Statistics

Practice set 11.1

Q. 1. The following table shows the number of saplings planted by 30 students. Fill in the boxes and find the average number of saplings planted by each student.

No. of saplings (Scores) x_i	No. of students (frequency) f_i	$f_i \times x_i$
1	4	4
2	6	[ ]
3	12	[ ]
4	8	[ ]
	N = [ ]	$\Sigma f_i x_i$= [ ]

$$\text{Mean } \bar{x} = \frac{[\ ]}{N}$$

$$= \frac{[\ ]}{[\ ]}$$

$$= \frac{[\ ]}{[\ ]}$$

∴ The average number of trees planted [ ].

Answer :

No. of saplings (Scores) x_i	No. of students (frequency) f_i	$f_i x_i$
1	4	1 × 4 = 4
2	6	2 × 6 = [12]
3	12	3 × 12 = [36]
4	8	4 × 8 = [32]
	N = [30]	$\Sigma f_i x_i$ = [84]

Formula Mean $\bar{X} = \frac{\Sigma f_i x_i}{N}$

Where, x_i = score ; f_i = frequency ; N = total frequency.

$$= \frac{84}{30}$$

$= \frac{28}{10}$

= 2.8

∴ The average no. of trees planted is 2.8.

Q. 2. The following table shows the electricity (in units) used by 25 families of Eklara village in a month of May. Complete the table and answer the following questions.

Electricity used (Units) x_i	No. of families (frequency) f_i	$f_i \times x_i$
30	7	.....
45	2	.....
60	8	.....
75	5	.....
90	3	.....
	N = ...	$\Sigma f_i x_i$=.....

(1) How many families use 45 units electricity?
(2) State the score, the frequency of which is 5.
(3) Find N and $\Sigma f_i x_i$
(4) Find the mean of electricity used by each family in the month of May.

Answer :

Electricity used (Units) x_i	No. of families (frequency) f	$f_i \times x_i$
30	7	30×7= 210
45	2	45×2=90
60	8	60×8=480
75	5	75×5= 375
90	3	90×3=270
	N = Σf_i = 25	$\Sigma f_i x_i$= 1425

From the given table it can be seen that 7 number of families consumed 30 units of electricity, 2 families consumed 45 units of electricity, similarly, 8,5 and 3 number of families consumed 60, 75, and 90 units of electricity respectively.

Further moving on to the questions,

(1) 2, because in the table provided, for x_i= 45, f is 2.

(2) 75, because in the table provided x_i for f_i = 5 is 75.

(3) From the table,

N = Σ f_i

= 7 + 2 + 8 + 5 + 3

= 25.

Σ $f_i x_i$= 210+90+480+375+270

= 1425.

(4) From the table,

Σ f_i x_i = 1425

Σ f_i = 25

Formula

Where, x_i = score ; f_i = frequency ; N = total frequency

$$\therefore \text{Mean } \bar{X} = \frac{\Sigma f_i x_i}{N}$$

= 1425/25

= 57.

Q. 3. The number of members in the 40 families in Bhilar are as follows:

1, 6, 5, 4, 3, 2, 7, 2, 3, 4, 5, 6, 4, 6, 2, 3, 2, 1, 4, 5, 6, 7, 3, 4, 5, 2, 4, 3, 2, 3, 5, 5, 4, 6, 2, 3, 5, 6, 4, 2. Prepare a frequency table and find the mean of members of 40 families.

Answer : 1. Write the scores in the 1st column, in ascending order as x_1< x_2< x_3...

2. Write the tally marks in the next column.

3. Count the tally marks of scores and write the frequency of the score, denoted as f_i.

4. Write the sum of all frequencies below the frequency column.

5. The total frequencies are denoted by ‘N’.

6. In the last column write the products $f_i.x_i$. Find $\Sigma f_i x_i$.

No. of members x_i	Tally marks	No. Of families f_i	$f_i \times x_i$
1	||	2	$2 \times 1 = 2$
2	𝍸 |||	8	$2 \times 8 = 16$
3	𝍸 ||	7	$3 \times 7 = 21$
4	𝍸 |||	8	$4 \times 8 = 32$
5	𝍸 ||	7	$7 \times 5 = 35$
6	𝍸 |	6	$6 \times 6 = 36$
7	||	2	$7 \times 2 = 14$
		Total = 40	Total = 156

Formula

Where, x_i = score ; fi = frequency ; N = total frequency.

$$\therefore \text{Mean } \bar{X} = \frac{\Sigma f_i x_i}{N}$$

$$= 156/40 = 156/40$$

= 3.9

Q. 4. The number of Science and Mathematics projects submitted by Model high school, Nandpur in last 20 years at the state level science exhibition is :

2, 3, 4, 1, 2, 3, 1, 5, 4, 2, 3, 1, 3, 5, 4, 3, 2, 2, 3, 2. Prepare a frequency table and find the mean of the data.

