

25. Data Handling-III (Pictorial Representation of Data as Pie Charts)

Exercise 25.1

1. Question

The number of hours, spent by a school boy on different activities in a working day, is given below :

Activities:	Sleep	School	Home	Play	Others	Total
Number of hours	8	7	4	2	3	24

Present the information in the form of a pie-chart.

Answer

Here, total number of hours = 24

So,

The central angle = $\frac{\text{Component value}}{24} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Activity	Number of hours	Sector angle (degree)
Sleep	8	$8/24 \times 360 = 120^\circ$
School	7	$7/24 \times 360 = 105^\circ$
Home	4	$4/24 \times 360 = 60^\circ$
Play	2	$2/24 \times 360 = 30^\circ$
Others	3	$3/24 \times 360 = 45^\circ$

Steps for construction of representation of data in pie chart

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2. Question

Employees of a company have been categorized according to their religions as given below :

Religions	Hindu	Muslim	Sikh	Christian	Total
No. of workers	320	300	225	105	1050

Answer

Here, total number of employees = 1050

So,

The central angle = $\frac{\text{Component value}}{1080} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Religion	Number of workers	Sector angle (degree)
Hindu	420	$420/1050 \times 360 = 144$
Muslim	300	$300/1050 \times 360 = 102.9$
Sikh	225	$225/1050 \times 360 = 77.14$
Christian	105	$105/1050 \times 360 = 36$

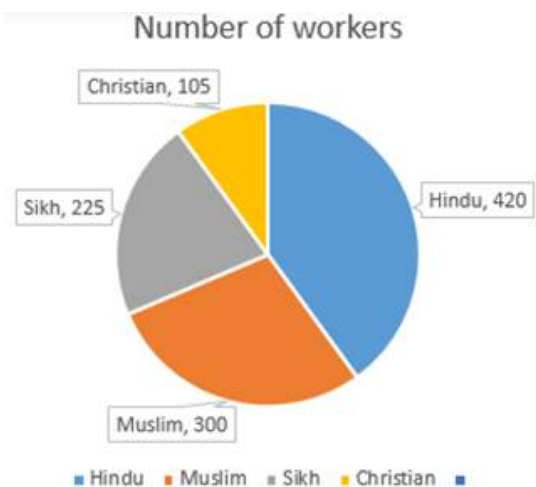
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3. Question

In one day the sales (in rupees) of different items of a baker's shop are given below :

Items	Ordinary Bread	Fruit Bread	Cake & Pastries	Biscuits	Others	Total
Amount (Rs.)	260	40	100	60	20	480

Draw a pie chart representing the above data:

Answer

Here, total sales = 480 rupees

So,

The central angle = $\frac{\text{Component value}}{480} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Sale (in Rs)	Sector angle (degree)
Ordinary bread	260	$260/480 \times 360 = 195$
Fruit bread	40	$40/480 \times 360 = 30$
Cakes and pastries	100	$100/480 \times 360 = 75$
Biscuits	60	$60/480 \times 360 = 45$
Others	20	$20/480 \times 360 = 15$

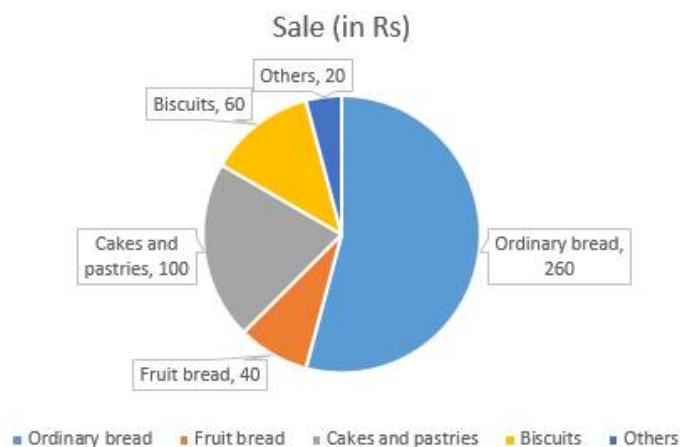
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4. Question

The following data shows the expenditure of a person on different items during a month. Represent the data by a pie-chart.

Items of Expenditure	Rent	Education	Food	Clothing	Others
Amount (in Rs.)	2700	1800	2400	1500	2400

Answer

Here, total amount = 10800 rupees

So,

The central angle = $\frac{\text{Component value}}{10800} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Amount (in Rs)	Sector angle (degree)
Rent	2700	$2700/10800 \times 360 = 90$
Education	1800	$1800/10800 \times 360 = 60$
Food	2400	$2400/10800 \times 360 = 80$
Clothing	1500	$1500/10800 \times 360 = 50$
Others	2400	$2400/10800 \times 360 = 80$

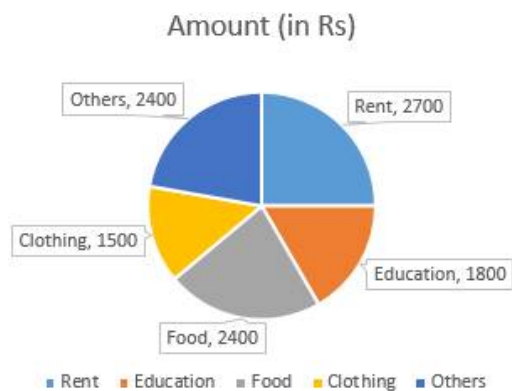
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5. Question

The percentages of various categories of workers in a state are given in the following table.

