EXERCISE 25.1

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.

Solution:

Here, total number of hours = 24

So,

The central angle = (component value/24) × 360°

The central angle for each activity will be calculated as follows

Activity	Number of Hours	Central Angle
Sleep	8	8/24 × 360° = 120°
School	7	7/24 × 360° = 105°
Home	4	4/24 × 360° = 60°
Play	2	2/24 × 360° = 30°
Others	3	3/24 × 360° = 45°

Now, the pie-chart can be constructed by using the given data.

Steps to construct:

Step 1: Draw the circle of an appropriate radius.

Step 2: Draw a vertical radius anywhere inside the circle.

Step 3: Choose the largest central angle. Here, it is 120°. Construct a sector of central angle 120° whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.

Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.

Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.

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

Religious	**Hindu**	**Muslim**	**Sikh**	**Christian**	**Total**
Number of Workers	**420**	**300**	**225**	**105**	**1080**

Draw a pie-chart to represent the above information.

Solution:

Here, total number of workers = 1080

So,

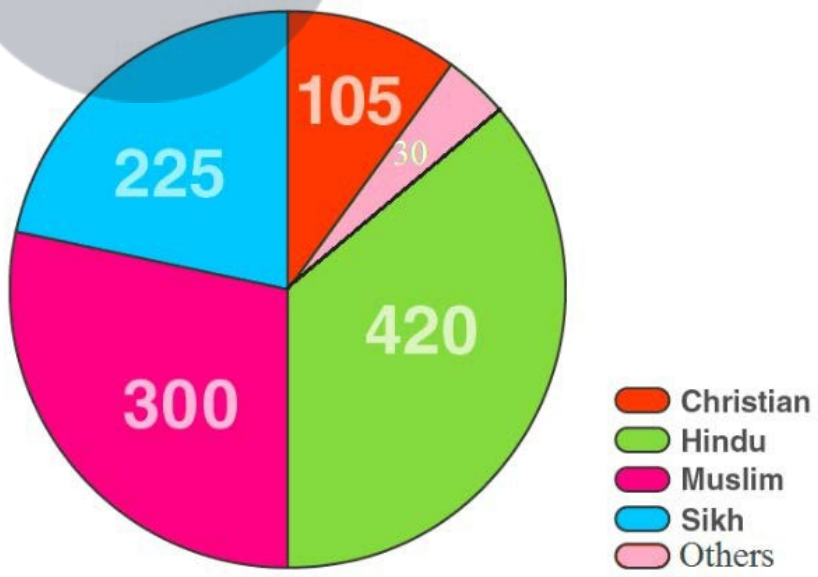
The central angle = (component value/1080) × 360°

The central angle for each activity will be calculated as follows

Religious	Number of Workers	Central Angle
Hindu	420	420/1080 × 360° = 144

Muslim	300	300/1080 × 360° = 100
Sikh	225	225/1080 × 360° = 75
Christian	105	105/1080 × 360° = 35
Others	30	30/1080 × 360° = 10

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



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

Items	**Ordinary bread**	**Fruit bread**	**Cakes and Pastries**	**Biscuits**	**Others**	**Total**
Sales (in Rs)	**260**	**40**	**100**	**60**	**20**	**480**

Draw a pie-chart to represent the above information.

Solution:

Here, total sales = 480

So,

The central angle = (component value/480) × 360°

The central angle for each activity will be calculated as follows

Items	Sales (in Rs)	Central Angle
Ordinary bread	260	260/480 × 360° = 195
Fruit bread	40	40/480 × 360° = 30
Cakes and Pastries	100	100/480 × 360° = 75
Biscuits	60	60/480 × 360° = 45
Others	20	20/480 × 360° = 15

Now, the pie-chart can be constructed by using the given data.

Steps to construct:

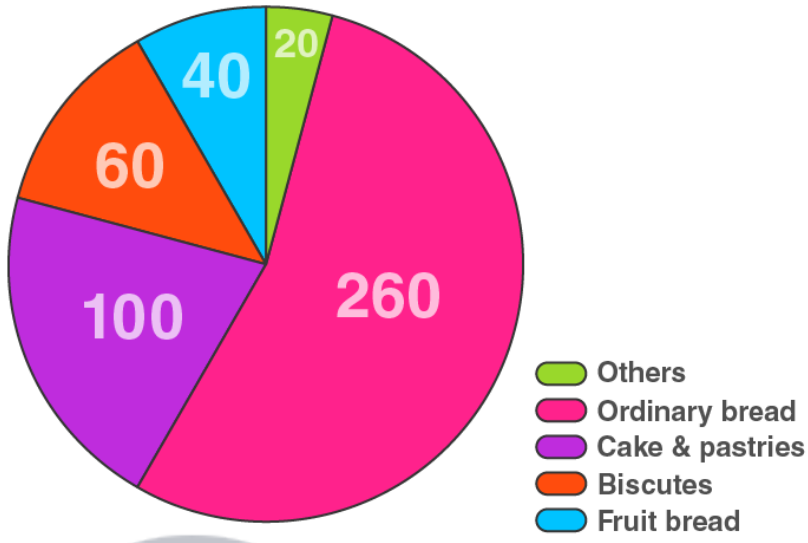
Step 1: Draw the circle of an appropriate radius.

Step 2: Draw a vertical radius anywhere inside the circle.

Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.

Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.

Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



3. 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**

Solution:

Here, total amount = Rs 10800

So,

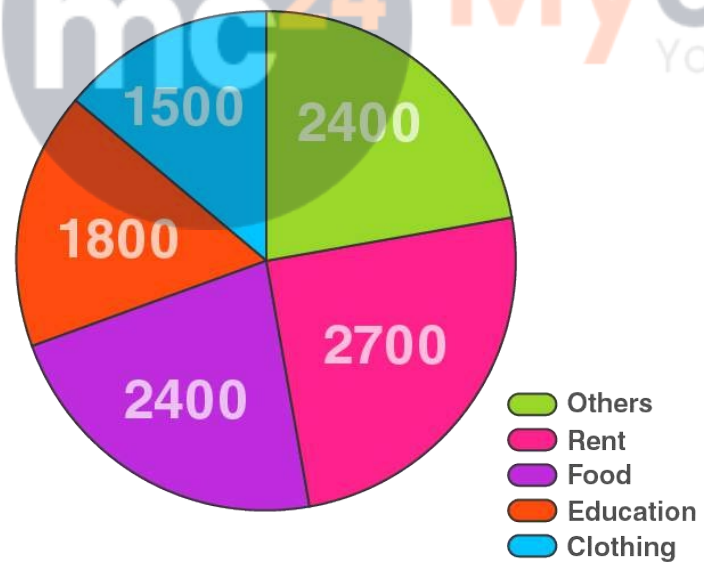
The central angle = (component value/10800) × 360°

The central angle for each activity will be calculated as follows

Items of expenditure	Amount (in Rs)	Central angle
Rent	2700	2700/10800 × 360° = 90
Education	1800	1800/10800 × 360° = 60

Food	2400	2400/10800 × 360° = 80
Clothing	1500	1500/10800 × 360° = 50
Others	2400	2400/10800 × 360° = 80

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



4. 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	40	25	12.5	10	12.5

workers					

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

Solution:

Here, total % of workers = 100%

So,

The central angle = (component value/100) × 360°

The central angle for each activity will be calculated as follows

Categories	% of workers	Central angle
Cultivators	40	400/100 × 360° = 144
Agricultural Labourers	25	25/100 × 360° = 90
Industrial Workers	12.5	12.5/100 × 360° = 45
Commercial Workers	10	10/100 × 360° = 36
Others	12.5	12.5/100 × 360° = 45

Now, the pie-chart can be constructed by using the given data.

Steps to construct:

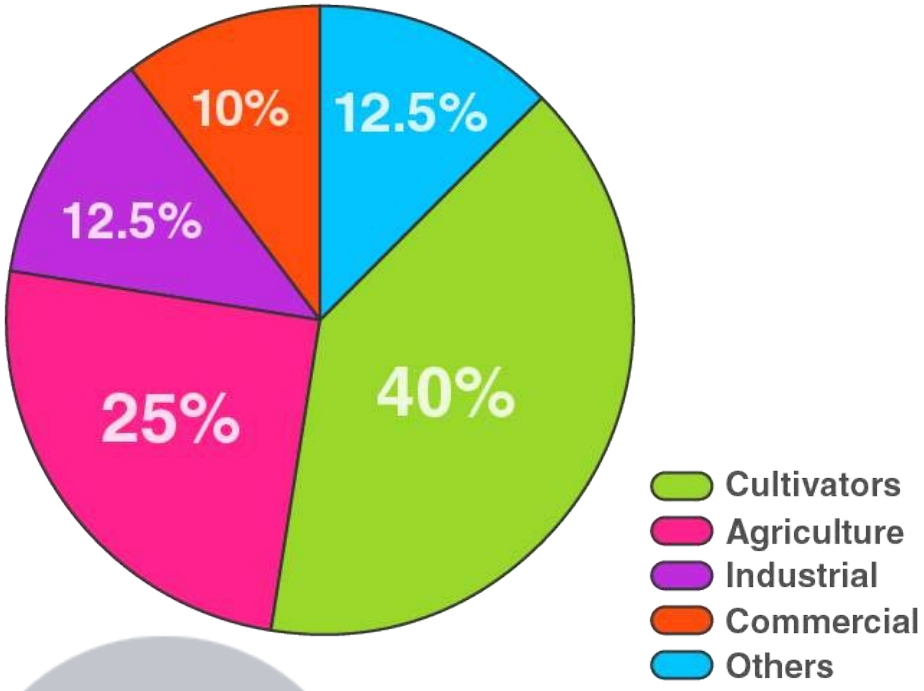
Step 1: Draw the circle of an appropriate radius.