Answer : 1. Write the scores in the 1st column, in ascending order as $x_1 < x_2 < x_3$...

2. Write the tally marks in the next column.

3. Count the tally marks of scores and write the frequency of the score, denoted as f_i

4. Write the sum of all frequencies below the frequency column.

5. The total frequencies are denoted by ‘N’.

6. In the last column write the products $f_i x_i$. Find $\Sigma f_i x_i$

No. of projects x_i	Tally Mark	No. of student who submitted f_i	$f_i \times x_i$
1	III	3	13
2	𝍸 I	6	12
3	𝍸 I	6	18
4	III	3	20
5	II	2	10
		20	Total 55

Formula

Where, x_i = score ; f_i = frequency ; N = total frequency

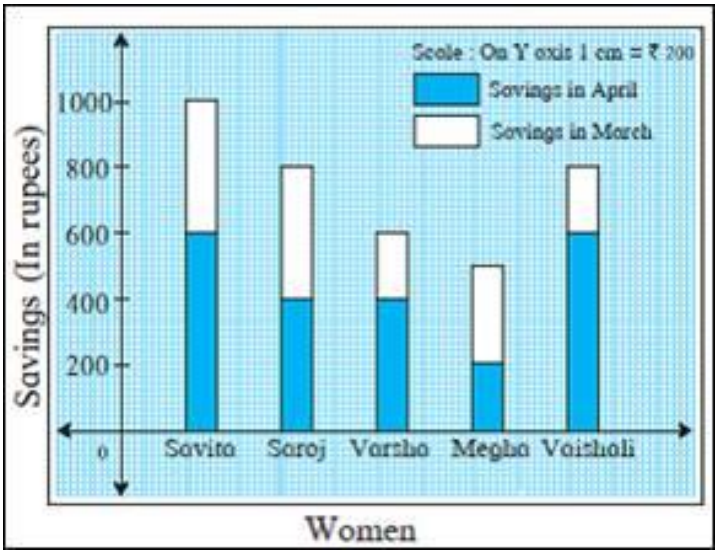
$$\text{Mean } \bar{X} = \frac{\Sigma f_i x_i}{N}$$

$$= 55/20$$

$$= 2.75$$

Practice set 11.2

Q. 1. Observe the following graph and answer the questions.



(1) State the type of the graph.
(2) How much is the savings of Vaishali in the month of April?
(3) How much is the total of savings of Saroj in the months March and April?
(4) How much more is the total savings of Savita than the total savings of Megha?
(5) Whose savings in the month of April is the least?

Answer : (1) The graph given in the question is a sub-divided bar graph.

(2) According to the graph, savings of Vaishali in the month of April is Rs. 400.

(3) According to the graph,

Savings of Saroj in the month of April = Rs. 400

Savings of Saroj in the month of March = Rs. (800-400)

= Rs. 400

The total of savings of Saroj in the months March and April = Rs (400+400)

= Rs 800

(4) According to the graph,

Savings of Savita in the month of April = Rs. 600

Savings of Savita in the month of March = Rs. (1000-600)

= Rs. 400

The total of savings of Savita in the months March and April = Rs. (600+400)

= Rs. 1000.

Again,

Savings of Megha in the month of April = Rs. 200

Savings of Megha in the month of March = Rs. (500-200)

= Rs. 300

The total savings of Megha in the months March and April =Rs. (200+300)

= Rs. 500

Clearly,

The total savings of Saroj is greater than Megha

The difference of their savings = Rs. (1000-500)

= Rs. 500

∴ The total savings of Saroj is Rs. 500 more than that of Megha.

Q. 2. The number of boys and girls, in std 5 to std 8 in a Z.P. school is given in the table. Draw a subdivided bar graph to show the data.

(Scale : On Y axis, 1cm= 10 students)

Standard	5^{th}	6^{th}	7^{th}	8^{th}
Boys	34	26	21	25
Girls	17	14	14	20

Answer : (1) Draw the X- axis and Y- axis on a graph paper.

