

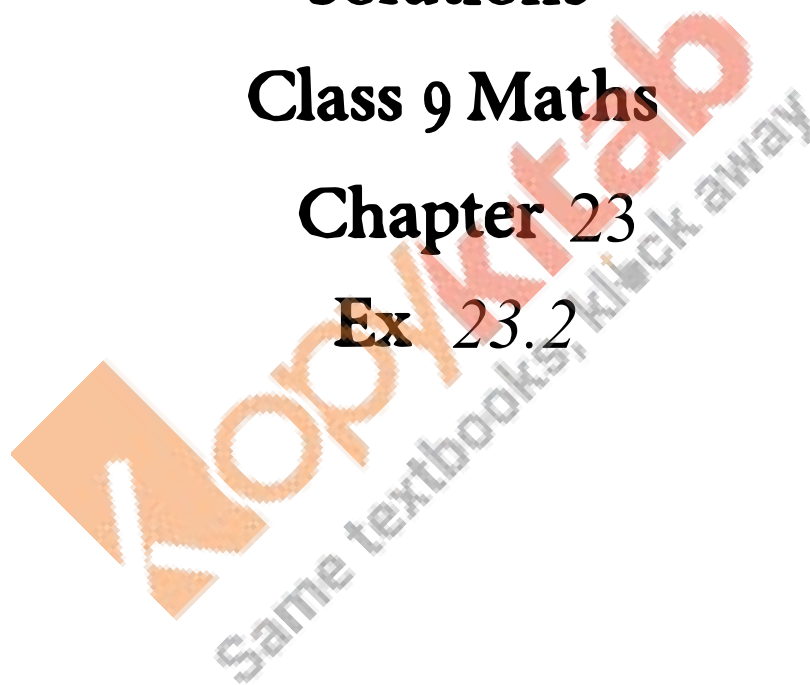
**RD SHARMA**

**Solutions**

**Class 9 Maths**

**Chapter 23**

**Ex 23.2**



Q1: Explain the reading and interpretation of bar graphs.

Ans: A bar graph is a diagram consisting of a sequence of vertical or horizontal bars or rectangles, each of which represents an equal interval of the values of a variable, and has the height proportional to the quantities of the phenomenon under consideration in that interval. A bar graph may also be used to illustrate discrete data, in which case each bar represents a distinct circumstance.

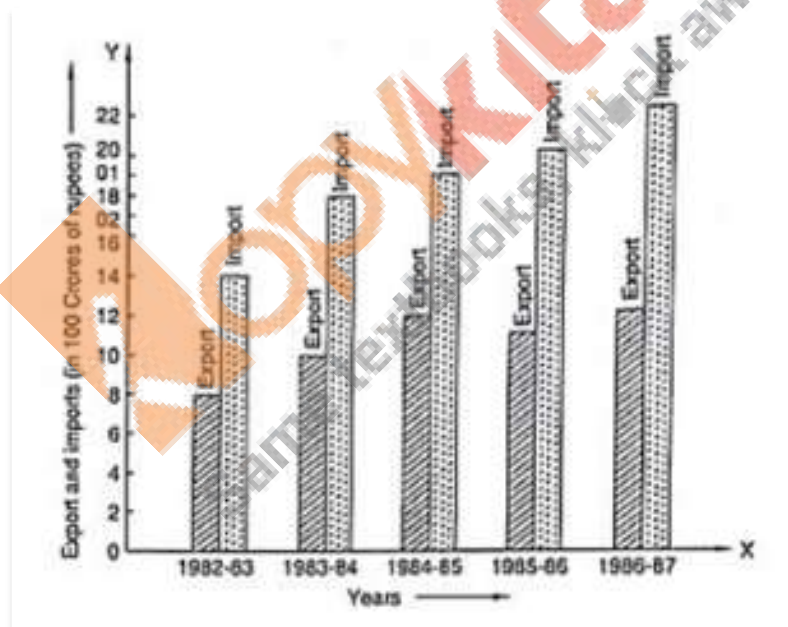
While drawing a bar graph, we keep in mind that:

1. The width of the bars should be uniform throughout.
2. The gap between any two bars should be uniform throughout.
3. Bars may be either horizontal or vertical.

Each bar must be of the same width and the gap between them must be uniform. Make sure that the width of the bars and the gap between them should not be necessarily same.

Q2: Read the following bar graph and answer the following questions:

- (i) What information is given by the bar graph?
- (ii) In which year the export is minimum?
- (iii) In which year the import is maximum?
- (iv) In which year the difference of the values of export and import is maximum?