Step 2: Draw a vertical radius anywhere inside the circle.

Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.

Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.

Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



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

Items	**Papers**	**Printing**	**Binding**	**Advertising**	**Miscellaneous**
Expenditure (in %)	**35%**	**20%**	**10%**	**5%**	**30%**

Present the above data in the form of pie-chart.

Solution:

Here, total Expenditure (in %) = 100%

So,

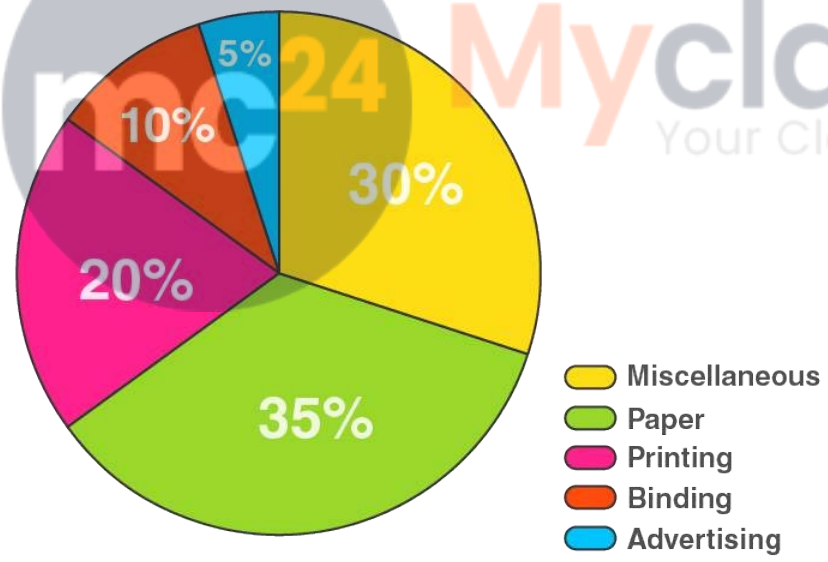
The central angle = (component value/100) × 360°

The central angle for each activity will be calculated as follows

Items	Expenditure (in %)	Central angle
Papers	35%	35/100 × 360° = 126
Printing	20%	20/100 × 360° = 72
Binding	10%	10/100 × 360° = 36

Advertising	5%	5/100 × 360° = 18
Miscellaneous	30%	30/100 × 360° = 108

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



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

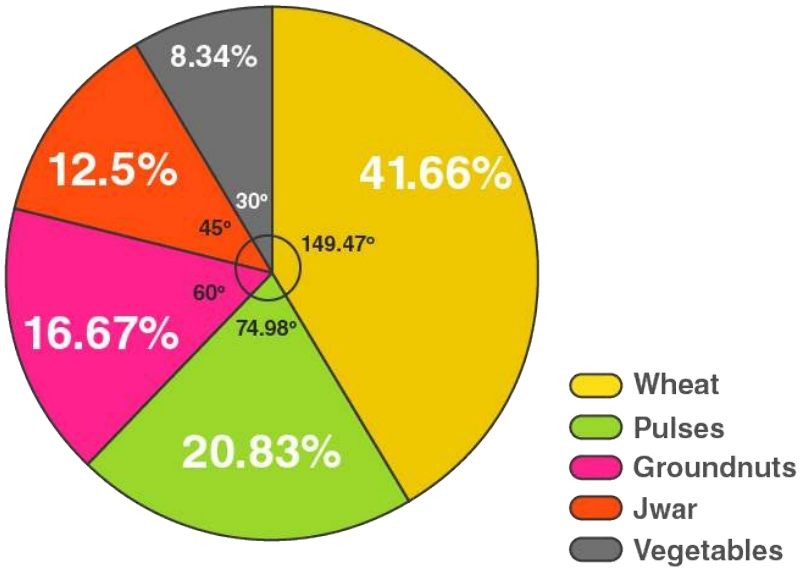
Items	**Wheat**	**Pulses**	**Jwar**	**Groundnuts**	**Vegetables**	**Total**
%	**125/3**	**125/6**	**25/2**	**50/3**	**25/3**	**100**

