

{CHAPTER 16}

DATA INTERPRETATION



The purpose of data interpretation is assess analytical ability of a person. In the entrance examinations, 2-3 questions related to this chapter are asked. Each of these comprise 3-5 questions each.

Data interpretation means understanding the given data to get inferences with the proper analysis of that data. In this, some data is provided in the form of tables, bar graphs, line graphs, pie-charts etc and questions are asked based on the given data.

A data can be represented in many different ways such as data tables, line graphs, bar graphs, pie-charts, mixed graphs, etc.

16.1 DATA TABLES

A data table is a chart of facts and figures represented in rows and columns. It can be easily understood by the following example.

Direction (Ex. 1-3) *Study the table carefully to answer the questions that follow.*

Sale (in crores) of number of units by six different companies over the years

Company\Year	1997	1998	1999	2000	2001	2002
L	107.0	80.0	28.48	38.0	26.5	36.6
M	175.1	76.0	31.38	43.0	27.5	32.8
N	156.6	66.49	43.7	45.2	19.0	40.12
O	112.4	78.24	56.6	35.1	25.1	25.0
P	95.1	111.8	53.2	48.9	22.5	37.0
Q	192.0	72.18	31.04	42.2	17.0	30.0

EXAMPLE 1 Number of units sold by company M in the year 2002 is what per cent of the total number of units sold by all the companies together in that year? (rounded off to two digits after decimal)

(a) 16.72

(b) 16.28

(c) 17.50

(d) 16.86

Solution (b) Number of units sold by all companies in 2002

$$= (36.6 + 32.8 + 40.12 + 25 + 37 + 30) \text{ crore} = 201.52 \text{ crore}$$

$$\text{Hence, required percentage} = \frac{32.8}{201.52} \times 100 = 16.28$$

EXAMPLE 2 Which company has sold the maximum number of units over the years?

- (a) M (b) N (c) O (d) P

Solution (a)

Company	Number of units sold over the years (in crores)
L	$107 + 80 + 28.48 + 38 + 26.5 + 36.6 = 316.58$
M	$175.1 + 76 + 31.38 + 43 + 27.5 + 32.8 = 385.78$
N	$156.6 + 66.49 + 43.7 + 45.2 + 19 + 40.12 = 371.11$
O	$112.4 + 78.24 + 56.6 + 35.1 + 25.1 + 25 = 332.44$
P	$95.1 + 111.8 + 53.2 + 48.9 + 22.5 + 37 = 368.5$
Q	$192 + 72.18 + 31.04 + 42.2 + 17.0 + 30 = 384.42$

Hence, M sold maximum number of units over the years.

EXAMPLE 3 In which year is the percentage increase/decrease in number of units sold from the previous year the lowest for company L?

- (a) 1998 (b) 1999 (c) 2000 (d) 2001

Solution (b) It is clear from the table that units sold by L in 1998 = 80 crore

Units sold in 1999 = 28.48 crore

Hence, there is sharp decrease in comparison to previous years.

16.2 LINE GRAPH

A line graph indicates the variation of a quantity with respect to the two parameters plotted on X and Y- axes, respectively. A line graph shows the quantitative information or a relationship between two changing quantities with a line or curve that connects a series of successive data points.

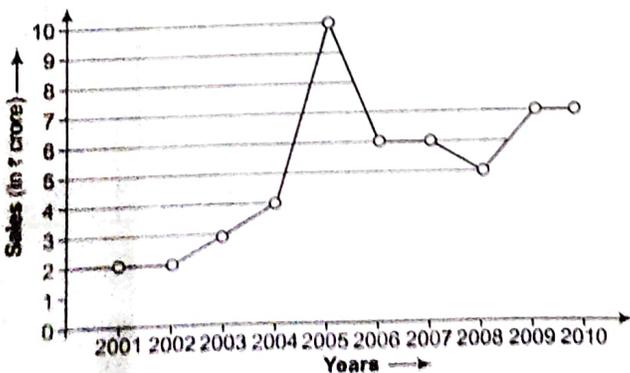
Types of Line Graph

Different types of line graph are discussed below

Single Line Graph

It is used for single variable representation.