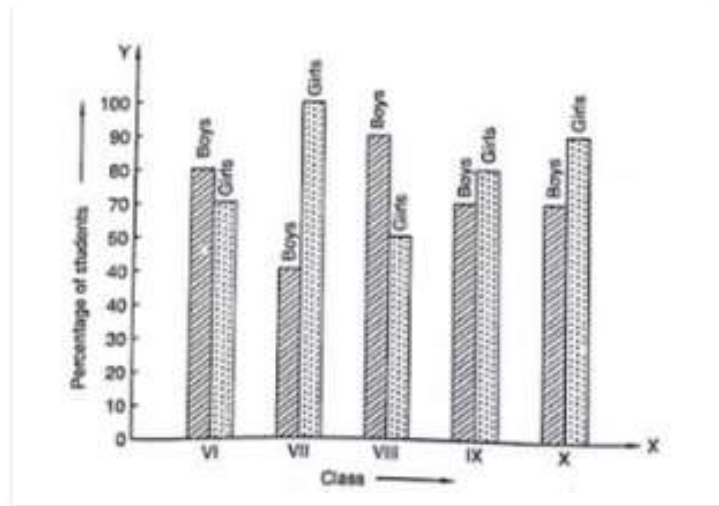


Ans:

- (1) The bar graph represents the import and export (in 100 Crores of rupees) from 1982-83 to 1986-87.
- (2) The export is minimum in the year 1982-83 at the height of the bar corresponding to export is minimum in the year 1982-83.
- (3) The import is maximum in the year 1986-87 as the height of the bar corresponding to import is maximum in the year 1986-87.
- (4) The bars of export and import are side by side. Clearly, it is seen from the bar graph that the difference between the values of export and import is maximum in the year 1986-87.

It is seen from the bar graph that the height of the 3s bar from the left is least, which is corresponding to DCE. Hence, the requirement is least in DCE.

Q3: The following bar graph shows the results of an annual examination in a secondary school. Read the bar graph (Fig. 23.28) and choose the correct alternative in each of the following:



(i) The pair of classes in which the results of boys and girls are inversely proportional are:

- (a) VI, VIII      (b) VI, IX      (c) VII, IX      (d) VIII, X

(ii) The class having the lowest failure rate of girls is:

- (a) VI      (b) X      (c) IX      (d) VIII

(iii) The class having the lowest pass rate of students is:

- (a) VI      (b) VII      (c) VIII      (d) IX

Ans :

(1) The pair of classes in which the results of boys and girls are inversely proportional are VI and IX.

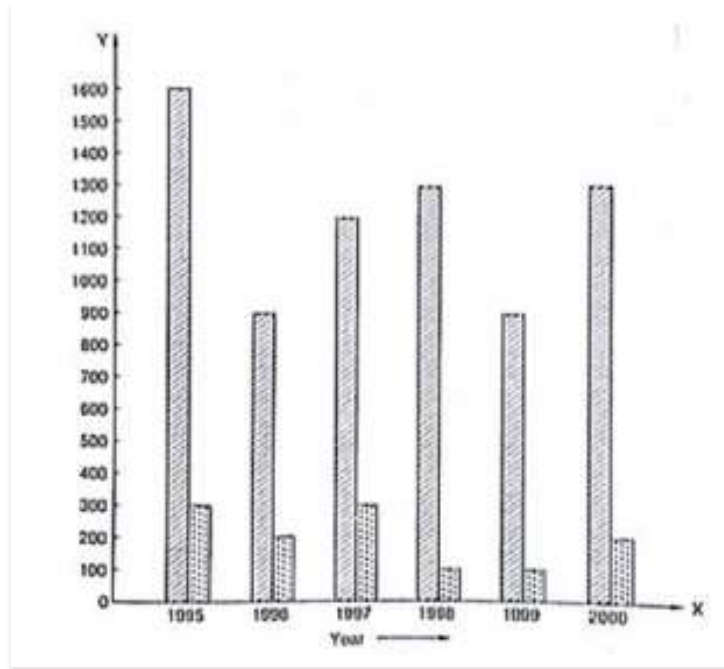
(2) The lowest failure rate of girls is same to the highest pass rate. Hence, the class having the lowest failure rate of girls is VII (the height of the bar corresponding to girls for this class is maximum).

(3) The sum of the heights of the bars for boys and girls in class VII is minimum, which is  $95 + 40 = 135$ . Hence, the class having the lowest pass rate is VII. Hence, the correct choice is (b).