Solution:

Here, total % = 100%
So,
The central angle = (component value/100) × 360°
The central angle for each activity will be calculated as follows

Items	%	Central angle
Wheat	125/3	(125/3)/100 × 360° = 150
Pulses	125/6	(125/6)/100 × 360° = 75
Jwar	25/2	(25/2)/100 × 360° = 45
Groundnuts	50/3	(50/3)/100 × 360° = 60
Vegetables	25/3	(25/3)/100 × 360° = 30

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



7. 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%**

Solution:

Here, total % = 100%

So,

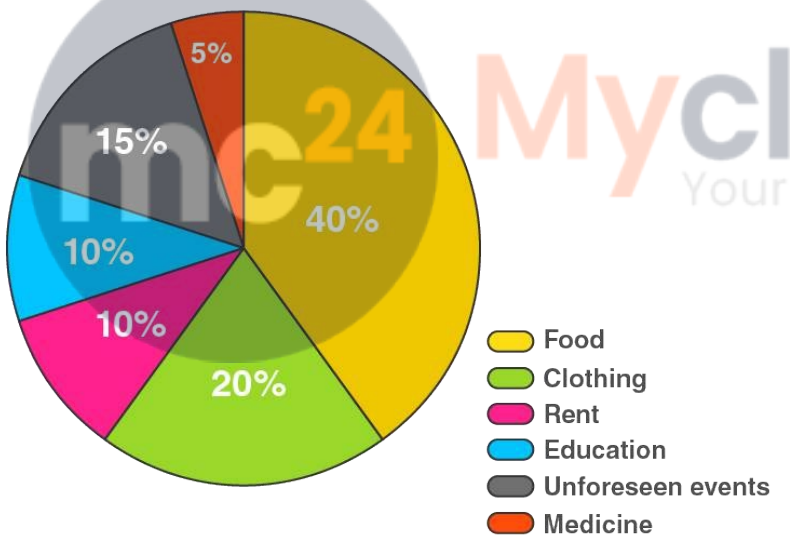
The central angle = (component value/100) × 360°

The central angle for each activity will be calculated as follows

Items	Expenditure (in %)	Central angle
Food	40%	40/100 × 360° = 144
Clothing	20%	20/100 × 360° = 72
Rent	10%	10/100 × 360° = 36
Education	10%	10/100 × 360° = 36

Unforeseen events	15%	15/100 × 360° = 54
Medicines	5%	5/100 × 360° = 18

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



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

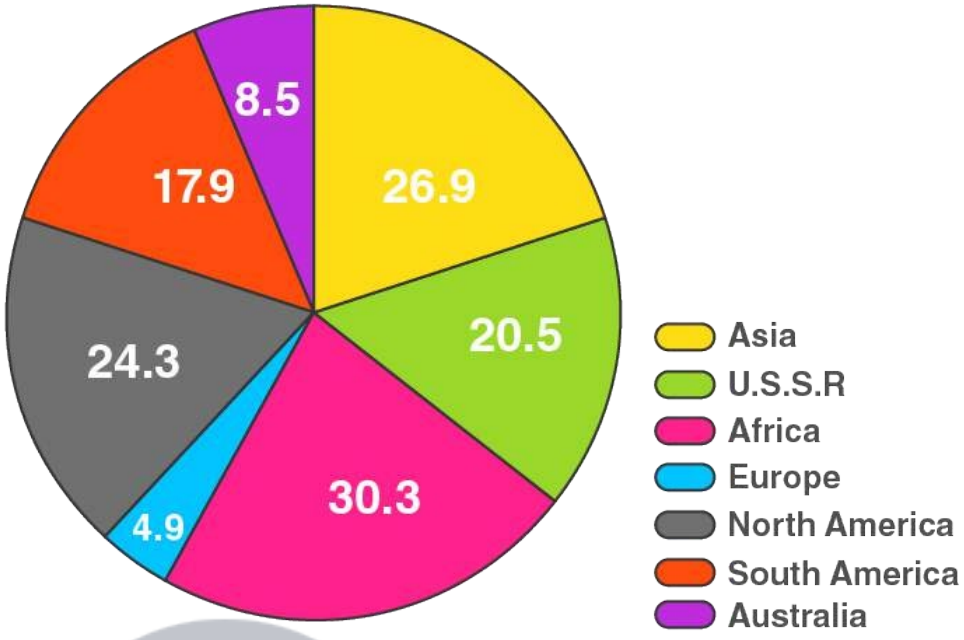
Continents	**Asia**	**U.S.S.R**	**Africa**	**Europe**	**North America**	**South America**	**Australia**
Area (in million sq.km)	**26.9**	**20.5**	**30.3**	**4.9**	**24.3**	**17.9**	**8.5**

