSUMPTION OF CHOCOBAR ACROSS THE COUNTRY (in '000 bars)



1. Which of the following statements is true regarding the consumption of chocobar?

   (A) the percentage change in consumption of chocobar over the previous year is the same every year.

   (B) The rate of fall of consumption chocobar is increasing steadily.

   (C) The steepest increase in the consumption of chcocbar follows the steepest fall in consumption

   (D) The consumption is falling and increasing in alternate years.

Sol. In 1997 the rise was 42 = It is the steepest rise and in 1996 the fall is 36, it is the steepest fall.

Answer: (C)

2. The highest percent fall in the consumption of chocobar s equal to

   (A) 28.1% (B) 39.1% (C) 25% (D) 32.2%

Sol. In 1996 the % drop = $\frac{36}{128} \times 100 = 28.1\%$

Answer: (A)

3. If 30% of the consumption of chocobars for the first five years was in marriage parties, then find the number of cartons of chocobar supplied to marriage parties given that each carton has 120 bars.

   (A) 1590 (B) 4998 (C) 4967 (D) 1490

Sol. Consumption of the chocobars for the first five years = $(124 + 118 + 128 + 92 + 134 + 126 + 122) \times 1000$

No. of cartons of 120 bars that has to be supplied = $\frac{0.3[124+118+128+92+134]}{120} \times 1000 = 1490$

Answer: (D)

4. If only 61% of the production for the year 1999 was consumed and of the rest 20% was stored and the rest had to be thrown away, then the number of chocobars that had to be thrown away is

   (A) 40,260 (B) 59,536 (C) 38,000 (D) 62,400

Sol. 61% of production in 1999 = 122×10^3

$\Rightarrow$ Production = 200×10^3

$\therefore$ No. of chocobars thrown away = $200(0.39)\ 0.8 \times 1000 = 62,400$

Answer: (D)

5. The least percentage decrease recoded was

(A) 3.14 (B) 3.19 (C) 3.22 (D) 3.17

Sol. By observation, least percentage decrease is from 1998 – 99,

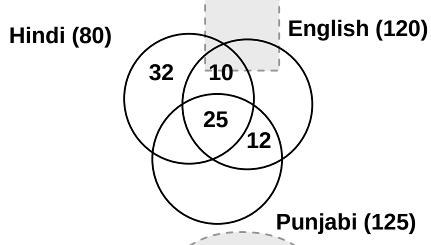
$= \frac{126 - 122}{126} \times 100 = 3.17\%$

Answer: (D)

5. Venn Diagrams

If the information comes under more than one category, we represent such data in the form of a Venn diagram.

The following Venn diagram represents the number of people who speak different languages.



From the above Venn diagram, we can find

1. the number of people who can speak only English.
2. the number of people who can speak only Punjabi.
3. the number of people who can speak both Punjabi and Hindi.
4. the number of people who can speak all the three languages.
5. the number of people who can speak exactly one or two languages.

Example:

In a class of 33 students, 20 play cricket, 25 football, & 18 volleyball, 15 play both cricket & football, 12 football & volleyball, 10 cricket & volleyball. If each student plays at least one game, find the number of students:

1. Who play only cricket?

(A) 5 (B) 7 (C) 2 (D) 3

Sol. Let C, F & V denote the sets of no of students who play cricket, football & volleyball respectively.

$\therefore$ n(C) = 20, n(F) = 25, n(V) = 18

n($C \cap F$) = 15. n($F \cap V$) = 12, n($C \cap V$) = 10

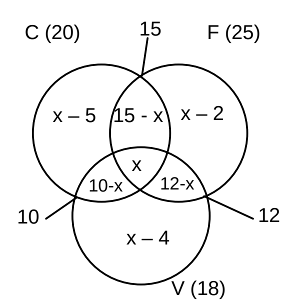
Let 'x' be the no. of students who play all the 3 games

$\therefore$ No. of students who like cricket & football but not volleyball = (15 – x)

Similarly, no. of students playing F & V but not cricket = (12 – x)

No. of students playing C & V but not football = (10 – x)

Now, we can find the no. of students who play cricket only, football only & volleyball only is



$n(C)$ only = 20 – (15 – x + x + 10 – x) = x – 5

$n(V)$ only = 18 – (10 – x + x + 12 – x) = x – 4

& $n(F)$ only = 25 – (15 – x + x + 12 – x) = x – 2

$\therefore$ 33 = (x – 5) + 15 – x + x + 10 – x + 12 – x + x – 4 + x – 2

33 = x + 26 $\therefore$ x = 7.

$\therefore$ No. of students who play only cricket = 7 – 5 = 2.

Answer. (C)

2. Who play all the three games?

(A) 5 (B) 7 (C) 2 (D) 3

Sol. $\therefore$ No. of students who play all 3 games = 7.

3. Who play any two games?

(A) 16 (B) 18 (C) 7 (D) 14

Sol. No. of who play any 2 games

= Total – [students who play all 3 games + Students who play only 1 game].

= 33 – [7 + 10] = 16.

Answer. (A)

4. Who play only one game?

(A) 18 (B) 16 (C) 10 (D) 5

Sol. No. of students who play only one game

= No. who play (C only + V only + F only)

= 2 + 3 + 5 = 10. **Answer. (C)**

OR

We can also use the formula

$n(C \cup F \cup V) = n(C) + n(F) + n(V) - n(C \cap F) - n(F \cap V) - n(C \cap V) + n(C \cap F \cap V)$

$\therefore$ 33 = 20 + 25 + 18 – 15 – 12 – 10 + x.

$\therefore$ x = 33 – 26 = 7.

i.e. no. of students who play all 3 games = 7. Now we can find the others as in the previous solutions.