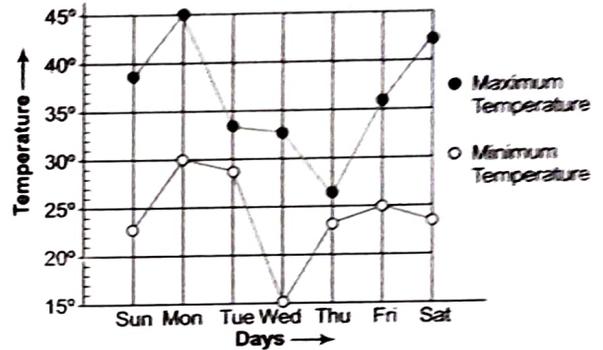
For example The following single line graph represents the yearly sales figure of a company in the years 2001-2010.



Multiple Line Graph

It is used for more than one variable representation.

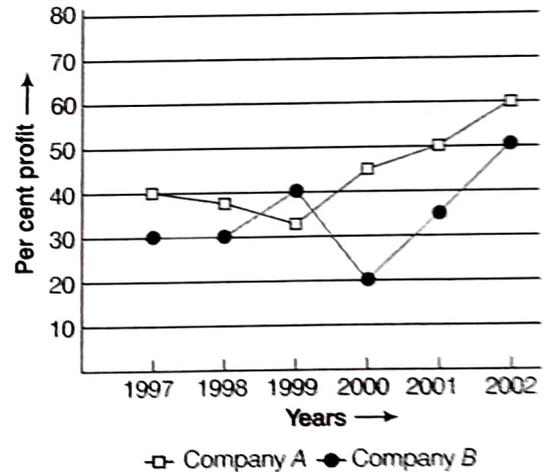
For example The following multiple line graph represents the maximum and minimum temperature of a place recorded everyday in a certain week.



Directions (Ex. 4-6) Study the following graph to answer the given questions.

$$\text{Per cent profit} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$$

Per cent Profit Earned by Two Companies Over the Given Year



EXAMPLE 4 If the expenditure of company B in 2000 was ₹ 200 crore, what was the income?

- (a) ₹ 275 crore (b) ₹ 250 crore
(c) ₹ 260 crore (d) ₹ 240 crore

Solution (d) Let the income be ₹ a crore. Then,

$$\frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100 = \text{Profit per cent}$$

$$\Rightarrow \frac{a - 200}{200} \times 100 = 20$$

$$\Rightarrow \frac{a - 200}{2} = 20$$

$$\Rightarrow a - 200 = 40$$

$$\Rightarrow a = 200 + 40$$

$$\Rightarrow a = ₹ 240 \text{ crore}$$

EXAMPLE 5 If the income of company A in 2002 was ₹ 600 crore, then what was its expenditure?

- (a) ₹ 300 crore
- (b) 375 crore
- (c) 325 crore
- (d) 350 crore

Solution (b) The income of company A in 2002 = ₹ 600 crore
 Per cent profit = 60
 Let the expenditure be ₹ a crore.

$$\text{Profit per cent} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$$

$$\frac{600 - a}{a} \times 100 = 60$$

$$\Rightarrow a = \frac{600 - a}{3} \times 100$$

$$\Rightarrow a = \frac{600 - a}{3} \times 5$$

$$\Rightarrow 3a = 5(600 - a) \Rightarrow 3a = 3000 - 5a$$

$$\Rightarrow 5a + 3a = 3000$$

$$\Rightarrow 8a = 3000$$

$$\therefore a = \frac{3000}{8} = ₹ 375 \text{ crore}$$

EXAMPLE 6 What is the per cent increase in per cent profit for company B from year 2000 to 2001?

- (a) 80%
- (b) 70%
- (c) 75%
- (d) 72%

Solution (c) Profit per cent in 2000 = 20

Profit per cent in 2001 = 35

∴ Required per cent

$$= \frac{35 - 20}{20} \times 100 = \frac{15}{20} \times 100 = 75\%$$

16.3 BAR GRAPH

A bar graph is a graphical display of data using bars of different heights which are equidistant from each other. It represents comparison between categories of data. The bars in a bar graph are presented in such away that they do not touch each other, to indicate elements as separate entities.

