

## 2

## PRESENTATION OF DATA

2.1 Maximum value = 141 and Minimum value = 63.

Range =  $141 - 63 = 78$

Class	Tally	Frequency	Class Boundary	Class Mark
63 - 67	/	1	62.5 - 67.5	65
68 - 72		0	67.5 - 72.5	70
73 - 77		0	73.5 - 77.5	75
78 - 82		0	77.5 - 82.5	80
83 - 87		6	82.5 - 87.5	85
88 - 92		2	87.5 - 92.5	90
93 - 97		6	92.5 - 97.5	95
98 - 102		8	97.5 - 102.5	100
103 - 107		6	102.5 - 107.5	105
108 - 112		7	107.5 - 112.5	110
113 - 117		6	112.5 - 117.5	115
118 - 122		3	117.5 - 122.5	120
123 - 127		2	122.5 - 127.5	125
128 - 132		2	127.5 - 132.5	130
133 - 137		0	132.5 - 137.5	135
138 - 142	/	1	137.5 - 142.5	140
		50		

2.2 Maximum value = 94 and Minimum value = 39

Class	Tally	Frequency
35 - 39	/	1
40 - 44		0
45 - 49	/	1
50 - 54		2
55 - 59		4
60 - 64		5
65 - 69		3
70 - 74		14
75 - 79		7
80 - 84		9
85 - 89	/	1
90 - 94		3

2.3 Before arranging the data into an array, we first write the values in the rows of 40's, 50's, 60's, 70's, 80's and 90's as shown below.

48.6

55.9, 68.3, 59.4

68.9, 65.7, 67.6, 69.4, 64.2, 63.9

79.4, 71.6, 73.0, 74.2, 75.2, 74.2, 77.8, 73.8, 70.8, 72.1,  
71.6, 77.6

81.8, 81.9, 80.7, 82.9, 88.1, 83.2, 82.7, 83.5

95.5, 90.6

Now we arrange the data into an array.

48.6, 55.9, 58.3, 59.4, 63.9, 64.2, 65.7,

67.6, 68.9, 69.4, 70.8, 71.6, 71.6, 72.1, 73.0,

73.8, 74.2, 74.2, 75.2, 77.6, 77.8,

79.4, 80.7, 81.8, 81.9, 82.7, 82.9, 83.2,

83.5, 88.1, 90.6, 95.5.

Since the data have been arranged, we use entry table to determine frequencies.

Class	Entry	Frequency	Class Boundary
48.5 – 53.4	48.6	1	48.45 – 53.45
53.5 – 58.4	55.9, 58.3	2	53.45 – 58.45
58.5 – 63.4	59.4	1	58.45 – 63.45
63.5 – 68.4	63.9, 64.2, 65.7, 67.6	4	63.45 – 68.45
68.5 – 73.4	68.9, 69.4, 70.8, 71.6, 71.6, 72.1, 73.0	7	68.45 – 73.45
73.5 – 78.4	73.8, 74.2, 74.2, 75.2, 77.8, 77.6	6	73.45 – 78.45
78.5 – 83.4	79.4, 80.7, 81.8, 81.9, 82.7, 82.9, 83.2	7	78.45 – 83.45
83.5 – 88.4	83.5, 88.1	2	83.45 – 88.45
88.5 – 93.4	90.6	1	88.45 – 93.45
93.5 – 98.4	95.9	1	93.45 – 98.45

2.4(b) Maximum value = 39 and Minimum value = 10.

## Frequency Distribution

Class	Tally	Frequency	C.B.
10 – 12		5	9.5-12.5
13 – 15		7	12.5-15.5
16 – 18		4	15.5-18.5
19 – 21		10	18.5-21.5
22 – 24		5	21.5-24.5
25 – 27		8	24.5-27.5
28 – 30		6	27.5-30.5
31 – 33		4	30.5-33.5
34 – 36		5	33.5-36.5
37 – 39		6	36.5-39.5

2.5 Maximum Mistakes = 10

Minimum Mistakes = 0

Mistakes	Tally	Frequency
0	/	1
1	/	1
2	/	1
3	//	2
4	THL /	5
5	THL /	6
6	IIII	4
7	III	3
8	III	3
9	III	3
10	/	1
		30