(2) Mark students on X-axis, keeping equal distances between two consecutive bars.

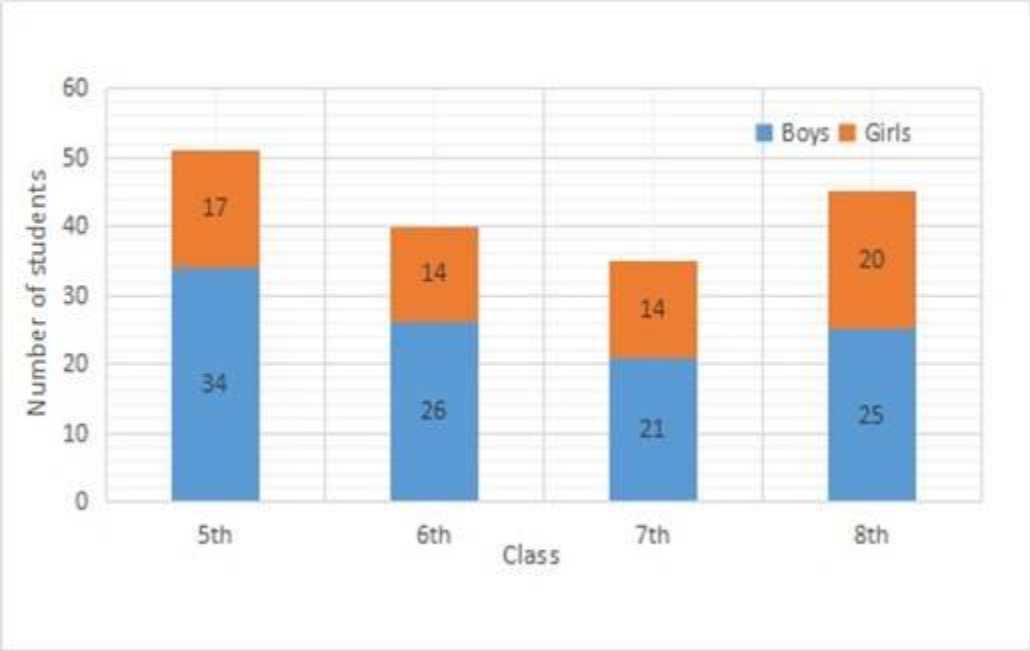
(3) Show a number of students i.e., boys and girls on Y - axis with the scale 1cm = 10 students.

(4) Show the number of boy students of class 5 by a part of the bar by some mark.

(5) Obviously, the remaining part of the bar will represent the girl students. Show this part by another mark.

(6) Similarly, draw the sub divided bars for the different classes.

(7) Following the above steps, the given information is shown by subdivided bar diagram, in the adjacent figure.



Q. 3. In the following table the number of trees planted in the year 2016 and 2017 in four towns is given. Show the data with the help of subdivided bar graph.

Town year	Karjat	Wadgoan	Shivapur	Khandala
2016	150	250	200	100
2017	200	300	250	150

Answer : (1) Draw the X- axis and Y- axis on a graph paper.

(2) Write the names of towns on X-axis, keeping equal distances between two consecutive bars.

(3) Show number of trees planted with the scale 1cm = 100 trees.

(4) Mark the no. of trees planted in 2016 in the town Karjat.

(5)Show the number of trees planted in 2016 by a part of the bar by some mark.

(6) Obviously, the remaining part of the bar will represent trees planted in the year 2017. Show this part by another mark.

(7) Similarly draw the subdivided bars for the towns Wadgaon, Shivapur, and Khandala.

(8) Following the above steps, the given information is shown by subdivided bar diagram, in the adjacent figure.

Q. 4. In the following table, data of the transport means used by students in the 8th standard for commutation between home and school is given.

Draw a subdivided bar diagram to show the data.
(Scale : On Y axis : 1 cm = 500 students)

Town → / Mean of commutation	Paithan	Yeola	Shahapur
Cycle	3250	1500	1250
Bus and Auto	750	500	500
On foot	1000	1000	500

Answer : (1) Draw the X- axis and Y- axis on a graph paper.

(2) Write the names of towns on X-axis, keeping equal distances between two consecutive bars.

(3) Show number of students taking the different mean of commutation on Y - axis with the scale 1cm = 500 students.

(4) Draw the graphics for the town, Paithan.