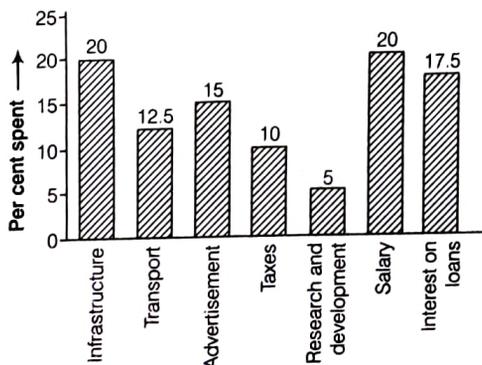
Types of Bar Graph

Different types of Bar Graph are discussed below.

Simple Bar Graph

A simple bar graph relates to only one variable.

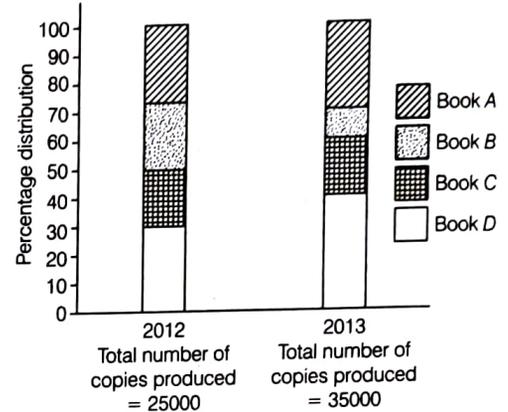
For example Given below chart shows the percentage distribution of total expenditure of a company.



Sub-Divided Bar Graph

A sub-divided bar graph is used to represent various parts of total magnitude of a given variable.

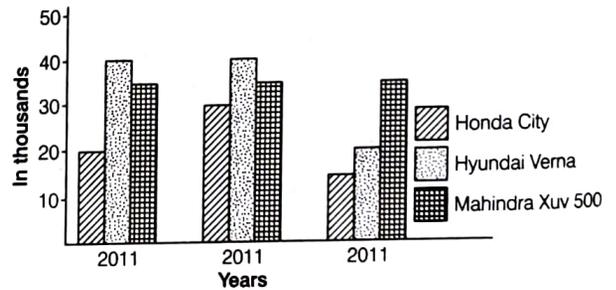
For example Given below chart shows percentage distribution of sales of 4 books in different years.



Multiple Bar Graph

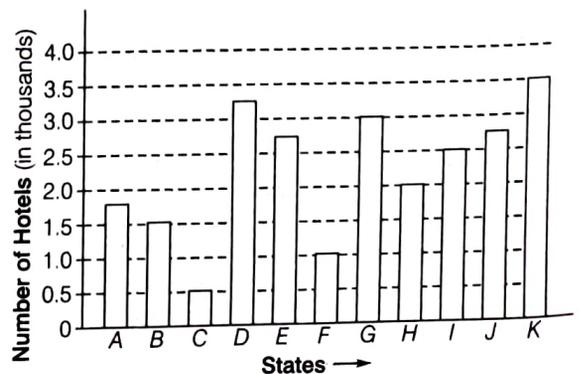
In this type, two or more bars are constructed adjoining each other to represent either different components of a complete data or to show multiple variables.

For example Given below chart shows the production of 3 types of car in three different years.



Directions (Ex. 7-9) Study the graph carefully to answer the questions that follow.

Number (in thousands) of hotels in different states



EXAMPLE 7 What is the approximate average number of hotels from all the states together?

- (a) 2221
- (b) 2226
- (c) 2220
- (d) 2227

Solution (d) Average number of hotels

$$= \frac{1}{11} [1.75 + 1.5 + 0.5 + 3.25 + 2.75 + 1 + 3 + 2 + 2.5 + 2.75 + 3.5] \text{ thousands}$$

$$= \frac{24.5}{11} \text{ thousands}$$

$$= \frac{24.5 \times 1000}{11} = 2227$$

EXAMPLE 8 Number of hotels in state *J* is what per cent of the total number of hotels from all the states together?