Categories	Cultivators	Agricultural Labourers	Industrial Workers	Commercial Workers	Others
% of workers	40	25	12.5	10	12.5

Present the information in the form of a pie chart.

Answer

Here, total workers = 100 %

So,

The central angle = $\frac{\text{Component value}}{100} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Category	Percentage of workers	Sector angle (degree)
Cultivators	40	$40/100 \times 360 = 144$
Agricultural laborers	25	$25/100 \times 360 = 90$
Industrial workers	12.5	$12.5/100 \times 360 = 45$
Commercial workers	10	$10/100 \times 360 = 36$
Others	12.5	$12.5/100 \times 360 = 45$

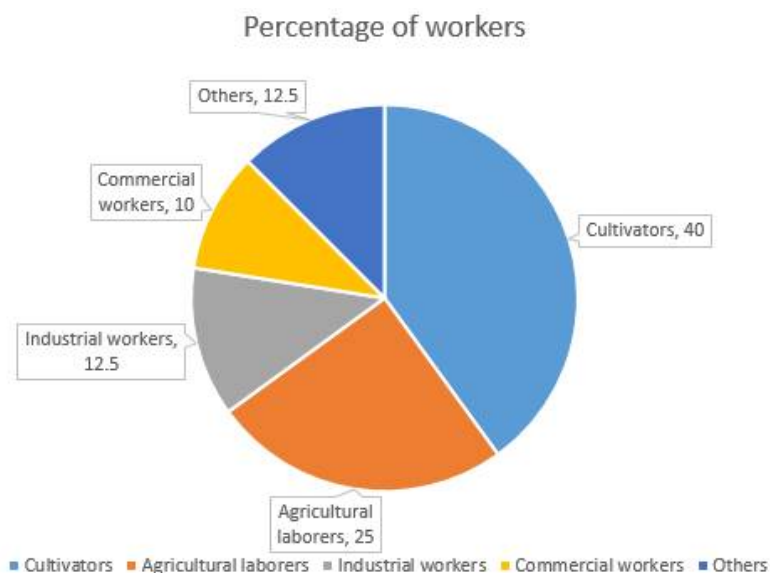
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6. Question

The following table shows the expenditure incurred by a publisher in publishing a book :

Present the above data in the form of piechart.

Items	Paper	Printing	Binding	Advertising	Miscellaneous
Expenditure %	35%	20%	10%	5%	30%

Answer

Here, total expenditure = 100 %

So,

The central angle = $\frac{\text{Component value}}{100} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in %)	Sector angle (degree)
Paper	35	$35/100 \times 360 = 126$
Printing	20	$20/100 \times 360 = 72$
Binding	10	$10/100 \times 360 = 36$
Advertising	5	$5/100 \times 360 = 18$
Miscellaneous	30	$30/100 \times 360 = 108$

Steps for construction of representation of data in pie chart

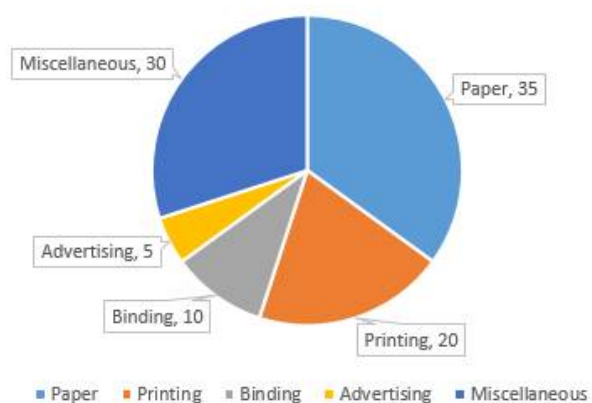
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Expenditure (in %)



7. Question

Percentage of the different products of a village in a particular district are given below. Draw a pie chart representing this information.

Items	Wheat	Pulses	Jwar	Ground Nuts	Vegetables	Total
%	$\frac{125}{3}$	$\frac{125}{6}$	$\frac{25}{2}$	$\frac{50}{3}$	$\frac{25}{3}$	100

Answer

Here, total product percentage = 100 %

So,

The central angle = $\frac{\text{Component value}}{100} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	In %	Sector angle (degree)
Wheat	125/3	$\frac{125}{3}/100 \times 360 = 150$
Pulses	125/6	$\frac{125}{6}/100 \times 360 = 75$
Jwar	25/2	$\frac{25}{2}/100 \times 360 = 45$
Groundnuts	50/3	$\frac{50}{3}/100 \times 360 = 60$
Vegetables	25/3	$\frac{25}{3}/100 \times 360 = 30$

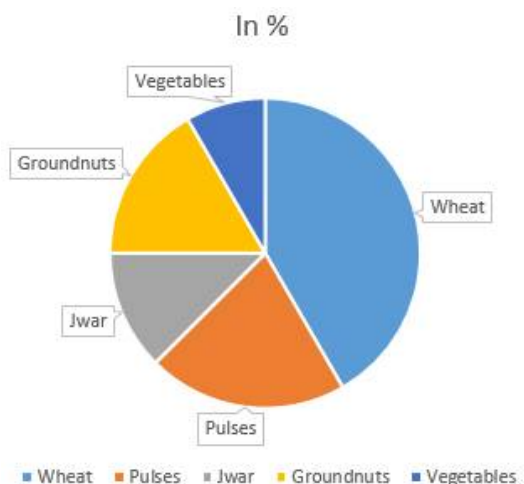
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8. Question

Draw a pie diagram for the following data of expenditure pattern in a family :

Items	Food	Clothing	Rent	Education	Unforeseen Events	Medicine
Expenditure (in %)	40%	20%	10%	10%	15%	5%

Answer

Here, total expenditure = 100 %

So,

The central angle = $\frac{\text{Component value}}{100} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure	Sector angle (degree)
Food	40%	$40/100 \times 360 = 144$
Clothing	20%	$20/100 \times 360 = 72$
Rent	10%	$10/100 \times 360 = 36$
Education	10%	$10/100 \times 360 = 36$
Unforeseen events	15%	$15/100 \times 360 = 54$
Medicine	5%	$5/100 \times 360 = 18$

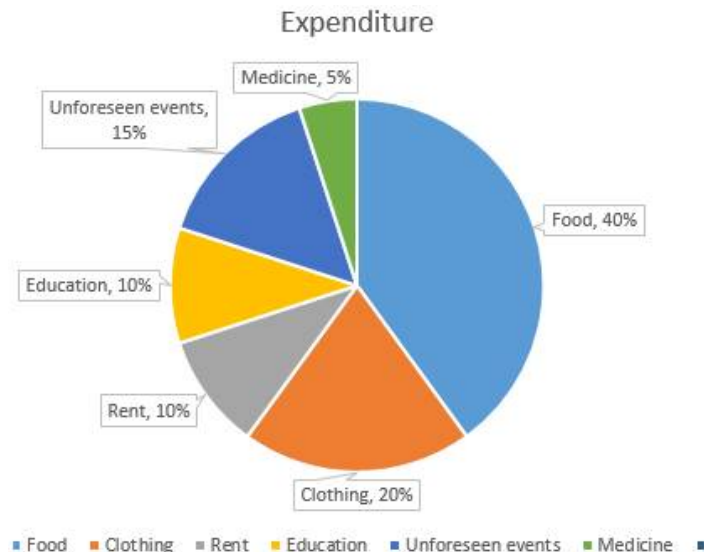
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9. Question

Draw a pie diagram of the areas of continents of the world given in the following table :

Continents	Asia	U.S.S.R	Africa	Europe	North America	South America	Australia
Area (in million Sq. km)	26.9	20.5	30.3	4.9	24.3	17.9	8.5

Answer

Here, total area = 133.3 million km²

So,

$$\text{The central angle} = \frac{\text{Component value}}{133.3} \times 360^\circ$$

Hence, the central angle for each activity will be calculated as follows

Continent	Area (in million sq. km)	Sector angle (degree)
Asia	26.9	$26.9/133.3 \times 360 = 72.6$
U.S.S.R	20.5	$20.5/133.3 \times 360 = 55.4$
Africa	30.3	$30.3/133.3 \times 360 = 81.8$
Europe	4.9	$4.9/133.3 \times 360 = 13.2$
North America	24.3	$24.3/133.3 \times 360 = 65.6$
South America	17.9	$17.9/133.3 \times 360 = 48.3$
Australia	8.5	$8.5/133.3 \times 360 = 23$

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10. Question

The following data gives the amount spent on the construction of a house. Draw a pie diagram

Items	Cement	Timber	Bricks	Labour	Steel	Miscellaneous
Expenditure (in thousand Rs.)	60	30	45	75	45	45

Answer

Here, total expenditure = 300 thousand rupees

So,

The central angle = $\frac{\text{Component value}}{300} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in thousand Rs)	Sector angle (degree)
Cement	60	$60/300 \times 360 = 72$
Timber	30	$30/300 \times 360 = 36$
Bricks	45	$45/300 \times 360 = 54$
Labour	75	$75/300 \times 360 = 90$
Steel	45	$45/300 \times 360 = 54$
Miscellaneous	45	$45/300 \times 360 = 54$