Q4: The following data gives the number (in thousands) of applicants registered with an Employment Exchange during 1995-2000:

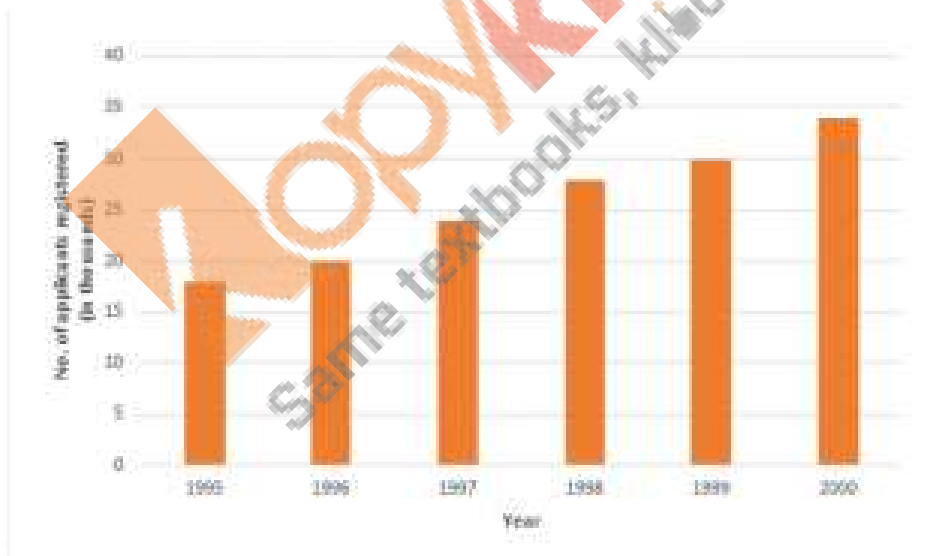
Year	1995	1996	1997	1998	1999	2000
Number of applicants registered (in thousands)	18	20	24	28	30	34

Construct a bar graph to represent the above data.



Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the years and the number of applicants registered in thousands respectively. We have to draw 6 bars of different lengths given in the table. At first we mark 6 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the number of applicants registered.

The vertical bar graph of the given data is following:



Q5: The production of saleable steel in some of the steel plants of our country during 1999 is given below:

Plant	Bhilai	Durgapur	Rourkela	Bokaro
Production(in thousands)	160	80	200	150

Construct a bar graph to represent the above data on a graph paper by using the scale 1 big divisions = 20 thousand tonnes.

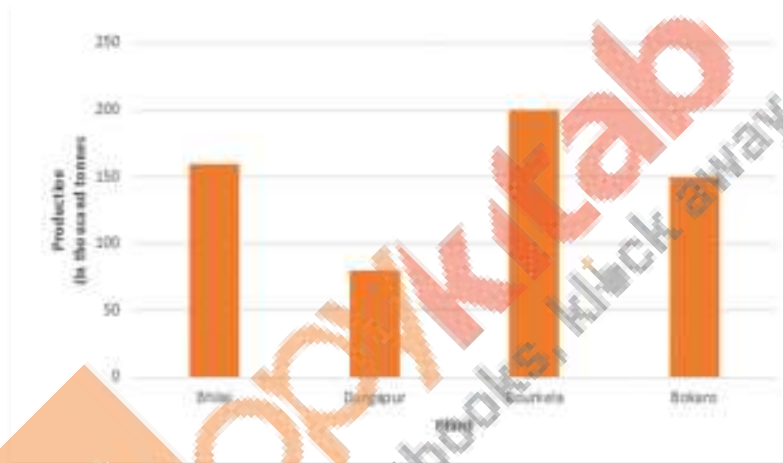
Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the plants and the production in thousand tonnes respectively. We have to draw 4 bars of different lengths given in the table.

The scale 1 big divisions must be 20 thousand tonnes. So, first find the heights of the bars corresponding to different plants. After that, we follow the well known procedure.

The heights of the different bars are:

1. The height of the bar corresponding to Bhilai  $160/20 = 8$  big division.
2. The height of the bar corresponding to Durgapur is  $80/20 = 4$  big divisions.
3. The height of the bar corresponding to Rourkela = 10 big divisions.
4. The height of the bar corresponding to Bokaro is = 7.5 big divisions.

At first we mark 4 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the productions. The vertical bar graph of the given data is following:



Note that one big division in the vertical axis is equivalent to 20 thousand tonnes

Q6: The following table gives the route length (in thousand kilometres) of the Indian Railways in some of the years:

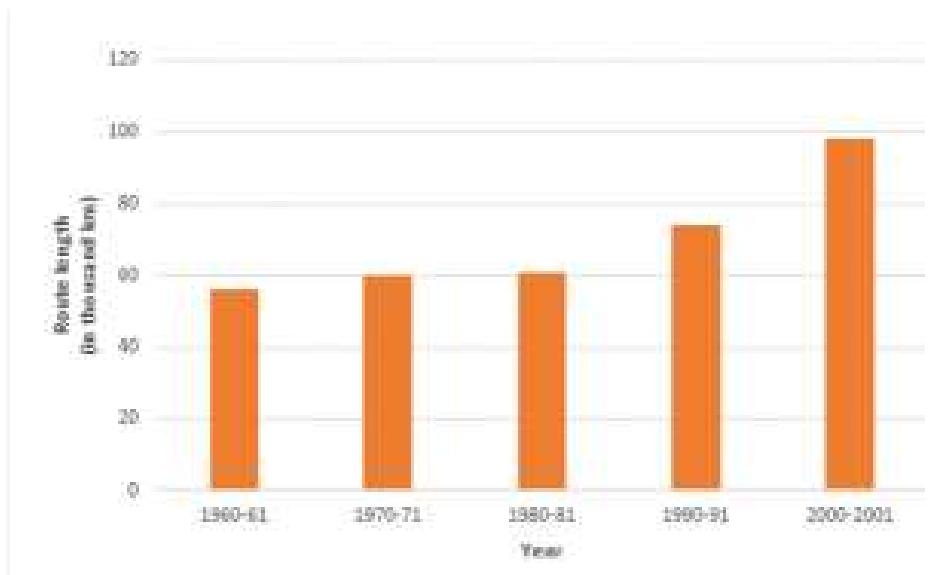
Year	1960-61	1970-71	1980-81	1990-91	2000-2001
Route length(in thousand km)	56	60	61	74	98

Represent the above data with the help of a bar graph.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the years and the route lengths in thousand km respectively. We have to draw 5 bars of different lengths given in the table.

At first we mark 5 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the route lengths.

The vertical bar graph of the given data is following:



Q7: The following data gives the amount of loans (in crores of rupees) disbursed by a bank during some years:

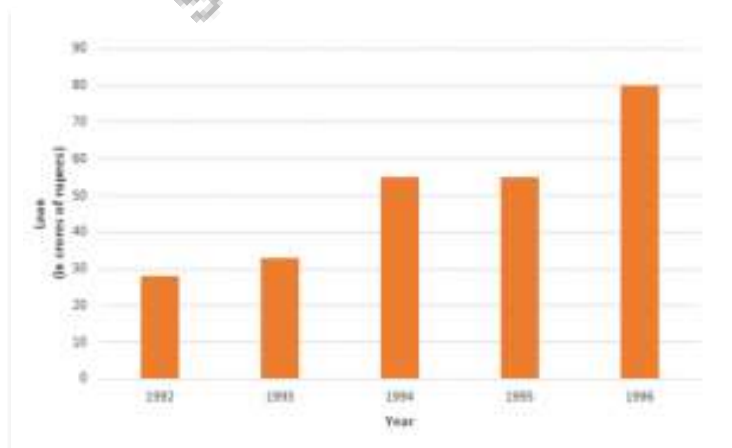
Year	1992	1993	1994	1995	1996
Loan(in crores of rupees)	28	33	55	55	80

(i) Represent the above data with the help of a bar graph.

(ii) With the help of the bar graph, indicate the year in which amount of loan is not increased over that of the preceding year.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the years and the amount of loan in Crores of rupees respectively. We have to draw 5 bars of different lengths given in the table. At first, we mark 5 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the amount of loan disbursed by the bank.

(1) The vertical bar graph of the given data is following:



(2) It is seen from the bar graph that the heights of the bars in the years 1994 and 1995 are same. Hence, the amount of loan is not increased in the year 1995 over the preceding year 1994.

Q8: The following table shows the interest paid by a company (in lakhs):

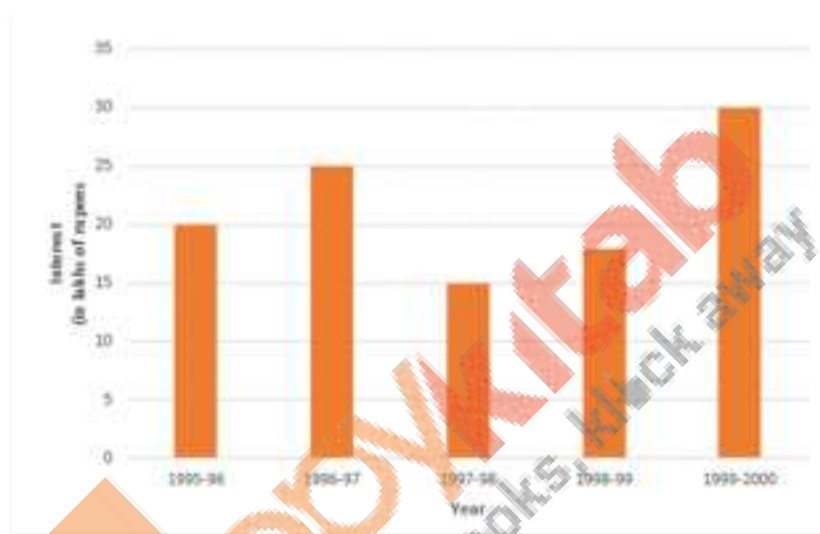
Year	1995-96	1996-97	1997-98	1998-99	1999-2000
Interest(in lakhs of rupees)	20	25	15	18	30

Draw the bar graph to represent the above information.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes.