- (a) 11.63% (b) 11.22%
 (c) 11.12% (d) 11.32%

Solution (b) Number of hotels in state *J* = 2.75
 Number of hotels in all the states = 24.51
 Hence, required per cent = $\frac{2.75}{24.5} \times 100 = 11.22\%$

EXAMPLE 9 Total number of hotels from states *B*, *D* and *F* together form approximately what per cent of the total number of hotels from all state together?

- (a) 25% (b) 26% (c) 23% (d) 24%

Solution (c) Number of hotels from states *B*, *D* and *F*
 $= 1.5 + 3.25 + 1 = 5.75$ thousands
 Hence, required per cent = $\frac{5.75}{24.5} \times 100 = 23.46\% \approx 23\%$

16.4 PIE-CHARTS

Pie-charts are specific types of data presentation where the data is represented in the form of a circle. In pie-chart, a circle is divided into various sections or segments such that each segment represents a certain proportion or percentage of the total.

Types of Pie-Chart

Different types of pie-chart are discussed below

Pie-Chart Based on Percentage In it, data points are represented in percentage.

So, total of given components is equal to 100%.

Value of any component

$$= \frac{\text{Percentage value of component}}{100} \times \text{Total value}$$

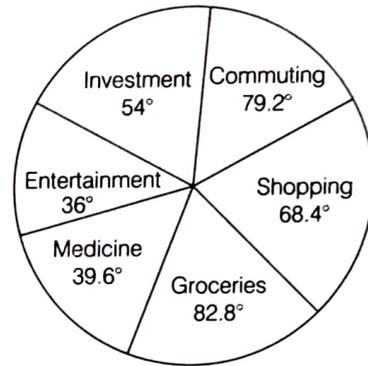
Pie Chart Based On Degree In it, data points are represented in degree. So, total of given components is equal to 360°.

Value of any component

$$= \frac{\text{Degree value of Component}}{360^\circ} \times \text{Total Value}$$

Directions (Ex. 10-14) Study the following pie-chart carefully to answer the questions that follow.

Degreewise Break-up of Expenditure of a Family in a Month



Total amount spent = ₹ 45800

EXAMPLE 10 What is the amount spent by the family on commuting?

- (a) ₹ 10080 (b) ₹ 10076
 (c) ₹ 10092 (d) ₹ 10075

Solution (b) The corresponding angle for commuting = 79.2°
 Also, $360^\circ = 45800$
 Hence, $79.2^\circ = \frac{79.2}{360} \times 45800 = ₹ 10076$

EXAMPLE 11 What is the respective ratio of amount spent by family on medicine to the amount spent on groceries?

- (a) 18 : 17 (b) 19 : 25
 (c) 11 : 23 (d) 12 : 33

Solution (c) Required ratio = 39.6 : 82.8 = 11 : 23

EXAMPLE 12 What is the total amount spent by the family on entertainment and shopping together?

- (a) 13282 (b) 13000 (c) 13684 (d) 13954

Solution (a) Corresponding angle for entertainment and shopping together = 36 + 68.4 = 104.4°
 Hence, total amount = $\frac{104.4^\circ}{360^\circ} \times 45800 = 13282$

EXAMPLE 13 Total amount spent by the family on groceries, entertainment and investment together forms approximately what per cent of amount spent on commuting?

- (a) 220 (b) 218
 (c) 219 (d) 227

Solution (a) Corresponding total angle for groceries, entertainment and investment together
 $= 82.8 + 36 + 54 = 172.8$
 Corresponding angle for commuting = 79.2°
 Hence, required percentage = $\frac{172.8}{78.2} \times 100 \approx 220$

EXAMPLE 14 Amount spent by the family on medicine forms what per cent of amount spent on shopping?