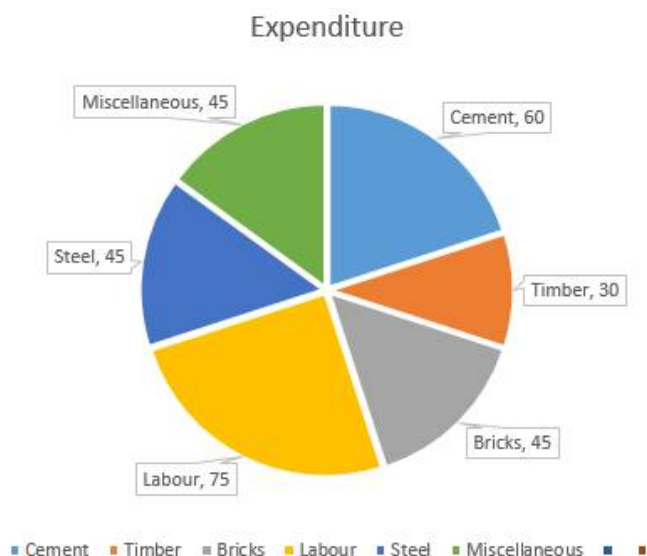
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11. Question

The following table shows how a student spends his pocket money during the course of a month. Represent it by a pie diagram.

Items	Food	Entertainment	Other Expenditure	Savings
Expenditure	40%	25%	20%	15%

Answer

Here, total expenditure = 100 %

So,

The central angle = $\frac{\text{Component value}}{100} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in %)	Sector angle (degree)s
Food	40	$40/100 \times 360 = 144$
Entertainment	25	$25/100 \times 360 = 90$
Other expenditures	20	$20/100 \times 360 = 72$
Savings	15	$15/100 \times 360 = 54$

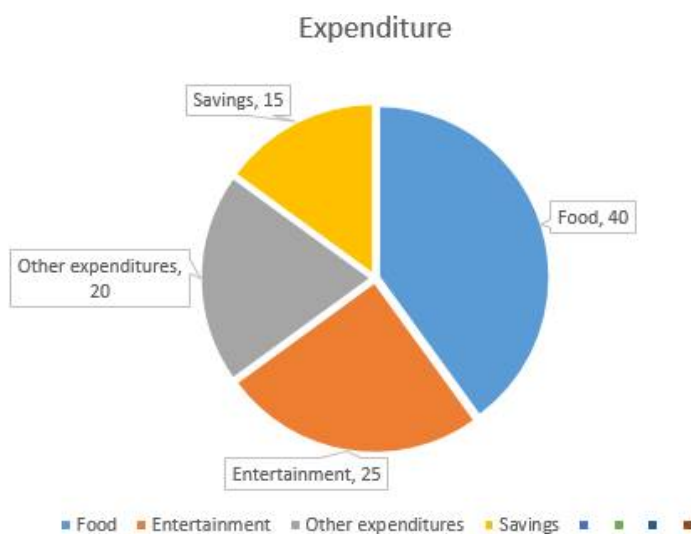
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12. Question

Represent the following data by a pie diagram:

Items of expenditure	Expenditure	
	Family A	Family B
Food	4000	6400
Clothing	2500	480
Rent	1500	3200
Education	400	1000
Miscellaneous	1600	600
Total	10000	11680

Answer

Here the total expenditure of family A = 10000 and family B = 11680

So,

The central angle for family A = $\frac{\text{Component value}}{10000} \times 360^\circ$

The central angle for family B = $\frac{\text{Component value}}{11680} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (Family A)	Sector angle (degree) (Family A)	Expenditure (Family B)	Sector angle (degree) (Family B)
Food	4000	$4000/10000 \times 360 = 144$	6400	$6400/11680 \times 360 = 197.3$
Clothing	2500	$2500/10000 \times 360 = 90$	480	$480/11680 \times 360 = 14.8$
Rent	1500	$1500/10000 \times 360 = 54$	3200	$3200/11680 \times 360 = 98.6$
Education	400	$400/10000 \times 360 = 14.4$	1000	$1000/11680 \times 360 = 30.8$
Miscellaneous	1600	$1600/10000 \times 360 = 57.6$	600	$600/11680 \times 360 = 18.5$

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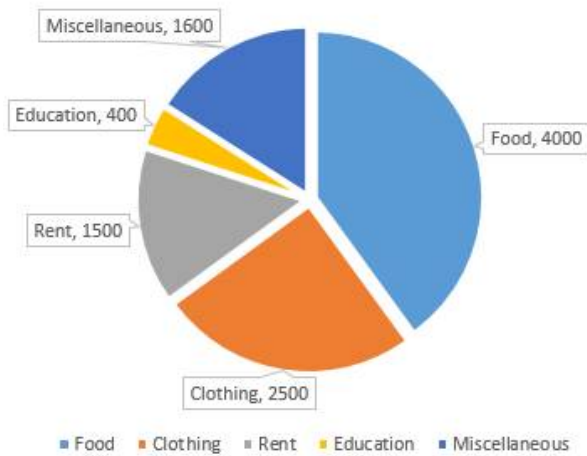
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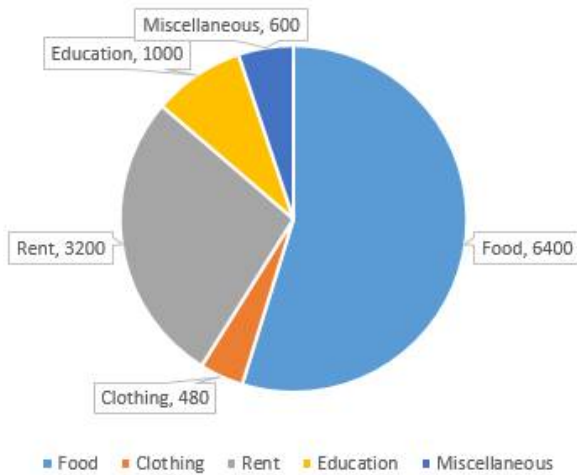
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Expenditure (Family A)



Expenditure(Family B)



13. Question

Following data gives the break up of the cost of production of a book :

Printing	Paper	Binding Charges	Advertisement	Royalty	Miscellaneous
30%	15%	15%	20%	10%	15%

Draw a pie diagram depicting the above information.

Answer

Here, total cost of production of book = 105 %

So,

$$\text{The central angle} = \frac{\text{Component value}}{105} \times 360^\circ$$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure	Sector angle (degree)
Printing	30	$30/105 \times 360 = 102.9$
Paper	15	$15/105 \times 360 = 51.4$
Binding charges	15	$15/105 \times 360 = 51.4$
Advertisement	20	$20/105 \times 360 = 68.6$
Royalty	10	$10/105 \times 360 = 34.3$
Miscellaneous	15	$15/105 \times 360 = 51.4$

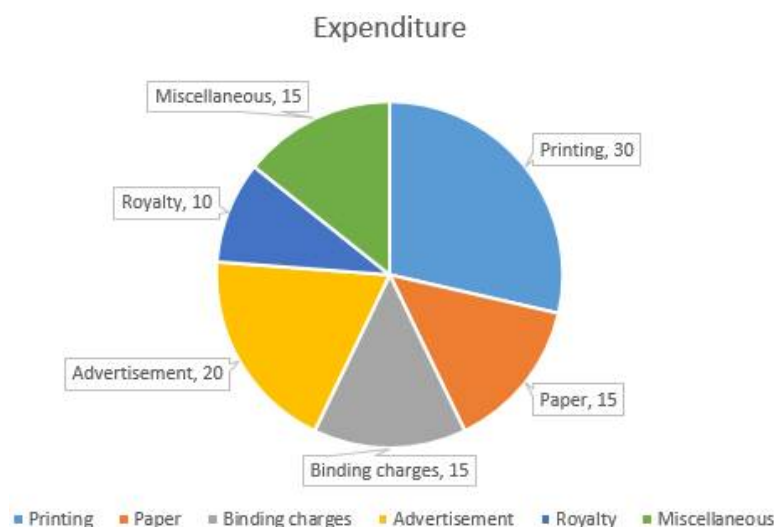
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14. Question

Represent the following data with the help of pie diagram :

Items	Wheat	Rice	Tea
Production (in metric Tons)	3260	1840	900

Answer

Here, total production = 6000 metric tons

So,

The central angle = $\frac{\text{Component value}}{6000} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Production (in metric tons)	Sector angle (degree)
Wheat	3260	$3260/6000 \times 360 = 195.6$
Rice	1840	$1840/6000 \times 360 = 110.4$
Tea	900	$900/6000 \times 360 = 54$

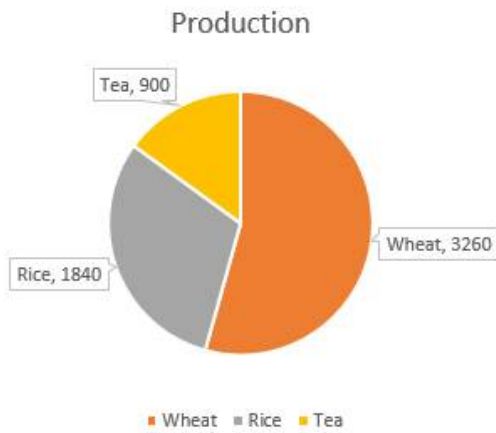
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15. Question

Draw a pie-diagram representing the relative frequencies (expressed as percentage) of the eight classes as given below :

12.6, 18.2, 17.5, 20.3, 2.8, 4.2, 9.8, 14.7

Answer

Here, total amount = 100.1%

The central angle = $\frac{\text{Component value}}{100.1} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Class	Amount (in %)	Sector angle (degree)
1	12.6	$12.6/100.1 \times 360 = 45.3$
2	18.2	$18.2/100.1 \times 360 = 65.5$
3	17.5	$17.5/100.1 \times 360 = 62.9$
4	20.3	$20.3/100.1 \times 360 = 73$
5	2.8	$2.8/100.1 \times 360 = 10.1$
6	4.2	$4.2/100.1 \times 360 = 15.1$
7	9.8	$9.8/100.1 \times 360 = 35.2$
8	14.7	$14.7/100.1 \times 360 = 52.9$

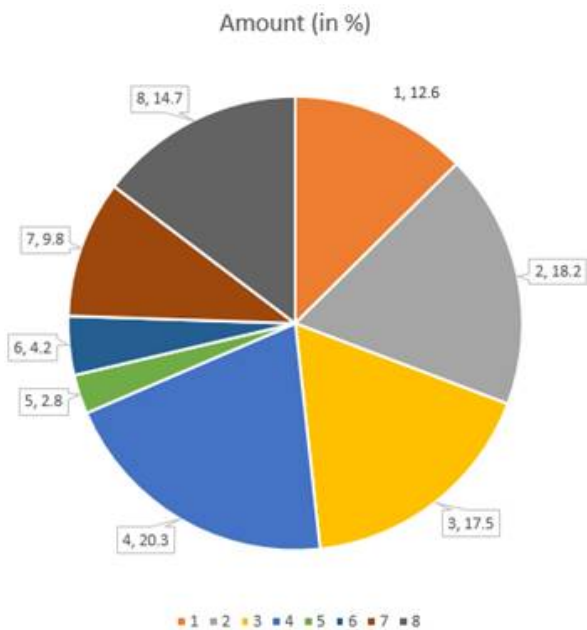
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16. Question

Following is the break up of the expenditure of a family on different items of consumption :

Items	Food	Clothing	Rent	Education	Fuel Etc.	Medicine	Miscellaneous
Expenditure (in Rs)	1600	200	600	150	100	80	270

Draw a pie diagram to represent the above data.

Answer

Here, total expenditure = 3000 rupees

So,

The central angle = $\frac{\text{Component value}}{3000} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Expenditure (in Rs)	Sector angle (degree)
Food	1600	$1600/3000 \times 360 = 192$
Clothing	200	$200/3000 \times 360 = 24$
Rent	600	$600/3000 \times 360 = 72$
Education	150	$150/3000 \times 360 = 18$
Fuel etc	100	$100/3000 \times 360 = 12$
Medicine	80	$80/3000 \times 360 = 9.6$
Miscellaneous	270	$270/3000 \times 360 = 32.4$

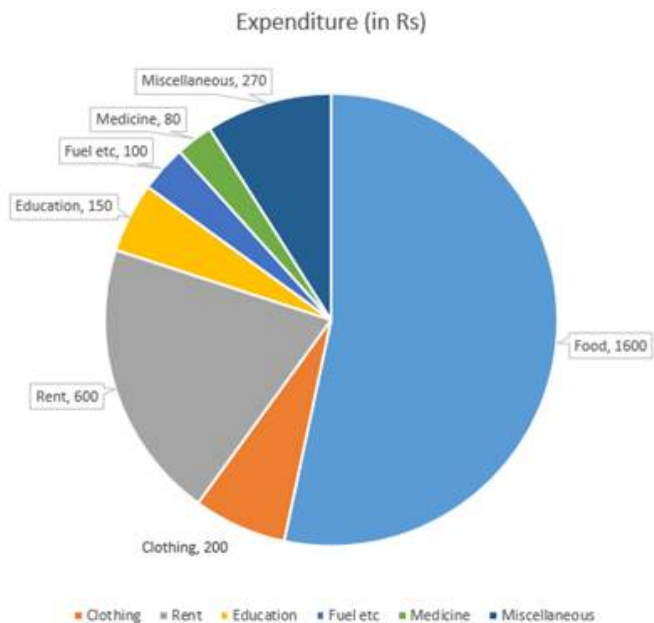
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17. Question

Draw a pie diagram for the following data of the investment pattern in a five years plan :

Agriculture	Irrigation & Power	Small Industries	Transport	Social; Service	Miscellaneous
14%	16%	29%	17%	16%	8%

Answer

Here, total investment = 100%

So,

The central angle = $\frac{\text{Component value}}{100} \times 360^\circ$

Hence, the central angle for each activity will be calculated as follows

Item	Amount	Sector angle (degree)
Agriculture	14	$14/100 \times 360 = 50.4$
Irrigation and Power	16	$16/100 \times 360 = 57.6$
Small Industries	29	$29/100 \times 360 = 104.4$
Transport	17	$17/100 \times 360 = 61.2$
Social Service	16	$16/100 \times 360 = 57.6$
Miscellaneous	8	$8/100 \times 360 = 28.8$

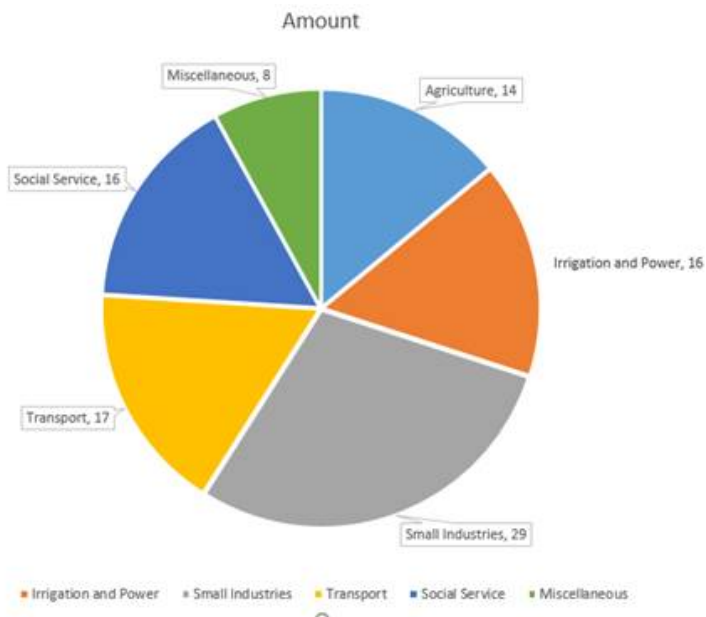
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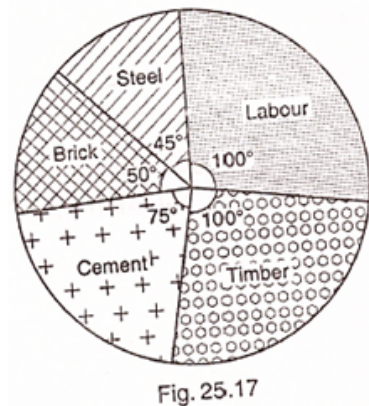
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Exercise 25.2

1. Question

The pie chart given in Fig. 25.17 represents the expenditure on different items in constructing a flat in Delhi. If the expenditure incurred on cement is Rs. 112500, find the following



- 1) Total cost of the flat.
- 2) Expenditure incurred on labour.

Answer

$$1) \text{ Expenditure incurred on cement} = \frac{\text{Central angle of the sector} \times \text{Total cost}}{360^\circ}$$

$$\text{Total cost of the flat} = \frac{360^\circ \times 112500}{75^\circ} = 540000 \text{ rupees}$$

$$2) \text{ Expenditure incurred on labor} = \frac{\text{Central angle of the sector} \times \text{Total cost}}{360^\circ} = \frac{100^\circ \times 540000}{360^\circ} = 150000 \text{ rupees}$$

2. Question

The pie-chart given in Fig. 25.18 shows the annual agricultural production of an Indian state. If the total production of all the commodities is 81000 tonnes, find the production (in tonnes) of

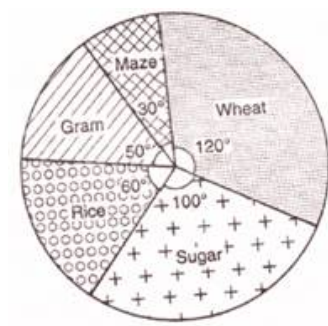


Fig. 25.18

(i) Wheat (ii) Sugar (iii) Rice (iv) Maize (v) Gram

Answer

∴ Total Production = 81000 Tonnes.

$$1) \text{ Production of wheat} = \frac{\text{Central angle for wheat} \times \text{Total production}}{360^\circ} = \frac{120^\circ \times 81000}{360^\circ} = 27000 \text{ tonnes}$$

$$2) \text{ Production of sugar} = \frac{\text{Central angle for sugar} \times \text{Total production}}{360^\circ} = \frac{100^\circ \times 81000}{360^\circ} = 22500 \text{ tonnes}$$

$$3) \text{ Production of rice} = \frac{\text{Central angle for Rice} \times \text{Total production}}{360^\circ} = \frac{60^\circ \times 81000}{360^\circ} = 13500 \text{ tonnes}$$

$$4) \text{ Production of maize} = \frac{\text{Central angle for maize} \times \text{Total production}}{360^\circ} = \frac{30^\circ \times 81000}{360^\circ} = 6750 \text{ tonnes}$$

$$5) \text{ Production of rice} = \frac{\text{Central angle for gram} \times \text{Total production}}{360^\circ} = \frac{50^\circ \times 81000}{360^\circ} = 11250 \text{ tonnes}$$

3. Question

The following pie chart shows the number of students admitted in different faculties of a college. If 1000 students are admitted in Science answer the following :

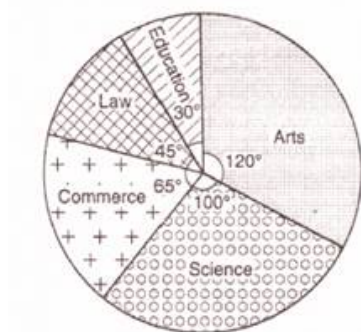


Fig. 25.19

(i) What is the total number of students?

(ii) What is the ratio of students in science and arts?

Answer

$$1) \text{ Students in science} = \frac{\text{Central angle of the corresponding sector} \times \text{Total students}}{360^\circ}$$

$$1000 = \frac{100^\circ \times \text{Total students}}{360^\circ}$$

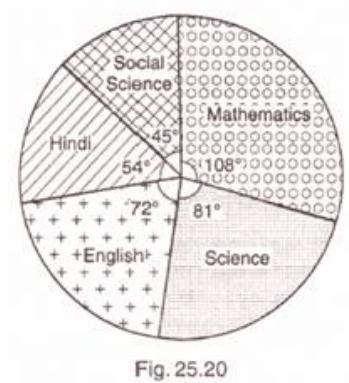
$$\therefore \text{Total students} = 3600$$

$$2) \text{ Students in arts} = \frac{\text{Central angle for arts} \times \text{Total students}}{360^\circ} = \frac{120^\circ \times 3600}{360^\circ} = 1200$$

$$\therefore \text{Ratio of students in science and arts} = 1000:1200 = 5:6$$

4. Question

In Fig. 25.20, the pie-chart shows the marks obtained by a student in an examination. If the student secures 440 marks in all, calculate his marks in each of the given subjects.



Answer

Marks secured in mathematics = $\frac{108 \times 440}{360}$ marks = 132 marks

Marks secured in science = $\frac{81 \times 440}{360}$ marks = 99 marks

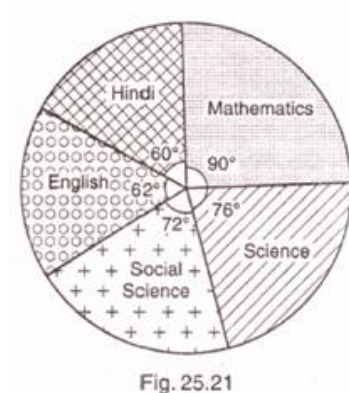
Marks secured in English = $\frac{72 \times 440}{360}$ marks = 88 marks

Marks secured in Hindi = $\frac{54 \times 440}{360}$ marks = 66 marks

Marks secured in social science = $\frac{45 \times 440}{360}$ marks = 55 marks

5. Question

In Fig. 25.21, the pie chart shows the marks obtained by a student in various subjects. If the student scored 135 marks in mathematics, find the total marks in all the subjects. Also, find his score in individual subjects.



Answer

First we need to find total marks.

So,

Marks scored in mathematics = $\frac{\text{Central angle of sector} \times \text{Total Marks}}{360^\circ}$

$$135 = \frac{90^\circ \times \text{Total Marks}}{360^\circ}$$

$\therefore$ Total Marks = 540

Marks scored in Hindi = $\frac{\text{Central angle of sector} \times \text{Total Marks}}{360^\circ} = \frac{60 \times 540}{360^\circ} = 90$ marks

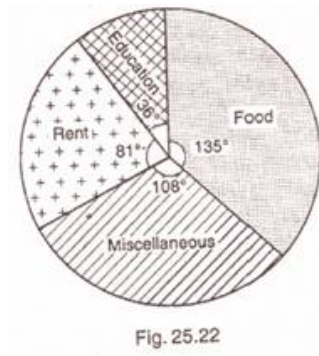
Similarly, marks scored in science = $\frac{76 \times 540}{360^\circ}$ marks = 114 marks

Marks scored in social science = $\frac{72 \times 540}{360^\circ}$ marks = 108 marks

Marks scored in English = $\frac{62 \times 540}{360^\circ}$ marks = 93 marks

6. Question

The following pie chart shows the monthly expenditure of Shikha on various items. If she spends Rs. 16000 per month, answer the following questions:



- How much does she spend on rent?
- How much does she spend on education?
- What is the ratio of expenses on food and rent?

Answer

$$1) \text{ Money spent on rent} = \frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{81^\circ \times 16000}{360^\circ} = 3,600 \text{ rupees}$$

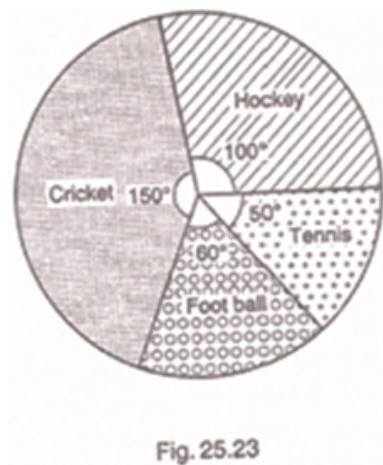
$$2) \text{ Money spent on education} = \frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{36^\circ \times 16000}{360^\circ} = 1,600 \text{ rupees}$$

$$3) \text{ Money spent on food} = \frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{135^\circ \times 16000}{360^\circ} = 6000 \text{ rupees}$$

$$\text{Ratio of expenses on food and rent} = \frac{6000}{3600} = \frac{5}{3}$$

7. Question

The pie chart (as shown in Fig. 25.23) represents the amount spent on different sports by a sports club in a year. If the total money spent by the club on sports is Rs. 1,08,000, find the amount spent on each sport.



Answer

$$\text{Money spent on cricket} = \frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{150^\circ \times 108000}{360^\circ} = 45,000 \text{ rupees}$$

$$\text{Money spent on hockey} = \frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{100^\circ \times 108000}{360^\circ} = 30,000 \text{ rupees}$$

$$\text{Money spent on football} = \frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{60^\circ \times 108000}{360^\circ} = 18,000 \text{ rupees}$$

$$\text{Money spent on cricket} = \frac{\text{Central angle of the sector} \times \text{Total Money spent}}{360^\circ} = \frac{50^\circ \times 108000}{360^\circ} = 15,000 \text{ rupees}$$