2.6 Maximum Marks = 60

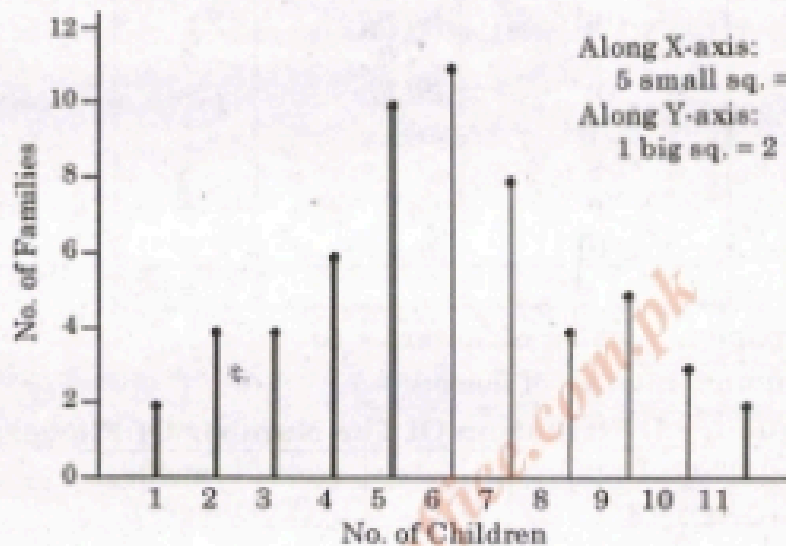
Minimum Marks = 4

Class Interval	Tally	Frequency
1 — 5	/	1
6 — 10	III	3
11 — 15	IIII	4
16 — 20	THL /	6
21 — 25	THL	5
26 — 30	III	3
31 — 35	III	4
36 — 40	THL /	6
41 — 45	THL	5
46 — 50	IIII	5
51 — 55	THL /	6
56 — 60	//	2
		50

Q. 2.7 Max Value = 11, Min Value = 1

No. of Children	Tally Mark	f
1	//	2
2	IIII	4
3	IIII	4
4	THL /	6
5	THL THL	10
6	THL THL /	11
7	THL III	8
8	IIII	4

No. of Children	Tally Mark	f
9		5
10		3
11		2
		$\Sigma f = 59$



2.7(b) Maximum number of children = 11

Minimum number of children = 1

#### Frequency Distribution Of The Number Of Children

No. of Children	Tally	No. of Families (Frequency)
1		2
2		4
3		4
4		6
5		10
6		11
7		8
8		4
9		5
10		3
11		2
Total		59

Draw a frequency polygon taking number of children along the X-axis and the number of families (frequency) along the Y-axis.

Q. 2.8 Max. value = 10, Min. value = 0

No. of Children	Tally Mark	f
0	//	2
1	///	8
2	///	9
3	///	7
4	///	11
5	///	7
6	///	8
7	///	3
8	///	3
9	///	5
10	///	3
		$\Sigma f = 66$

2.8(a) Maximum number of flowers = 10

Minimum number of flowers = 1

Frequency Distribution Of The Number Of Flowers

No. of flowers	Tally	No. of branches (Frequency)
0	//	2
1	///	8
2	///	9
3	///	7
4	///	11
5	///	7
6	///	8
7	///	3
8	///	3
9	///	5
10	///	3
Total		66

(b)

Weight(kg)	62-64	65-67	68-70	71-73	74-76	77-79	80-82
Frequency	6	23	34	17	12	6	2
Rel. Frequency	0.06	0.23	0.34	0.17	0.12	0.06	0.02
Cum. Frequency	6	29	63	80	92	98	100

2.9(a)

Cumulative Frequency Distribution		Decumulative Frequency Distribution	
Less than 59.5	0	59.5 or more	50
Less than 64.5	2	64.5 or more	48

Cumulative Frequency Distribution		Decumulative Frequency Distribution	
Less than 69.5	8	69.5 or more	42
Less than 74.5	20	74.5 or more	30
Less than 79.5	34	79.5 or more	16
Less than 84.5	44	84.5 or more	6
Less than 89.5	50	89.5 or more	0

2.9(b)

Marks	f
0 — 10	4
10 — 20	6
20 — 30	20
30 — 40	10
40 — 50	7
50 — 60	3

Q. 2.9

Weight	No. of Boys	C.B.
60 — 64	2	59.5 — 64.5
65 — 69	6	64.5 — 69.5
70 — 74	12	69.5 — 74.5
75 — 79	14	74.5 — 79.5
80 — 84	10	79.5 — 84.5
85 — 89	6	84.5 — 89.5
$\Sigma f = 50$		

less than commulative frequency distribution.