- (a) 56.24% (b) 57.89%
 (c) 58.32% (d) 55%

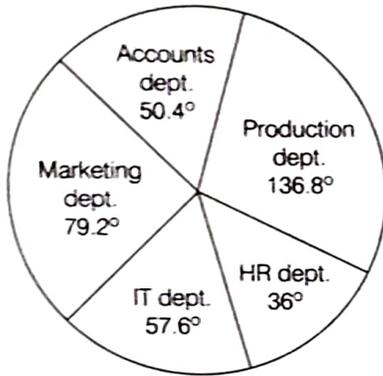
Solution (b) Required percentage = $\frac{39.6}{68.4} \times 100 = 57.89\%$

16.5 MIXED GRAPH

In mixed graphs, instead of giving data in any of the standard formats, we merge two or three formats. You have to study them to answer the questions.

Directions (Ex. 15-18) Study the graph carefully and answer the questions that follow.

Degreewise distribution of employees working in various departments of an organisation and the ratio of number of men to number of women.



Total number of employees = 3250

Respective ratio of number of men to number of women in each department.

Department	Men	Women
Production	4	1
HR	12	13
IT	7	3
Marketing	3	2
Accounts	6	7

EXAMPLE 15 What is the number of men working in the marketing department?

- (a) 442 (b) 435 (c) 450 (d) 429

Solution (d) Number of men working in the marketing department

$$= 3250 \times \frac{79.2}{360} \times \frac{3}{3+2}$$

$$= 715 \times \frac{3}{5} = 143 \times 3 = 429$$

EXAMPLE 16 What is the ratio of the number of women working in the HR department to the number of men working in the IT department?

- (a) 18 : 35 (b) 13 : 28 (c) 14 : 17 (d) 19 : 17

Solution (b) Number of women working in the HR department

$$= 3250 \times \frac{36}{360} \times \frac{13}{13+12} = 169$$

Number of men working in the IT department

$$= 3250 \times \frac{57.6}{360} \times \frac{7}{7+3} = 364$$

$$\therefore \text{Required ratio} = \frac{169}{364} = \frac{13}{28} = 13 : 28$$

EXAMPLE 17 The number of men working in the production department of the organisation is what per cent of the total number of employees working in that department?

- (a) 92% (b) 82% (c) 80% (d) 73%

Solution (c) Total number of employees in production department

$$= 3250 \times \frac{136.8}{360} = 1235$$

Number of men working in the production department

$$= 1235 \times \frac{4}{4+1} = 988$$

$$\therefore \text{Required percentage} = \frac{988}{1235} \times 100\% = 80\%$$

EXAMPLE 18 The number of women working in the IT department of the organisation is what per cent of the total number of employees in the organisation from all the departments together?

- (a) 4.8% (b) 4.6% (c) 4.5% (d) 4.7%

Solution (a) Number of women working in the IT department

$$= 3250 \times \frac{57.6}{360} \times \frac{3}{7+3} = 156$$

Total number of employees = 3250

$$\therefore \text{Required percentage} = \frac{156}{3250} \times 100\% = 4.8\%$$

CHECK YOUR PREPARATION LEVEL

{EXERCISE 1}

Directions (Q. Nos. 1-5) Refer to the following table. Read the table and answer the questions.

Food Grains Production in a Country in 1999 (in lakh tonne)

State	Rice	Wheat	Jowar	Pulses	Others
P	45	103	—	27	29
Q	48	86	73	19	15
R	59	32	67	14	31
S	41	37	59	21	15
T	37	22	41	13	11
U	68	15	12	—	18
V	57	8	7	12	10
W	38	28	31	22	45

- Which state had the highest grain production?
(a) P (b) Q (c) R (d) S
- What was the proportion of rice production to wheat production in the country?
(a) 1 : 1 (b) 331 : 339 (c) 393 : 331 (d) 2 : 1
- Jowar was the most important food grain in the state/states
(a) Q, R, S (b) Q (c) R, S (d) R, S, T
- State P alone accounted for approximately, what percentage of wheat production in the country?
(a) 73% (b) 50% (c) 41% (d) 30%
- If the average per hectare yield of rice in the country was 30 tons, then the area (approx.) under rice cultivation during the year was approx. (in lakh hectares)
(a) 1.5 (b) 8 (c) 13 (d) 40