



Exercise 16.1

1. The first 5 natural numbers are 1, 2, 3, 4, 5.

$$\therefore \text{Mean} = \frac{\text{Sum of first 5 natural numbers}}{\text{Number of natural numbers}}$$

$$\therefore \text{Mean} = \frac{1 + 2 + 3 + 4 + 5}{5} = \frac{15}{5} = 3$$

$$\text{Mean} = 3$$

2. Mean = $\frac{\text{Sum of distributed magazine}}{\text{Number of days}}$

$$= \frac{3105 + 1795 + 1500 + 1405 + 2615 + 1800 + 1913}{7} = \frac{14133}{7} = 2019$$

3. Arrange the ages of 10 teachers in ascending order 22, 27, 27, 33, 34, 37, 40, 41, 46, 55.

(a) 55 years and 22 years is the age of the eldest and the youngest teachers respectively.

(b) Range = $55 - 22 = 33$

(c) Mean = $\frac{\text{Sum of teacher's ages}}{\text{Number of teaches}}$

$$= \frac{33 + 40 + 27 + 55 + 34 + 27 + 22 + 46 + 37 + 41}{10} = \frac{362}{10} = 36.2$$

4. Arrange the marks of students in ascending order :

41, 50, 58, 76, 77, 78, 83, 84, 86, 87, 90, 92, 97

(a) Highest marks obtained by the students = 97

Lowest marks obtained by the students = 41

(b) Range = $97 - 41 = 56$

(c) Mean = $\frac{41 + 50 + 58 + 76 + 77 + 78 + 83 + 84 + 86 + 87 + 90 + 92 + 97}{13}$

$$= 76.85$$

5. (a) Range = $20.5 - 0.0 = 20.5$

(b) Mean = $\frac{0.9 + 12.2 + 2.1 + 0.0 + 20.5 + 5.3 + 1.0}{7}$

$$\text{Mean} = \frac{42}{7} = 6$$

(c) Monday, Wednesday, Thursday, Saturday and Sunday are 5 days when the rainfall less than the mean rainfall.

6. The frequency table :

Number	1	2	3	4	5	6
Frequency	3	3	1	1	4	8
Tall marks						

7. Arrange the height of 10 girls in ascending order :

140, 143, 145, 148, 148, 152, 152, 152, 155, 155

$$\text{The average height} = \frac{140 + 143 + 145 + 148 + 148 + 152 + 152 + 152 + 155 + 155}{10} \text{ cm}$$

$$= \frac{1490}{10} \text{ cm}$$

$$= 149 \text{ cm}$$

$$8. \text{ Mean} = \frac{10 \times 3 + 15 \times 7 + 12 \times 8 + 18 \times 5 + 20 \times 2}{3 + 7 + 8 + 5 + 2}$$

$$\text{Mean} = \frac{30 + 105 + 96 + 90 + 40}{25}$$

$$\text{Mean} = \frac{361}{25} = 14.44$$

$$9. \text{ Mean age} = \frac{14 \times 5 + 15 \times 8 + 16 \times 15 + 17 \times 10 + 18 \times 2}{5 + 8 + 15 + 10 + 2}$$

$$= \frac{70 + 120 + 240 + 170 + 36}{40}$$

$$= \frac{636}{40}$$

$$= 15.90$$

Exercise 16.2

1. Arrange the numbers in ascending order :

(a) 10, 12, 12, 14, 14, 14, 14, 14, 14, 16, 16, 18

Mode of this data is 14 because it occurs more frequently than other observations.

(b) 0, 2, 2, 3, 3, 3, 3, 3, 4, 4, 5, 5, 6

Mode of this data is 3 because it occurs more frequently than other observations.

(c) 1, 1, 1, 2, 2, 2, 2, 3, 4, 4

Mode of this data is 2 because it occurs more frequently than other observations.

2. First we arrange the data in ascending order :

(a) 6, 8, 12, 14, 20, 23, 26, 31, 35

Since, the number of observations is even.

$$\text{So, Median} = \left(\frac{n+1}{2} \right) \text{th} = \left(\frac{9+1}{2} \right) \text{th}$$

$$= \left(\frac{10}{2} \right) \text{th} = 5^{\text{th}} \text{ term}$$

\therefore Median = 20

(b) 71, 72, 73, 74, 76, 77, 78, 79

Since, $n = 8$ (even)

Here, the two middle values are 74 and 76.

$$\text{Thus, Median} = \frac{74 + 76}{2} = 75$$

3. First we arrange the data in ascending order :

32, 35, 36, 37, 38, 38, 38, 40, 42, 43, 43, 43, 45, 47, 50

- (a) Mode = 38, 43

$$\text{Median} = \left(\frac{n+1}{2}\right)\text{th term}$$

$$= \left(\frac{15+1}{2}\right)\text{th term}$$

$$= \left(\frac{16}{2}\right)\text{th term} = 8^{\text{th}} \text{ term}$$

∴ Median = 40

- (b) Yes, there are more than one in this observation.