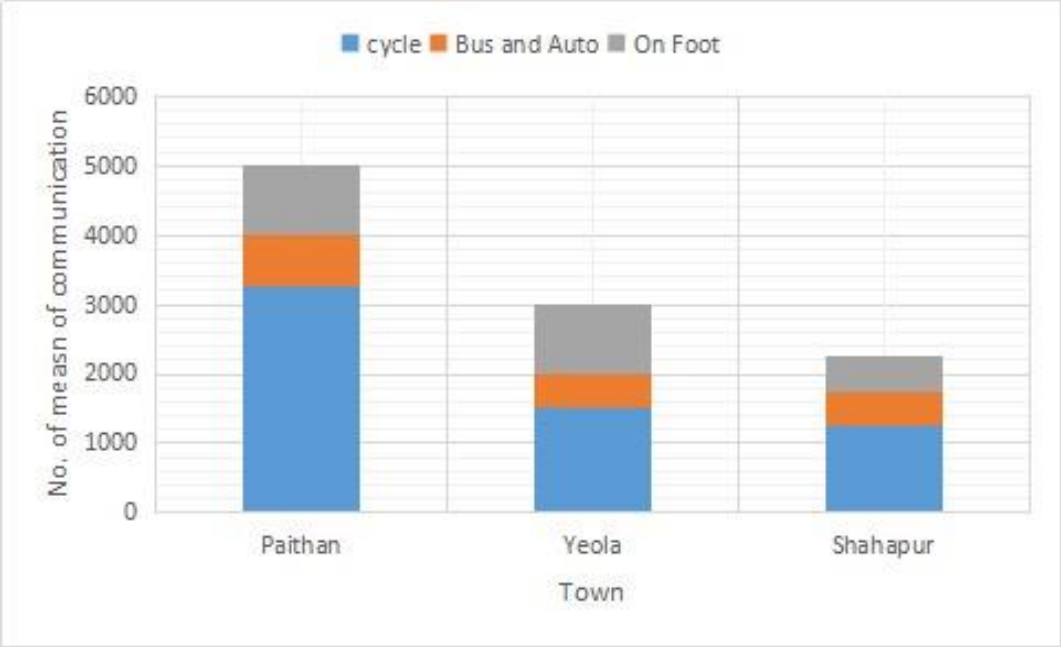
(5) Show the number of students using cycle by a part of the bar by some mark.

(6) Again show the number of students using bus or auto by a part of the bar by some mark.

(7) The remaining part of the bar will represent the students going on foot. Show this part by another mark.

(8) Similarly draw the sub divided bars for the towns Yeola, Shahpur.

(9) Following the above steps, the given information is shown by subdivided bar diagram, in the adjacent figure.



Practice set 11.3

Q. 1. Show the following information by a percentage bar graph.

Division of standard 8	A	B	C	D
Number of students securing grade A	45	33	10	15
Total number of students	60	55	40	75

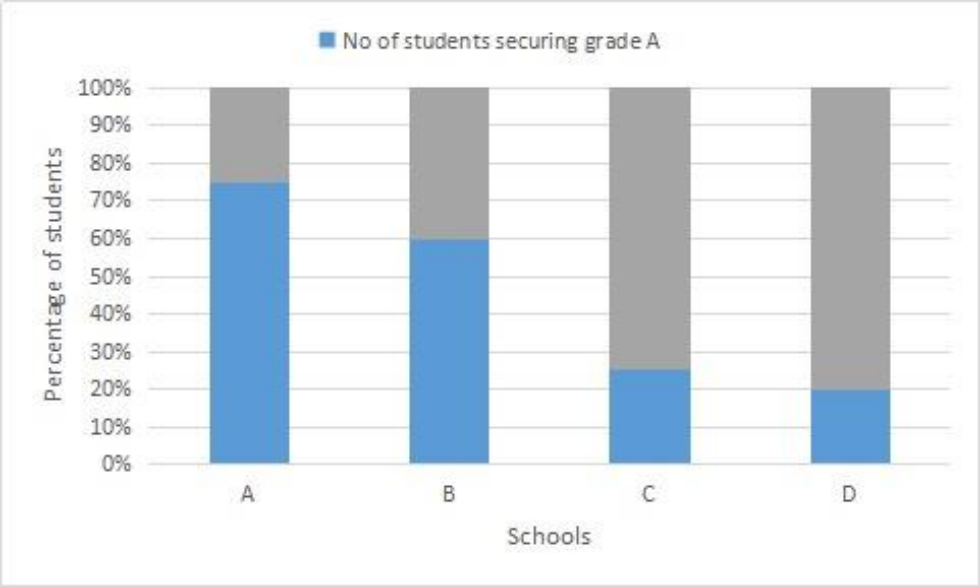
Answer : First of all we prepare a table as follows:

Division of standard	A	B	C	D
Total no. of students	60	55	40	75
No. of students securing Grade A	45	33	10	15
Percentage of students securing Grade A	$\left(\frac{45}{60}\right) \times 100\%$	$\left(\frac{33}{55}\right) \times 100\%$	$\left(\frac{10}{40}\right) \times 100\%$	$\left(\frac{15}{75}\right) \times 100\%$
	75%	60%	25%	20%

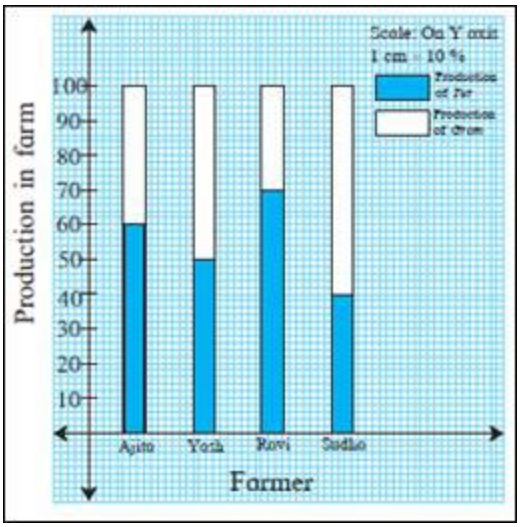
(2) In a percentage bar graph, all bars are of height 100 units. In each bar, we show the percentage of students who secured grade A.

(3) Remaining part shows the percentage of students

Who did not secure grade A?



Q. 2. Observe the following graph and answer the questions.



(1) State the type of the bar graph.
(2) How much percent is the Tur production to total production in Ajita's farm?
(3) Compare the production of Gram in the farms of Yash and Ravi and state whose percentage of production is more and by how much?
(4) Whose percentage production of Tur is the least?
(5) State production percentages of Tur and gram in Sudha's farm.

Answer : (1) The given graph is a Percentage-Bar Graph.

(2) According to the graph, the percentage of Tur production with respect to total production in Anita's farm

$$= \left(\frac{60}{100}\right) \times 100\%$$

(3) According to the graph,

Percentage production of Gram in Yash's farm = (100-50)%

= 50%

Percentage production of Gram in Ravi's farm = (100-70)%

= 30%

Clearly,

The percentage production of Yash is greater than Ravi's farm.

Difference of their production = (50-30)%

= 20%

∴ The Gram production of Yash is 20% more than that of Ravi.

(4) Percentage production of Tur in Ajita's farm = 60%

Percentage production of Tur in Yash's farm = 50%

Percentage production of Tur in Ravi's farm = 70%

Percentage production of Tur in Sudha's farm = 40%

Clearly,

Percentage production of Tur in Sudha's farm is the least.

(5) Production percentage of Tur in Sudha's farm = 40%

Production percentage of Gram in Sudha's farm = (100-40)%

= 60%

Q. 3. The following data is collected in a survey of some students of 10th standard from some schools. Draw the percentage bar graph of the data.

School	1st	2nd	3rd	4th
Inclination towards science steam	90	60	25	16
Inclination towards commerce steam	60	20	25	24

Answer : (1) First of all we prepare a table as follows:

Schools	1st	2nd	3rd	4th
Total no. of students	90+60=150	60+20=80	25+25=50	16+24=40
No. of students inclining towards science stream	90	60	25	16
No. of students inclining towards commerce stream	60	20	25	24
Percentage of students inclining towards science stream	$\left(\frac{90}{150}\right)\times 100\%$ =60%	$\left(\frac{60}{80}\right)\times 100\%$ =75%	$\left(\frac{25}{20}\right)\times 100\%$ =50%	$\left(\frac{16}{40}\right)\times 100\%$ =40%
Percentage of students inclining towards commerce stream	$\left(\frac{60}{150}\right)\times 100\%$ =40%	$\left(\frac{20}{80}\right)\times 100\%$ =25%	$\left(\frac{25}{20}\right)\times 100\%$ =50%{	$\left(\frac{24}{40}\right)\times 100\%$ =60%

(2) In a percentage bar graph, all bars are of height 100 units. In each bar we show percentage of students inclining towards different streams.