Let us consider that the horizontal and vertical axes represent the years and the interests in lakhs of rupees respectively. We have to draw 5 bars of different lengths given in the table. At first, we mark 5 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the interests paid by the company.

The vertical bar graph of the given data is following:



Q9: The following data shows the average age of men in various countries in a certain year.

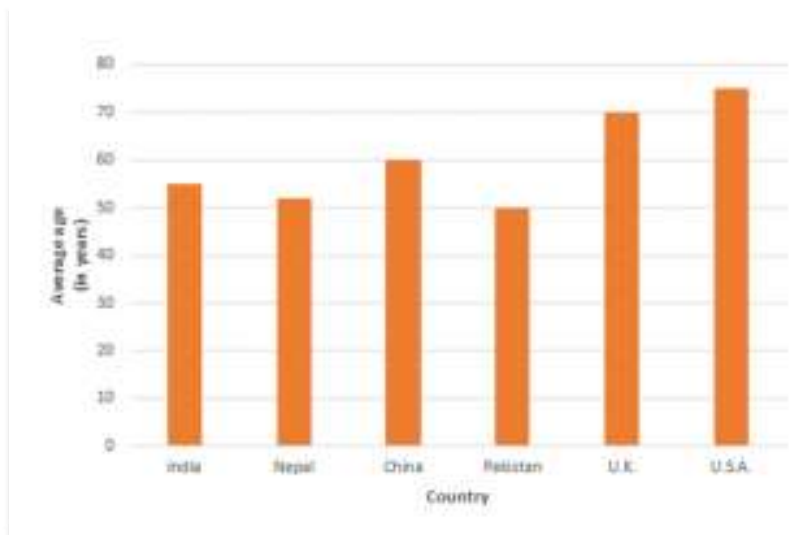
Country	India	Nepal	China	Pakistan	U.K	U.S.A
Average age(in years)	55	52	60	50	70	75

Represent the above information by a bar graph.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes.

Let us consider that the horizontal and vertical axes represent the countries and the average age of men's respectively. We have to draw 6 bars of different lengths given in the table. At first, we mark 6 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the average age of men's in different countries.

The vertical bar graph of the given data is following:



Q10: The following data gives the production of food grains (In thousand tonnes) for some years:

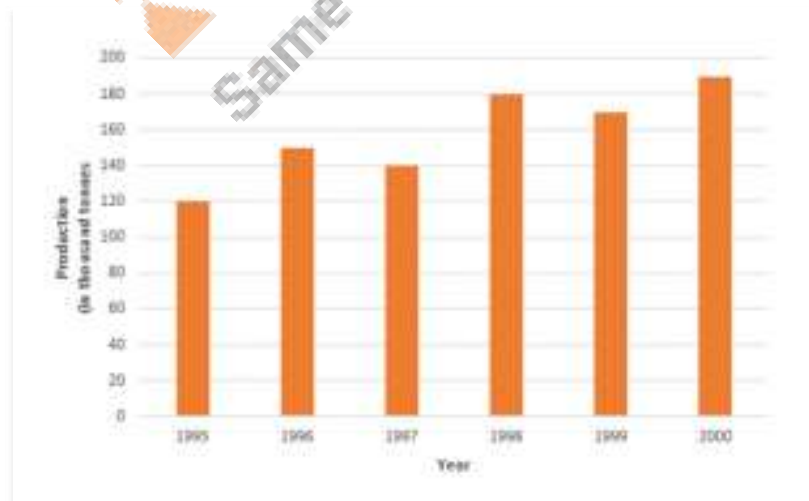
Year	1995	1996	1997	1998	1999	2000
Production (in thousand rupees)	120	150	140	180	170	190

Represent the above data with the help of a bar graph.

Ans:

To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes.