Weight	C.F.
less than 59.5	0
less than 64.5	2
less than 69.5	8
less than 74.5	20
less than 79.5	34
less than 84.5	44
less than 89.5	50

More than C.F. distribution.

Weight	C.F.
59.5 or more	50
64.5 or more	48
69.5 or more	42
74.5 or more	30
79.5 or more	16
84.5 or more	6
89.5 or more	0

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2.10(a) Since the left end-point of the third class interval is 20 and the mid-point of the fifth class interval is 45, it means that the third class interval is 20 – 30 and the fifth class interval is 40 – 50. Frequency table is given below:

Class interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	3	9	15	30	18	5

(b) (i) 799.5 (ii) 999.5 (iii) 949.5 (iv) 100 (v) 76.

2.10(b)

Life time	$f$	C.B.
300 – 399	7	299.5 – 399.5
400 – 499	46	399.5 – 499.5
500 – 599	58	499.5 – 599.5
600 – 699	76	599.5 – 699.5
700 – 799	68	699.5 – 799.5
800 – 899	62	799.5 – 899.5
900 – 999	49	899.5 – 999.5
1000 – 1099	22	999.5 – 1099.5
1100 – 1199	6	1099.5 – 1199.5

(1) 799.5 (2) 999.5 (3) 949.5 (4) 100 (5) 76

2.11

No. of Letters							No. of Vowels						
7	2	5	3	7	3	4	2	0	2	1	3	1	1
4	3	8	2	6	6		2	1	4	0	2	1	
3	4	5	5	10	5		1	1	2	2	4	1	
4	7	7	2	3	5		2	3	2	1	1	1	

No. of letters	2	3	4	5	6	7	8	9	10	Total
No. of words	3	5	4	5	2	4	1	0	1	25

No. of letters	0	1	2	3	4	Total
No. of vowels	2	11	8	2	2	25

2.12 For ages of husbands Maximum age = 31,  
 Minimum age = 16, Range =  $31 - 16 = 15$ ,  
 No. of classes = 6, Class interval size =  $15/6 = 2.5$  or 3.  
 For ages of wives Maximum age = 30,  
 Minimum age = 16, Range =  $30 - 16 = 14$ ,  
 No. of classes = 5, Class interval size =  $14/5 = 2.8$  or 3.

First we form a tally table as given below.

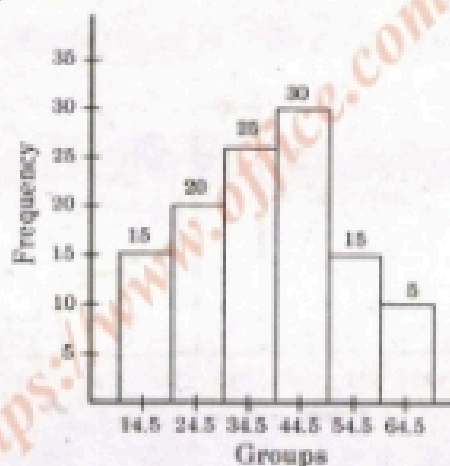
Age of Wife	Age of Husband					
	16 – 18	19 – 21	22 – 24	25 – 27	28 – 30	31 – 33
16 – 18	///	//	/	///		

19 – 21	///	////	///	//	/	
22 – 24		//	///	/// //	////	
25 – 27		/	///	/// /	/// ///	
28 – 30				///	///	/

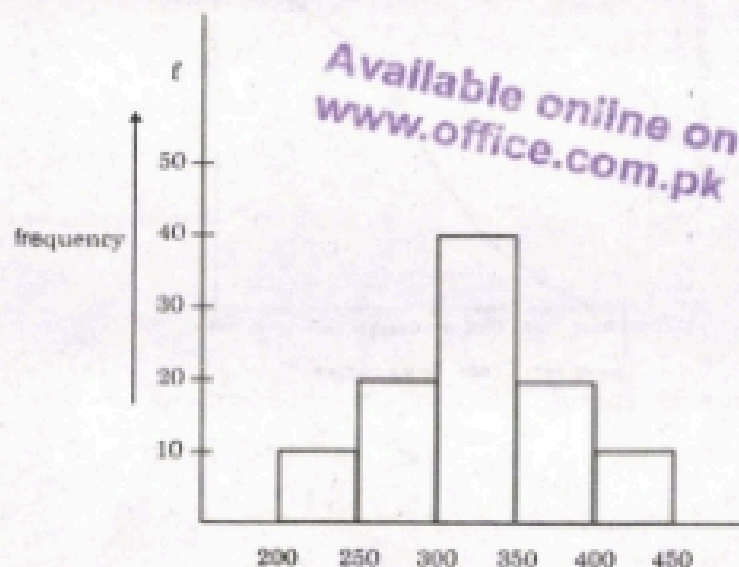
The bivariate frequency table is given below:

Age of Wife	Age of Husband						Total
	16 – 18	19 – 21	22 – 24	25 – 27	28 – 30	30 – 33	
16 – 18	3	2	1	3	–	–	9
19 – 21	3	4	3	2	1	–	13
22 – 24	–	2	3	7	4	–	16
25 – 27	–	1	3	6	9	–	19
28 – 30	–	–	–	3	3	1	7
Total	6	9	10	21	17	1	64

2.13(a) Histogram.



2.13(b).



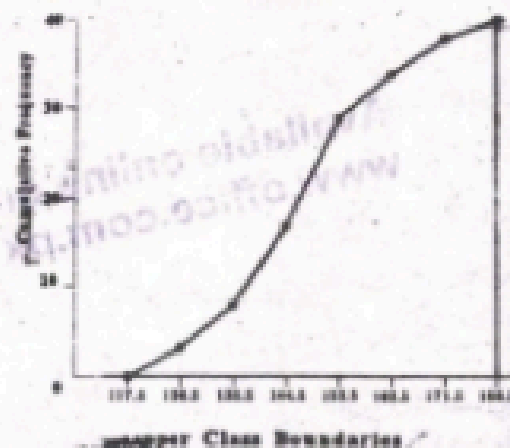
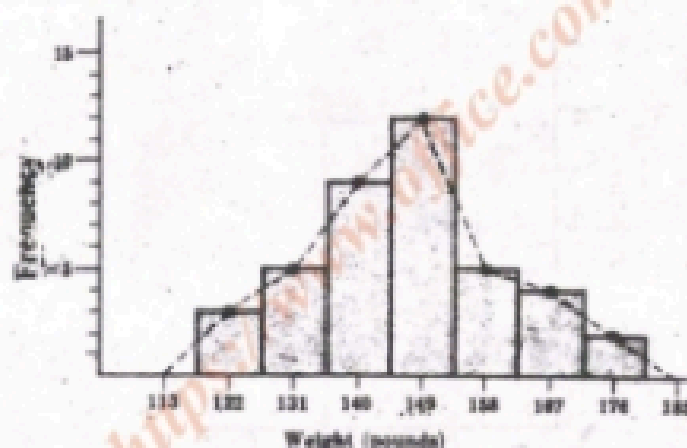


C.L.	200—250	250—300	300—340	350—400	400—450
$f$	10	20	40	20	10

2.14(a) Formation of frequency distribution is outlined below.

Class	Tally	Frequency	Cumulative frequency	Class boundary
118 – 126	///	3	3	117.5 – 126.5
127 – 135	///	5	8	126.5 – 135.5
136 – 144	/// ///	9	17	135.5 – 144.5
145 – 153	/// /// //	12	29	144.5 – 153.5
154 – 162	///	5	34	153.5 – 162.5
163 – 171	///	4	38	162.5 – 171.5
172 – 180	//	2	40	171.5 – 180.5

(b) The following figures give the histogram and the cumulative frequency polygon.



2.15 Similar as above.

2.16(a) (i) Minimum grade = 53, Maximum grade = 87.

Grade	Tally	No. of students (Frequency)	Class boundary
50 - 54	/	1	49.5 - 54.5
55 - 59	//	2	54.5 - 59.5
60 - 64	THL THL /	11	59.5 - 64.5
65 - 69	THL THL	10	64.5 - 69.5
70 - 74	THL THL //	12	69.5 - 74.5
75 - 79	THL THL THL THL /	21	74.5 - 79.5
80 - 84	THL /	6	79.5 - 84.5
85 - 89	THL IIII	9	84.5 - 89.5
90 - 94	IIII	4	89.5 - 94.5
95 - 99	IIII	4	94.5 - 99.5

(ii) Draw the frequency polygon for the above data.

(b) Draw the histogram, frequency polygon, frequency curve and ogive for the given data.

2.17 Maximum value = 8.52, Minimum value = 8.20,

Range =  $8.52 - 8.20 = 0.32$ , No. of classes = 11,

Class interval size =  $0.32/11 = 0.029$  or  $0.03$ .

Class	Tally	Frequency	Class boundary
8.20 - 8.22	III	3	8.195 - 8.225
8.23 - 8.25	THL	5	8.225 - 8.255
8.26 - 8.28	THL IIII	9	8.255 - 8.285
8.29 - 8.31	THL III	8	8.285 - 8.315
8.32 - 8.34	THL THL THL /	16	8.315 - 8.345
8.35 - 8.37	THL THL THL III	18	8.345 - 8.375
8.38 - 8.40	THL THL /	11	8.375 - 8.405
8.41 - 8.43	THL IIII	9	8.405 - 8.435
8.44 - 8.46	THL THL III	13	8.435 - 8.465
8.47 - 8.49	THL IIII	9	8.465 - 8.495
8.50 - 8.52	III	3	8.495 - 8.525

Draw the histogram for the above data.

2.18(i)

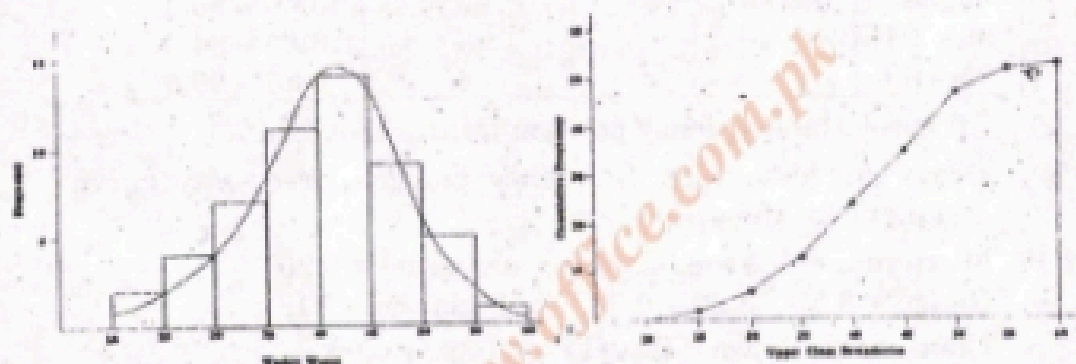
Class	24 - 27	27 - 30	30 - 33	33 - 36	36 - 39	39 - 42	42 - 45
Frequency	3	17	20	30	13	11	4
Midpoint	25.5	28.5	31.5	34.5	37.5	40.5	43.5

(ii)

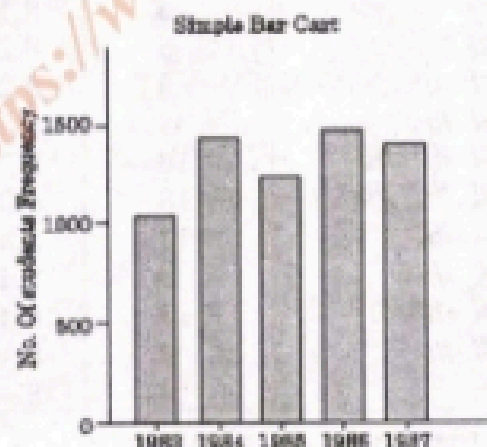
24 or more	98
27 or more	95
30 or more	78
33 or more	58
36 or more	28
39 or more	15
42 or more	4
45 or more	0

Less than 24	0
Less than 27	3
Less than 30	20
Less than 33	40
Less than 36	70
Less than 39	83
Less than 42	94
Less than 45	98

2.19 The following figures show the histogram, frequency curve and cumulative frequency polygon for the given data.

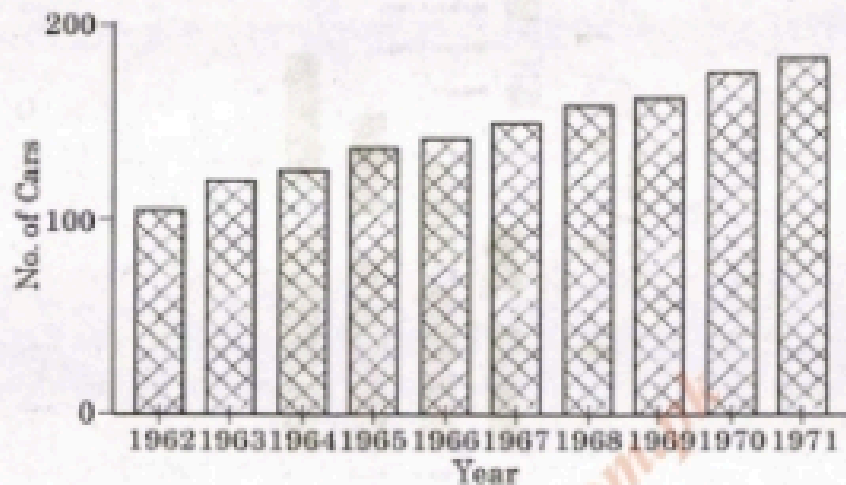


2.20(b)

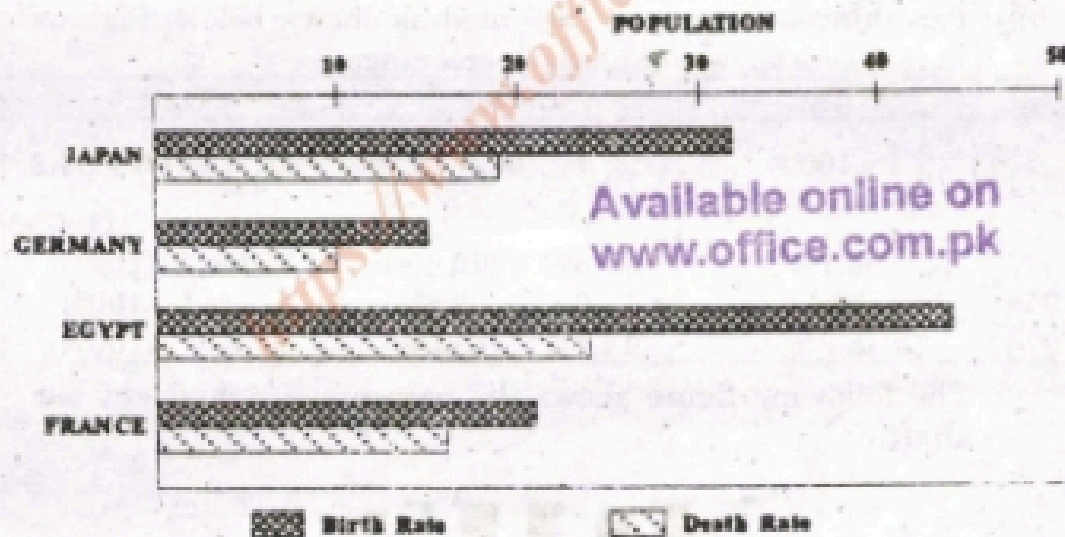


- (c) Draw the simple bar chart for the data.

The following figure shows the simple bar chart for the data.



- 2.21(b)(i) The following figure shows the multiple bar chart for birth and death rates for various countries.