Solution:

Here, total Area = 133.3 million sq.km
So,
The central angle = (component value/133.3) × 360°
The central angle for each activity will be calculated as follows

Continents	Area (in million sq.km)	Central angle
Asia	26.9	26.9/133.3 × 360° = 72.6
U.S.S.R	20.5	20.5/133.3 × 360° = 55.4
Africa	30.3	30.3/133.3 × 360° = 81.8
Europe	4.9	4.9/133.3 × 360° = 13.2
North America	24.3	24.3/133.3 × 360° = 65.6
South America	17.9	17.9/133.3 × 360° = 48.3
Australia	8.5	8.5/133.3 × 360° = 23

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



9. 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**

Solution:

Here, total Expenditure = 300 thousand rupees

So,

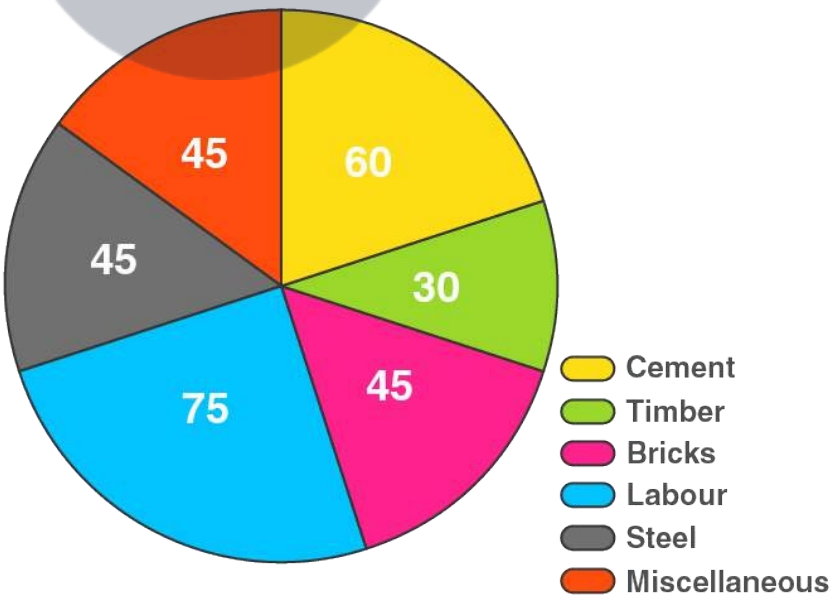
The central angle = (component value/300) × 360°

The central angle for each activity will be calculated as follows

Items	Expenditure (in thousand Rs)	Central angle
Cement	60	60/300 × 360° = 72
Timber	30	30/300 × 360° = 36

Bricks	45	45/300 × 360° = 54
Labour	75	75/300 × 360° = 90
Steel	45	45/300 × 360° = 54
Miscellaneous	45	45/300 × 360° = 54

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



10. 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%**

Solution:

Here, total Expenditure = 100%

So,

The central angle = (component value/100) × 360°

The central angle for each activity will be calculated as follows

Items	Expenditure	Central angle
Food	40%	40/100 × 360° = 144
Entertainment	25%	25/100 × 360° = 90
Other Expenditure	20%	20/100 × 360° = 72
Savings	15%	15/100 × 360° = 54

Now, the pie-chart can be constructed by using the given data.