Let us consider that the horizontal and vertical axes represent the years and the production of food grains in thousand tonnes respectively. We have to draw 6 bars of different lengths given in the table. At first, we mark 6 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the production of food grains. The vertical bar graph of the given data is following:



Q11: The following data gives the amount of manure (in thousand tones) manufactured by a company during some years:

Year	1992	1993	1994	1995	1996	1997



Manure(in thousand tones)	15	35	45	30	40	20
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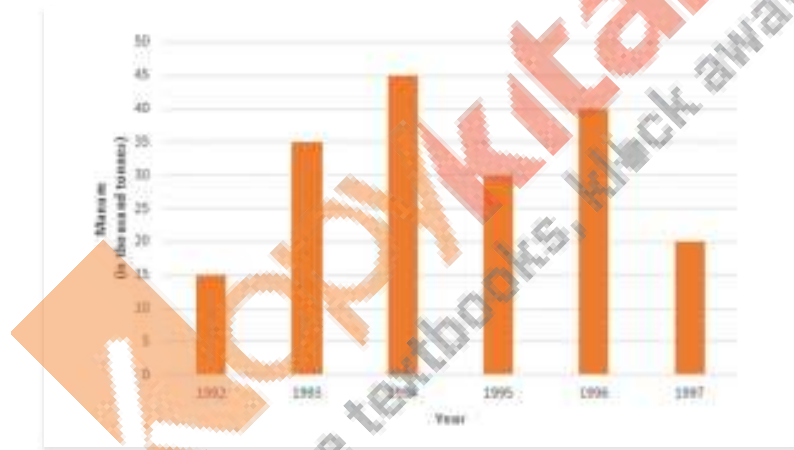
- (i) Represent the above data with the help of a bar graph.
- (ii) Indicate with the help of the bar graph the year in which the amount of manufactured by the company was maximum.
- (iii) Choose the correct alternative:

The consecutive years during which there was the maximum decrease in manure production are:

- (a) 1994 and 1995    (b) 1992 and 1993    (c) 1996 and 1997    (d) 1995 and 1996

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the years and the amount of manure in thousand 9 ones respectively. We have to draw 6 bars of different lengths given in the table. At first, we mark 6 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the amount of manures manufactured by the company.

(1) The vertical bar graph of the given data is following:



(2) It is seen from the bar graph that the height of the 3s bar from the left is maximum, which is corresponding to the year 1994. So in 1994, the quantity manufactured by the company was maximum.

(3) It is seen from the bar graph that the manure production is decreased in the years 1995 (1.5 scale divisions) and 1997 (2 full-scale divisions). So, the maximum decrease is in the year 1997. Hence, the correct choice is (c).

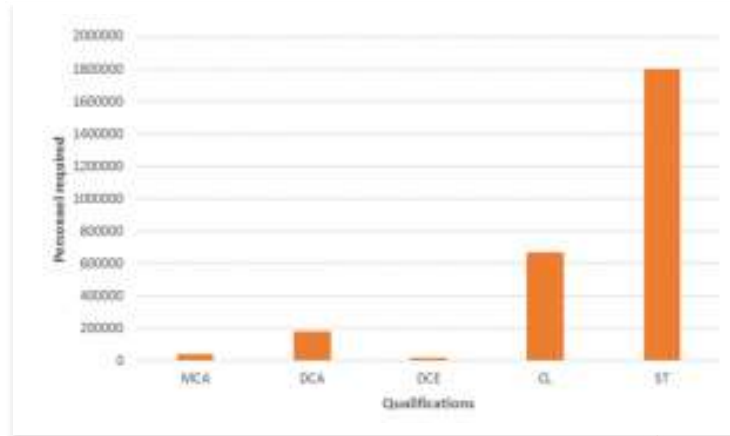
Q12: The following data gives the demand estimates of the Government of India, Department of Electronics for the personnel in the Computer sector during the Eighth Plan period (1990-95):

Qualifications	MCA(masters in computer applications)	DCA(diploma in computer applications)	DCE(diploma in computer engineering)	CL(certificat level course)	ST(short term course)
Personnel required	40600	181600	18600	670600	1802900

Represent the data with the help of a bar graph. Indicate with the help of the bar graph the course where the estimated requirement is least.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the qualifications and the personnel required in hundreds respectively. We have to draw 5 bars of different lengths given in the table. At first, we mark 5 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the number of personnel required.

The vertical bar graph of the given data is following:



It is seen from the bar graph that the height of the 3rd bar from the left is least, which is corresponding to DCE. Hence, the requirement is least in DCE.

Q13: The income and expenditure for 5 years of a family is given in the following data:

Represent the above data by a bar graph.

Years	1995-96	1996-97	1997-98	1998-99	1999-2000
Income (Rs. In thousands)	100	140	150	170	210
Expenditure (Rs. in thousands)	80	130	145	160	190

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the years and the income or expenditure in thousand rupees respectively. We have to draw 5 bars for each income and expenditure side by side of different lengths given in the table.

At first, we mark 5 points for each income and expenditure in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the corresponding income or expenditures.