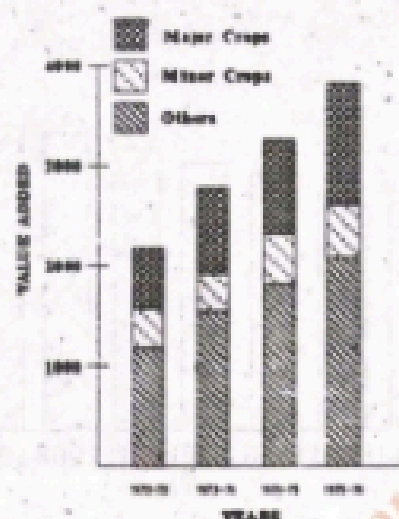


- (ii) Draw the simple bar chart for the data.

- 2.22(a) Draw the multiple bar chart for the data.

- (b) Draw the multiple bar chart for the data.

2.23 The following figure shows the component bar chart.

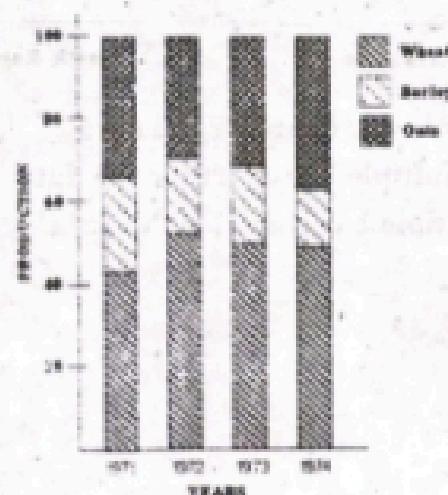


2.24(a) Draw the component bar chart for the data.

(b) Percentages have been computed as shown below. Figures in brackets show cumulative percentages.

Year	Wheat	Barley	Oats
1971	$\left(\frac{34}{79}\right) \times 100 = 43\%$	$\left(\frac{18}{79}\right) \times 100 = 22.8\%$	$\left(\frac{27}{79}\right) \times 100 = 34.2\%$
1972	53.1%	17.3% (70.1%)	29.6% (100%)
1973	50%	18.6% (68.6%)	31.4% (100%)
1974	48.9%	14.1% (63.0%)	37% (100%)

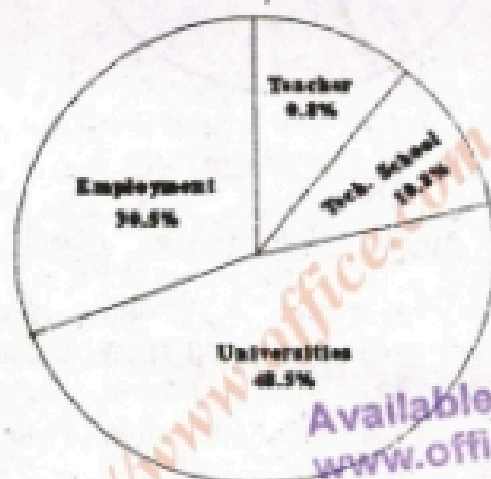
The following figure shows the percentage component bar chart.



2.25

		Angle	Percentage
Leaving for teachers training colleges	140	39°	10.77%
Leaving for technical schools	140	39° (78°)	10.77% (21.54%)
Leaving for universities	630	174° (252°)	48.46% (70.00%)
Leaving to take up employment	390	108° (360°)	30.00% (100%)
Total	1300		

Angles and percentages in parentheses give the cumulative figures. The following figure shows the pie chart.



2.26

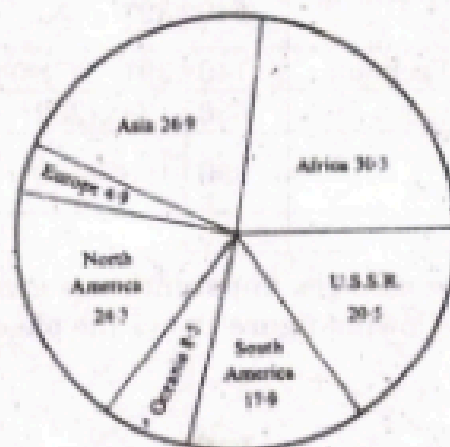
Items	Expenditure	Angle	Percentage
Food	95	142.5°	39.6
Clothing	32	48° (190.5°)	13.3 (52.9)
Rent	50	75° (265.5°)	20.8 (73.7)
Medical Care	23	34.5° (300°)	9.6 (83.3)
Others	40	60° (360°)	16.7 (100)
Total	240		

Angles and percentages in parentheses give the cumulative figures. Draw the pie chart for the data.

2.27

Continent/Country	Area	Angle	Percentage
Africa	11.7	81.8°	22.7
Asia	10.4	72.7° (154.5°)	20.2 (42.9)
Europe	1.9	13.3° (167.8°)	3.7 (46.6)
North America	9.4	65.7° (233.5°)	18.3 (64.9)
Oceania	3.3	23.1° (256.6°)	6.4 (71.3)
South America	6.9	48.2° (304.8°)	13.4 (84.7)
U.S.S.R.	7.9	55.2° (360°)	15.3 (100.0)
Total	51.5		

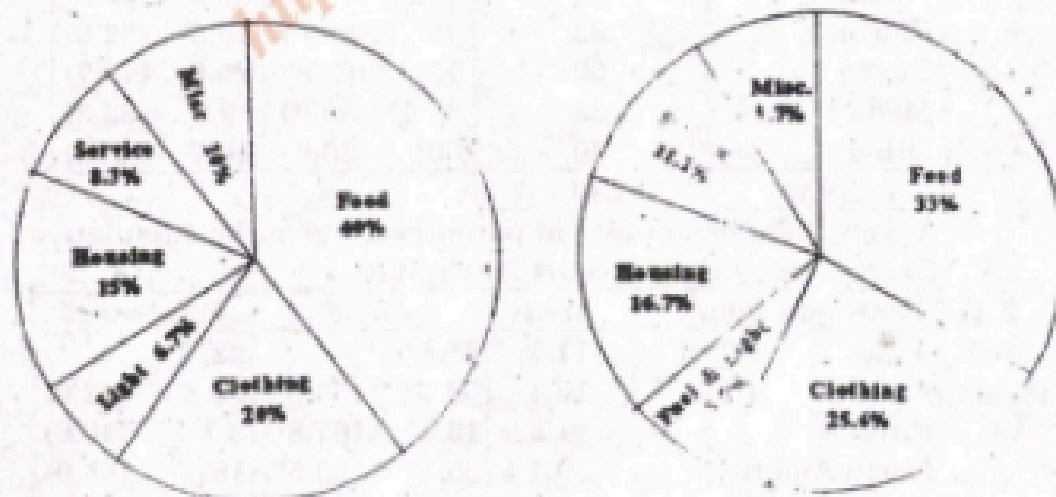
The following figure shows the pie chart.



2.28 Computation of angles and percentages are shown below. Figures in parentheses are cumulative figures.

Item of expenditure	Family A		Family B	
	Angle	Percentage	Angle	Percentage
Food	144°	40	120°	33.3
Clothing	72° (216°)	20 (60)	85° (205°)	23.6 (56.9)
Fuel and lighting	24° (240°)	6.7 (66.7)	25 (230°)	7.0 (63.9)
Housing	54° (294°)	15 (81.7)	60 (290°)	16.7 (80.6)
Services	30° (324°)	8.3 (90.0)	40 (330°)	11.1 (91.7)
Miscellaneous	36° (360°)	10 (100)	30 (360°)	8.3 (100.0)

The following figures show pie charts for families A and B.



2.29 Percentages for Families A, B and C are computed below.

Item of expenditure	Percentage		
	Family A	Family B	Family C
Food	30	35	33.3
Clothing	15 (45)	13 (48)	15 (48.3)
Education	17.5 (62.5)	20 (68)	15 (63.3)
Fuel	10 (72.5)	10 (78)	10 (73.3)
Housing	12.5 (85.0)	12 (90)	13.3 (86.6)
Miscellaneous	15 (100)	10 (100)	13.3 (99.9)

The percentage component bar chart is shown in the following figure.