4. First we arrange the data in ascending order :

1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 5, 5, 5, 6, 6

So, mode = 2

5. First we arrange the data in ascending order :

- (a) 10, 12, 12, 12, 12, 13, 15, 17, 18, 19, 20

$$\text{Mean} = \frac{\text{Sum of observation}}{\text{Sum of number}}$$

$$\text{Mean} = \frac{10+12+12+12+12+13+15+17+18+19+20}{11}$$

$$\text{Mean} = \frac{160}{11} = 14.6$$

$$\text{Median} = \left(\frac{n+1}{2}\right)\text{th term}$$

$$= \left(\frac{11+1}{2}\right)\text{th term} = \left(\frac{12}{2}\right)\text{th term} = 6^{\text{th}} \text{ term}$$

∴ Median = 13

Mode = 12

- (b) 22, 22, 22, 22, 22, 24, 24, 24, 26, 26, 26, 28

$$\text{Mean} = \frac{22+22+22+22+22+24+24+24+26+26+26+28}{12}$$

$$\text{Mean} = \frac{288}{12} = 24$$

$$\text{Median} = \frac{\left(\frac{n}{2}\right)\text{th} + \left(\frac{n}{2}+1\right)\text{th}}{2} = \frac{\left(\frac{12}{2}\right)\text{th} + \left(\frac{12}{2}+1\right)\text{th}}{2}$$

$$= \frac{6^{\text{th}} + 7^{\text{th}}}{2} = \frac{24 + 24}{2} = \frac{48}{2} = 24$$

Mode = 22

6. The maximum frequency of 19 is 18.

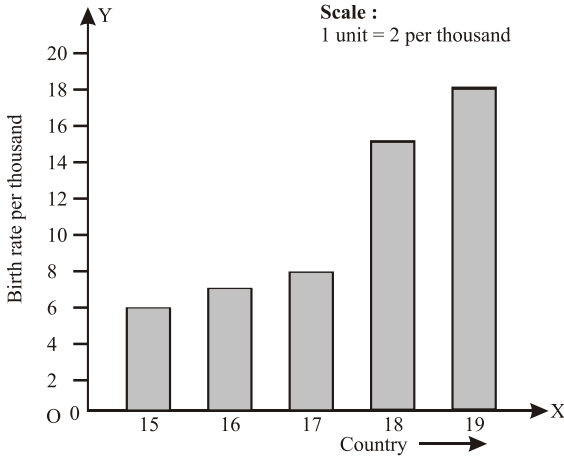
So, mode = 19

Exercise 16.3

1. To represent this data by a graph paper, we shall :

1. Label \vec{OX} with 'country' and \vec{OY} with 'birth rate per thousand'.
2. Choose a scale on \vec{OY} : 1 cm = 2 birth.
3. Calculate the lengths of bars as :
- 5 3 cm, 5.5 cm, 4 cm, 7.5 cm, 9 cm

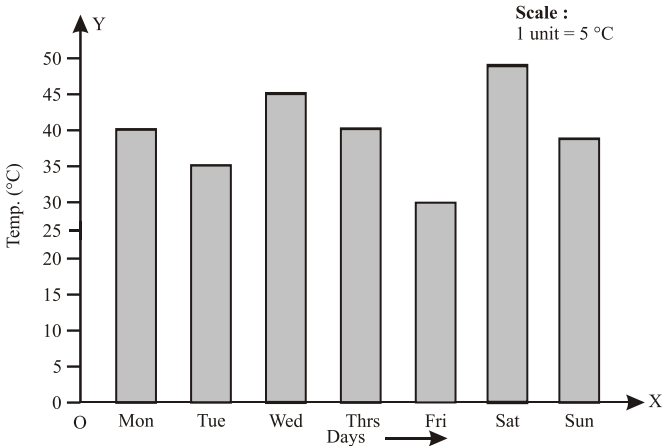
Thus, the required bar-graph representing the data is as follows :



2. To represent this data by a graph paper, we shall

1. Label \vec{OX} with 'Days' and \vec{OY} with 'Temperature'.
2. Choose a scale on \vec{OY} : 1 cm = 5° C
3. Calculate the lengths of bars as :
8 cm, 7 cm, 9 cm, 8 cm, 6 cm, 9.6 cm, 7.6 cm