Q14: The investments (in ten crores of rupees) of Life Insurance Corporation of India in different sectors is given below:

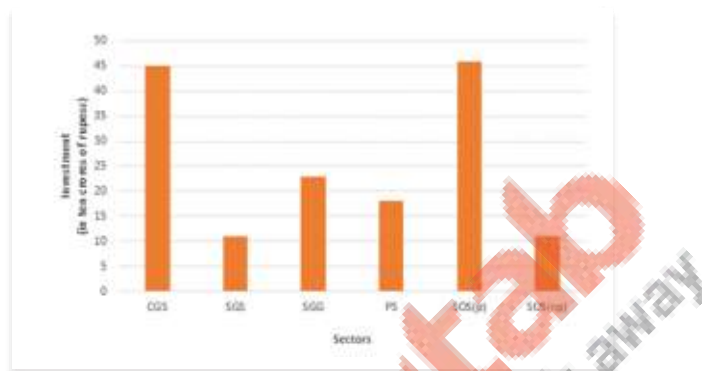
Sectors	Investment (in ten crores of rupees)
Central government securities	45
State government securities	11
Securities guaranteed by the government	23

Private sectors	18
Socially oriented sectors(plan)	46
Socially oriented sectors(Non – plan)	11

Represent the above data with the help of a bar graph.

Ans:

To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the sectors and the investment in ten Crores of rupees respectively. We have to draw 6 bars of different lengths given in the table. At first, we mark 6 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the investments of Life Insurance Corporation of India. The vertical bar graph of the given data is following:



The short forms used in the graph are:

- (a) C.G.S. : Central Government Securities
- (b) S.G.S. : State Government Securities
- (c) S.G.G. : Securities Guaranteed by Government
- (d) RS.: Private Sectors
- (e) S.O.S.(P) : Socially Oriented Sectors (Plan)
- (f) S.O.S.(NP) : Socially Oriented Sectors (Non-Plan)

Q15: The following data gives the value (in crores of rupees) of the Indian export of cotton textiles for different years:

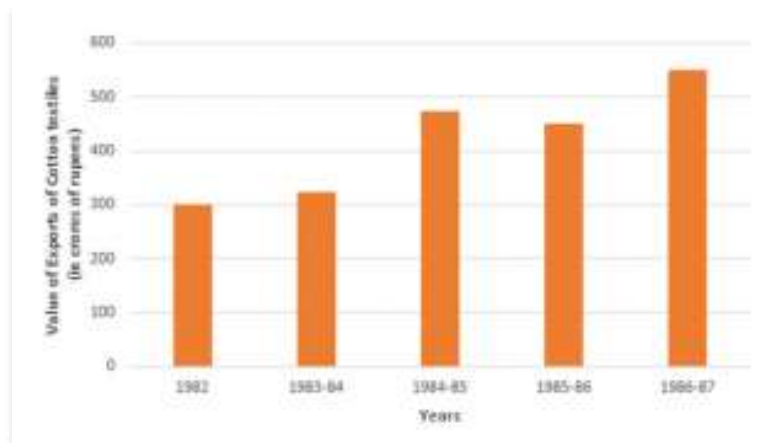
Years	1982-83	1983-84	1984-85	19985-86	19986-87
Value of exports of cotton textiles(in crores of rupees)	300	325	475	450	550

Represent the above data with the help of a bar graph. Indicate with the help of a bar graph the year in which the rate of increase in exports is maximum over the preceding year.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the years and the value of Indian export of cotton textiles in Crores

of rupees respectively. We have to draw 5 bars of different lengths given in the table.

At first, we mark 5 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the values of Indian export of cotton textiles in different years. The vertical bar graph of the given data is following:



The export increases in the years 1983-84, 1984-85 and 1986-87. Now,

(a) The rate of increase in the year 1983-84 is

$$\Rightarrow \frac{325-300}{300} \times 100$$

$$\Rightarrow \frac{25}{3}$$

$$= 8.33\%$$

(b) The rate of increase in the year 1984-85 is

$$\Rightarrow \frac{475-325}{325} \times 100$$

$$\Rightarrow 15000 / 325$$

$$\Rightarrow 600/13$$

$$\Rightarrow 46.15\%$$

(c) The rate of increase in the year 1986-87 is

$$\Rightarrow \frac{550-450}{450} \times 100$$

$$\Rightarrow 10000 / 450$$

$$\Rightarrow 22.22\%$$

Hence, in the year 1984-85, the rate of increase of export is the maximum over the preceding year.