Steps to construct:

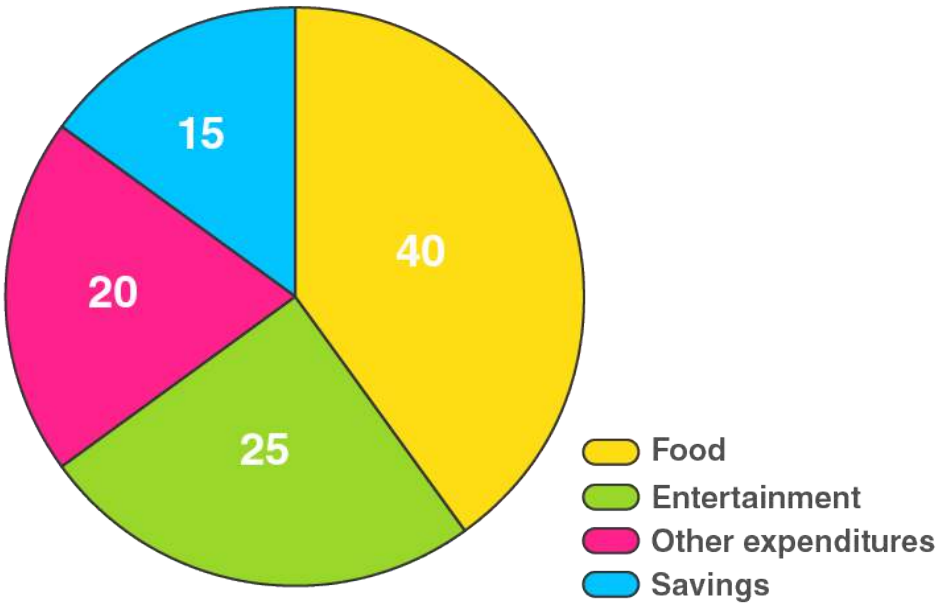
Step 1: Draw the circle of an appropriate radius.

Step 2: Draw a vertical radius anywhere inside the circle.

Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.

Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.

Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



11. 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	16000

Solution:

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

The central angle for family A = (component value/10000) × 360°
The central angle for family B = (component value/11680) × 360°

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

Items of expenditure	Expenditure of Family A	Expenditure of Family B	Central angle of Family A	Central angle of Family B

Food	4000	6400	4000/10000 × 360° = 144	6400/11680 × 360° = 197.3
Clothing	2500	480	2500/10000 × 360° = 90	480/11680 × 360° = 14.8
Rent	1500	3200	1500/10000 × 360° = 54	3200/11680 × 360° = 98.6
Education	400	1000	400/10000 × 360° = 14.4	1000/11680 × 360° = 30.8
Miscellaneous	1600	600	1600/10000 × 360° = 57.6	600/11680 × 360° = 18.5

Now, the pie-chart for Family A and Family B can be constructed by using the given data.

Steps to construct:

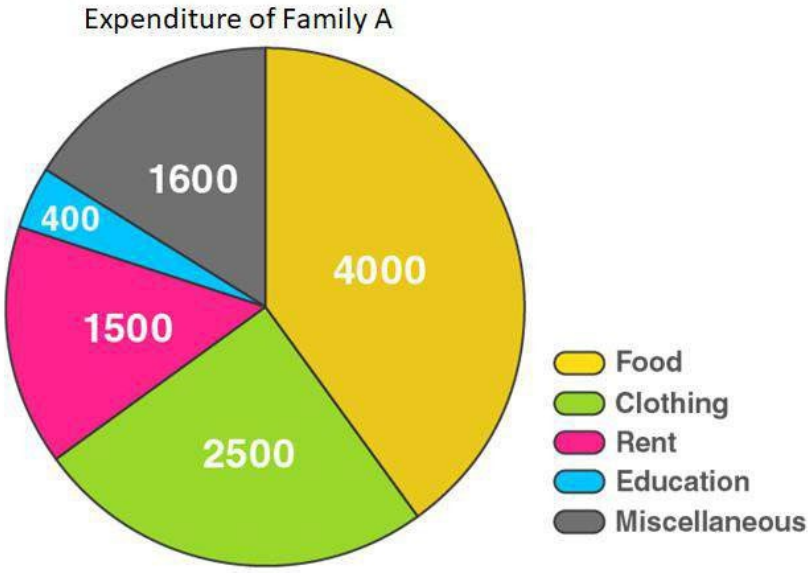
Step 1: Draw the circle of an appropriate radius.

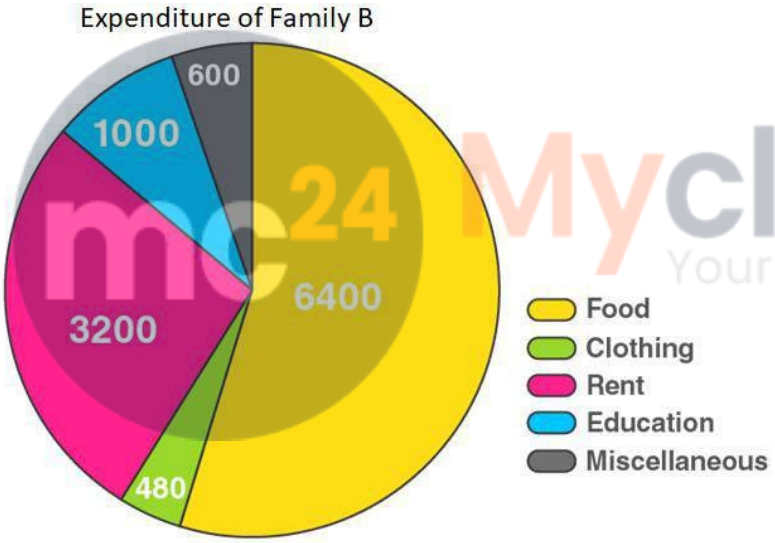
Step 2: Draw a vertical radius anywhere inside the circle.

Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.

Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.

Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.





12. 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.

Solution:

Here, total cost of production of book = 105%

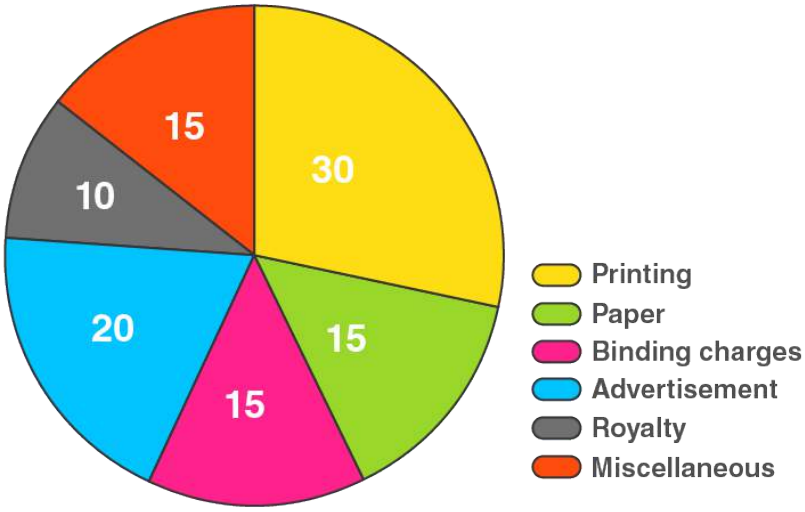
So,

The central angle = (component value/105) × 360°

The central angle for each activity will be calculated as follows

Items	Expenditure	Central angle
Printing	30%	30/105 × 360° = 102.9
Paper	15%	15/105 × 360° = 51.4
Binding charges	15%	15/105 × 360° = 51.4
Advertisement	20%	20/105 × 360° = 68.6
Royalty	10%	10/105 × 360° = 34.3
Miscellaneous	15%	15/105 × 360° = 51.4

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



13. Represent the following data with the help of pie diagram:

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

Solution:

Here, total cost of production = 6000 metric tons

So,

The central angle = (component value/6000) × 360°

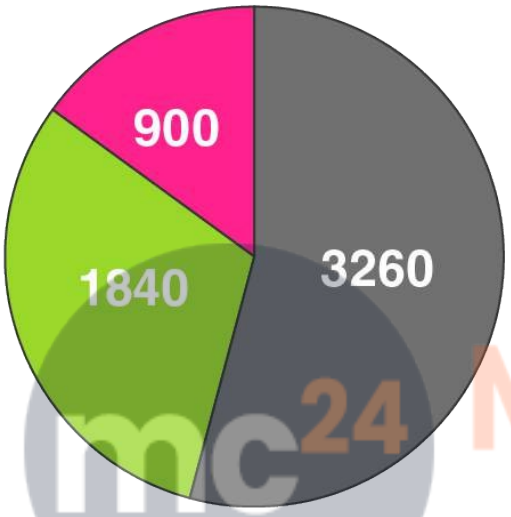
The central angle for each activity will be calculated as follows

Items	Production	Central angle
Wheat	3260	3260/6000 × 360° = 195.6
Rice	1840	1840/6000 × 360° = 110.4
Tea	900	900/6000 × 360° = 54

Now, the pie-chart can be constructed by using the given data.

Steps to construct:

Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



14. 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
Solution:
Here, total amount = 100.1%
So,
The central angle = (component value/100.1) × 360°
The central angle for each activity will be calculated as follows

Class	Amount (in %)	Central angle
1	12.6	12.6/100.1 × 360° = 45.3
2	18.2	18.2/100.1 × 360° = 65.5

3	17.5	17.5/100.1 × 360° = 62.9
4	20.3	20.3/100.1 × 360° = 73
5	2.8	2.8/100.1 × 360° = 10.1
6	4.2	4.2/100.1 × 360° = 15.1
7	9.8	9.8/100.1 × 360° = 35.2
8	14.7	14.7/100.1 × 360° = 52.9

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.

15. 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.

Solution:

Here, total expenditure = 3000 Rs

So,

The central angle = (component value/3000) × 360°

The central angle for each activity will be calculated as follows

Items	Expenditure (in Rs)	Central angle
Food	1600	1600/3000 × 360° = 192
Clothing	200	200/3000 × 360° = 24
Rent	600	600/3000 × 360° = 72
Education	150	150/3000 × 360° = 18
Fuel	100	100/3000 × 360° = 12
Medicine	80	80/3000 × 360° = 9.6
Miscellaneous	270	270/3000 × 360° = 32.4

Now, the pie-chart can be constructed by using the given data.

Steps to construct:

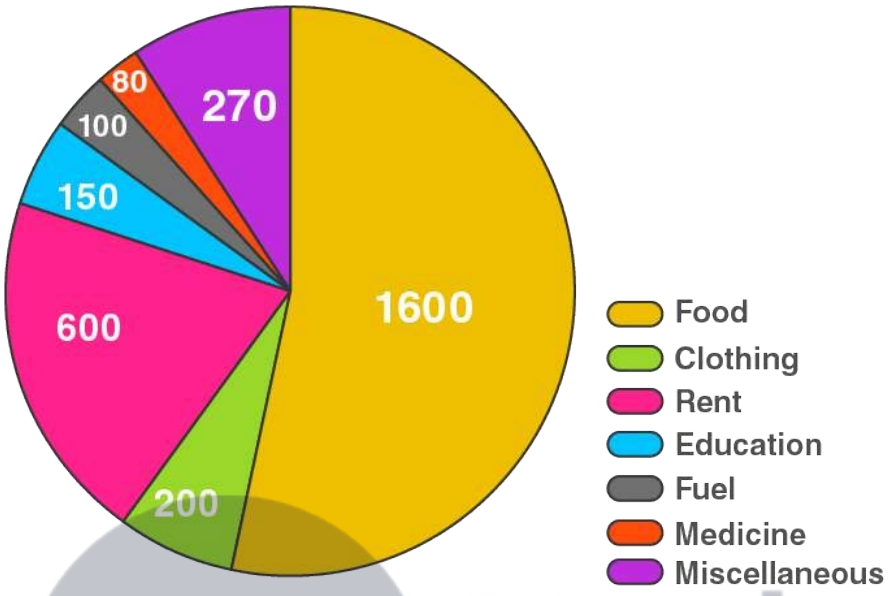
Step 1: Draw the circle of an appropriate radius.

Step 2: Draw a vertical radius anywhere inside the circle.

Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.

Step 4: Construct other sectors representing other values in clockwise direction in

descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.



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

Agriculture	Irrigation and Power	Small Industries	Transport	Social service	Miscellaneous
14%	16%	29%	17%	16%	8%

Solution:
Here, total investment = 100%
So,
The central angle = (component value/100) × 360°
The central angle for each activity will be calculated as follows

Data	Investment	Central angle
Agriculture	14%	14/100 × 360° = 50.4
Irrigation and Power	16%	16/100 × 360° = 57.6
Small Industries	29%	29/100 × 360° = 104.4

Transport	17%	17/100 × 360° = 61.2
Social service	16%	16/100 × 360° = 57.6
Miscellaneous	8%	8/100 × 360° = 28.8

Now, the pie-chart can be constructed by using the given data.
Steps to construct:
Step 1: Draw the circle of an appropriate radius.
Step 2: Draw a vertical radius anywhere inside the circle.
Step 3: Choose the largest central angle. Construct a sector of central angle, whose one radius coincides with the radius drawn in step 2 and the other radius is in clockwise direction to the vertical radius.
Step 4: Construct other sectors representing other values in clockwise direction in descending order of magnitudes of their central angles.
Step 5: Shade the sectors so obtained by different colours and label them as shown in below figure.