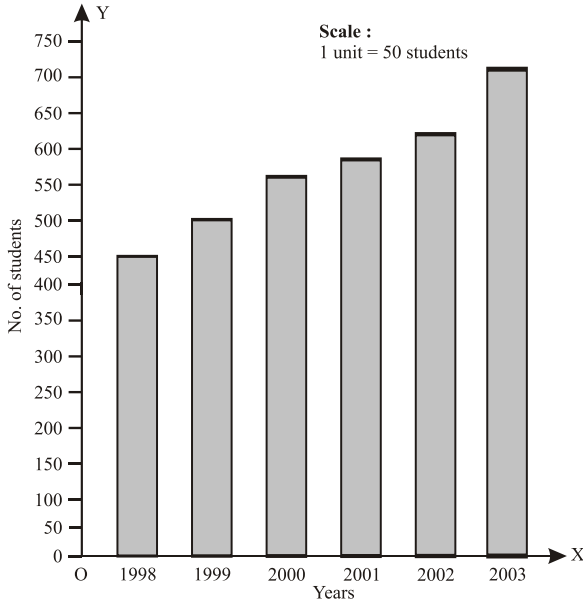
Thus, the required bar-graph representing the data is as follows :



3. To represent this data by a graph paper, we shall

1. Label \vec{OX} with 'Years' and \vec{OY} with 'No. of students'.
2. Choose a scale on \vec{OY} : 1 cm = 50 students.
3. Calculate the lengths of bar as :
9 cm, 10 cm, 11.2 cm, 11.6 cm, 12.8 cm, 14.6 cm.

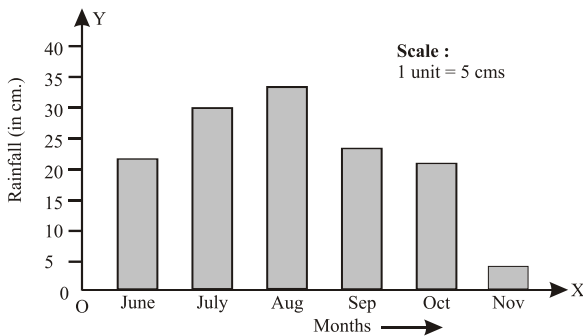
Thus, the required bar-graph representing the data is as follows :



4. To represent this data by a graph paper, we shall

1. Label \vec{OX} with 'Months' and \vec{OY} with 'Rainfall'.
2. Choose a scale on \vec{OY} : 1 unit = 5 cms.

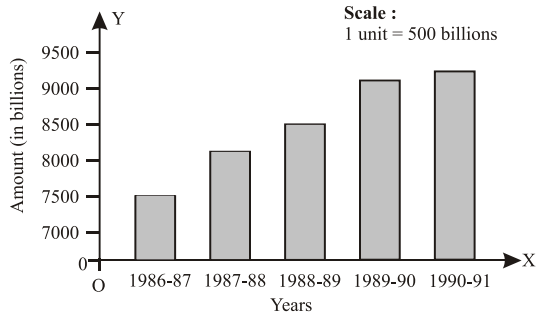
Thus, the required bar-graph representing the data is as follows :



5. (a) 600 books were sold in 2003.
 (b) In 1999, the minimum number of books were sold.
6. To represent this data by a graph paper, we shall

1. Label \vec{OX} with 'Years' and \vec{OY} with 'Amount (in billions)'.

2. Choose a scale on \vec{OY} : 1 cm = 500 billions.
 Thus, the required bar-graph representing the data is as follows :

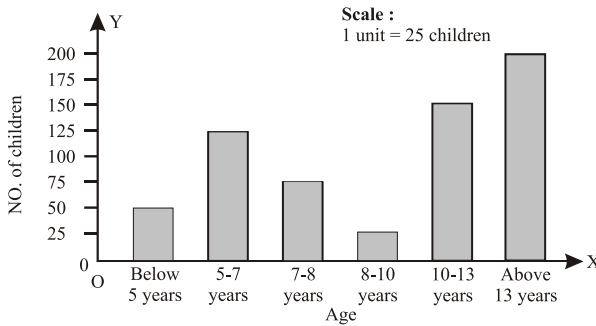


7. To represent this data by a graph paper, we shall

1. Label \vec{OX} with 'Ages' and \vec{OY} with 'No. of children'.

2. Choose a scale on \vec{OY} : 1 unit = 25 children.

Thus, the required bar-graph representing the data is as follows :

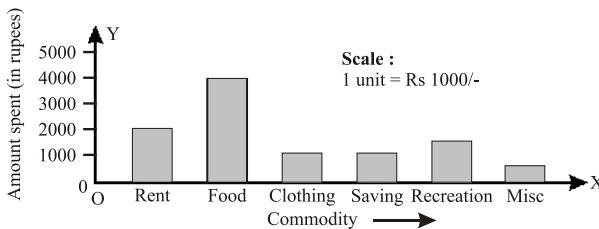


8. To represent this data by a graph paper, we shall

1. Label \vec{OX} with 'Commodity' and \vec{OY} with 'Amount'.

2. Choose a scale on \vec{OY} : 1 unit = ₹ 1000.

Thus, the required bar-graph representing the data is as follows :



MCQs

1. (d) 2. (c) 3. (a) 4. (c) 5. (a)