Q16: The following table gives the quantity of goods (in crores of rupees)

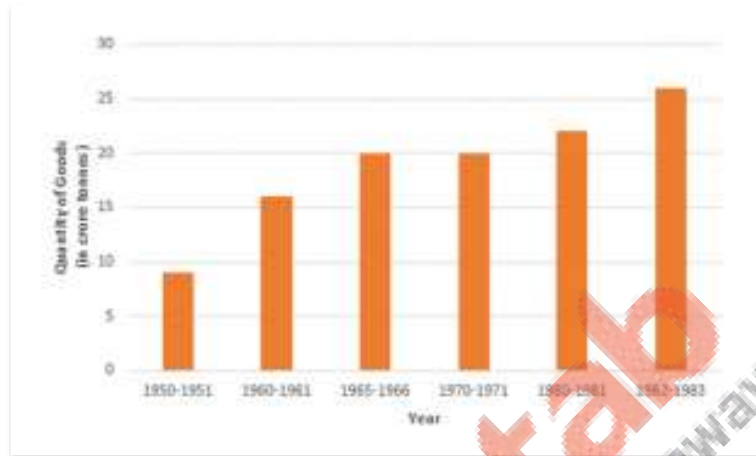
Year	1950-51	1960-61	1965-66	1970-71	1980-81	1982-83
Quantity of goods(in crore tonnes)	9	16	20	20	22	26

Represent this information with the help of a bar graph.

Explain through the bar graph if the quantity of goods carried by the Indian Railways in 1965-66 is more than double the quantity of goods carried in the year 1950-51.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes. Let us consider that the horizontal and vertical axes represent the years and the quantity of goods in Crores tonnes respectively. We have to draw 6 bars of different lengths given in the table. At first, we mark 6 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the quantity of goods carried by Indian railways in different years.

The vertical bar graph of the given data is following:



It is seen from the bar graph that the quantity of goods carried in the years 1950-51 and 1965-66 are 9 Crores tonnes and 20 Crores tonnes. Clearly 20 is more than 2 multiplied by 9. Hence, the statement is true.

Q17: The production of oil (in lakh tonnes) in some of the refineries in India during 1982 was given below:

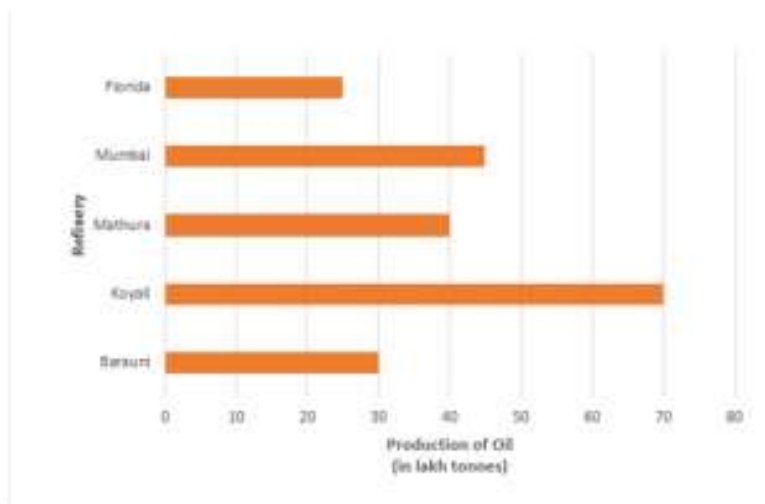
Refinery	Barauni	Koyali	Mathura	Mumbai	Florida
Production of oil(in lakh tonnes)	30	70	40	45	25

Construct a bar graph to represent the above data so that the bars are drawn horizontally.

Ans: To represent the given data by a horizontal bar graph, we first draw horizontal and vertical axes. Let us consider that the vertical and horizontal axes represent the refineries and the production of oil in lakh tonnes respectively. We have to draw 5 bars of different lengths given in the table.

At first, we mark 5 points in the vertical axis at equal distances and erect rectangles of the same width at these points. The lengths of the rectangles are proportional to the productions of oil.

The horizontal bar graph of the given data is following:



Q18: The expenditure (in 10 crores of rupees) on health by the Government of India during the various five-year plans is shown below:

Plans	I	II	III	IV	V	VI
Expenditure on health (in 10 crores of rupees)	7	14	23	34	76	182

Construct a bar graph to represent the above data.

Ans: To represent the given data by a vertical bar graph, we first draw horizontal and vertical axes.

Let us consider that the horizontal and vertical axes represent the years and the expenditures on health in 10 Crores rupees respectively. We have to draw 6 bars of different lengths given in the table.

At first, we mark 6 points in the horizontal axis at equal distances and erect rectangles of the same width at these points. The heights of the rectangles are proportional to the expenditures on health by the government of India in different years.

The vertical bar graph of the given data is following:

