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Pie chart

It is a circular graph which is used to represent data

Constructing Circle Graphs or Pie Charts

A **pie chart** (also called a Pie Graph or Circle Graph) makes use of sectors in a circle. The angle of a sector is proportional to the value of the data.

The formula to determine the angle of a sector in a circle graph is:

Angle of a sector = $\frac{value}{total\ value}\ x\ 360^0$

Steps

1. Calculate the angle of each sector, using the formula

   Angle of a sector = $\frac{value}{total\ value}\ x\ 360^0$

2. Draw a circle using a pair of compasses
3. Use a protractor to draw the angle for each sector.
4. Label the circle graph and all its sectors.

Example 1:

In a class, has 45 boys and 75 girls. Draw a Pie chart to represent the numbers of students in the class.

Solution:

Total number of students = 45 + 75 = 120

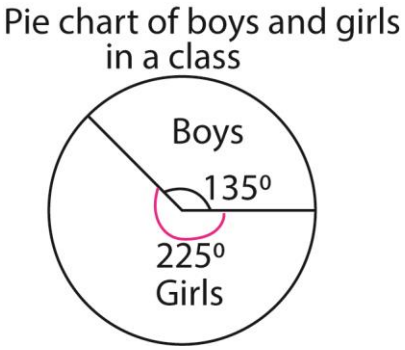
Size of the angle of boys = $\frac{45}{120}\ x\ 360 = 135^o$

Size of the angle of girls = $\frac{75}{120}\ x\ 360 = 225^0$

Note that after calculating the angle of each component the total angle = 3600

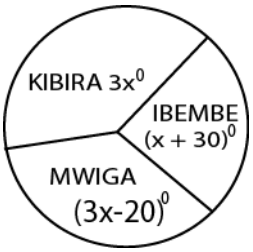
That is the angle representing boys + angle representing girls or 135 + 225 = 360

Draw the circle of any radius, measure in each sector. Label each sector of the pie chart.



Example 2

The Pie-chart below shows the population in three villages: Kibira, Mwiga and Ibembe



(a) Given that the population of Ibembe is 1080. Find the population of.

(i) Kibira

First find the value of x

$3x + (x + 30) + (3x – 20) = 360^0$ (total angle of circles)

$7x + 10 = 360$

$7x = 350$

$X = 50$

Angle Ibembe = $50 + 30 = 80^0$

Let the total population be Y

$\frac{80y}{360} = 1080$

$y = \frac{1080\ x\ 360}{80} = 4860$

Angle of Kibira = 3x = 3 x 50 = 150^0

Population of Kibira = $\frac{150}{360}\ x\ 4860 = 2025$

(ii) Mwiga

Angle of Mwiga = 3x – 20 = 3 x 50 -20 = 130^0

Population pf Mwiga =$\frac{130}{360}\ x\ 4860 = 1755$

Exercise

1. Peter spent $\frac{2}{3}$ of his salary on food and $\frac{1}{4}$ on transport. He saves the balance of sh.2400.

   (a) Draw an accurate pie-chart to represent this information. (Take the radius of the pie chart to be 4 cm)

(b) What is Peter's total monthly earnings?

2. In a class of 72 pupils taking Agriculture, 12 have rakes, 15 have slashes and 30 have hoes. The rest do not have any tools.

   Draw an accurate pie chart to show the above information, using 5cm as the radius.

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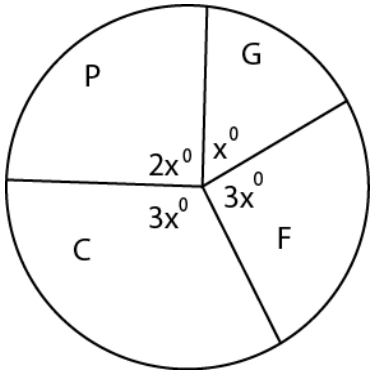
3. The pie Chart below shows how a farmer has divided his land. C is for cash crops, G is for grazing. F is for food crops and P is for other purposes. The land available is 720 hectares.

a) How many hectares are left for grazing?



(b) If he pays rent of Shs. 200 per hectare per year, how much will he pay for land reserved for cash crops?

4. A farmer planted his land as follows:

Maize $^2/_5$of the land.

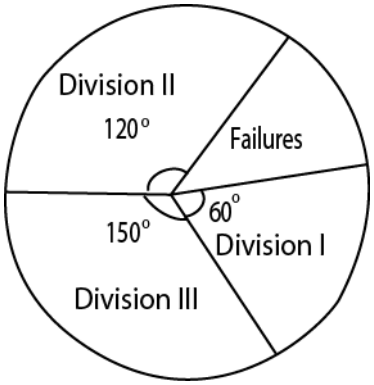
Beans $^1/_3$ of the land.

Peas $^1/_5$ of the land, and

Elephant grass on the remainder.

Draw a pie chart to represent this information.

5. The pie-chart below shows the performance of 60 candidates of Pole-pole P/S in PLE Mock examinations. Use the information to answer the questions that follow:



(a) How many candidates passed in division I?

(b) How many candidates passed in division II?

(c) How many candidates failed?

(d) Of those who passed, what fraction passed in division III?

6. A piece of land is used as follows:

   5 hectares for growing coffee.

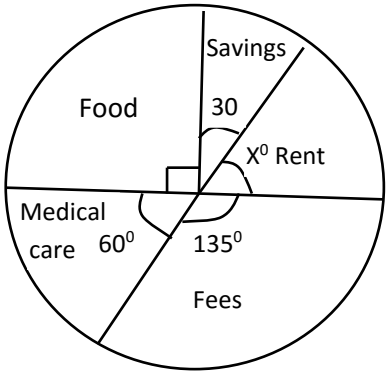
   10 hectares for growing cassava.

   20 hectares for growing matooke

   25 hectares for keeping animals.

   Represent the above information on a pie-chart. (Use a radius of 5 cm.)

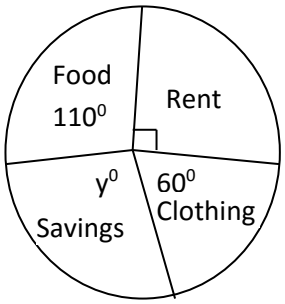
7. The pie –chart below shows how Bbosa spends his monthly salary.



(a) If he spends shs. 15,000 on rent, find his salary. (4 marks)

(b) Find Bbosa's Salary (02marks)

8. The Pie –chart below shows how Matata spends his monthly salary. Study ***it carefully and answer the question that follow.***



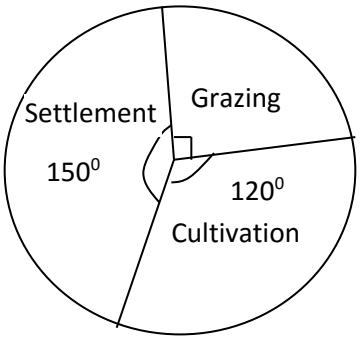
(a) Find the value of y (2 marks)

(b) If he spends shs 36,000 on clothing, how much does he does he earn per month? (2 mark)

(c) How much more money does he spend on spend on food than he saves? (3 marks)

9. The pie- chart below shows how a farmer uses her land.

Use it to answer the question that follows.



Calculate the size of her land if she uses 72 acres for cultivation.

10. The pie chart below shows how pupils of Mpaata Primary school are distributed in various clubs in the school. Use it to answer the questions that follow.

(a) There are 216 pupils in the debating club. Find the total number of pupils in the school.

(b) Express the number of pupils in the debating club as a percentage of the whole school. (02 marks)

Suggested answer

1. Peter spent $\frac{2}{3}$ of his salary on food and $\frac{1}{4}$ on transport. He saves the balance of sh.2400.

(a) Draw an accurate pie-chart to represent this information. (Take the radius of the pie chart to be 4 cm)

Fraction of saved $= 1 - (\frac{2}{3} + \frac{1}{4})$

$= 1 - \frac{8+3}{12}$

$= 1 - \frac{11}{12} = \frac{1}{12}$

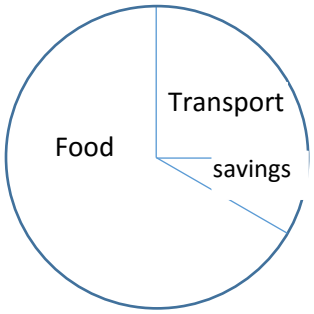
Converting to degrees

Degrees of saved income $\frac{1}{12}\ x\ 360 = 30\ degres$

Degrees for the income spent on food = $\frac{2}{3}\ x\ 360 = 240^0$

Degrees for income spent of transport = $\frac{1}{4}\ x\ 360 = 90^0$

Pie chart



(b) What is Peter's total monthly earnings?

Let the salary be x

$\frac{1}{12}\ x = 2400$

The salary = 2400 x 12 = 28,800 /=

2. In a class of 72 pupils taking Agriculture, 12 have rakes, 15 have slashes and 30 have hoes. The rest do not have any tools.

Draw an accurate pie chart to show the above information, using 5cm as the radius.

Converting tools to degrees

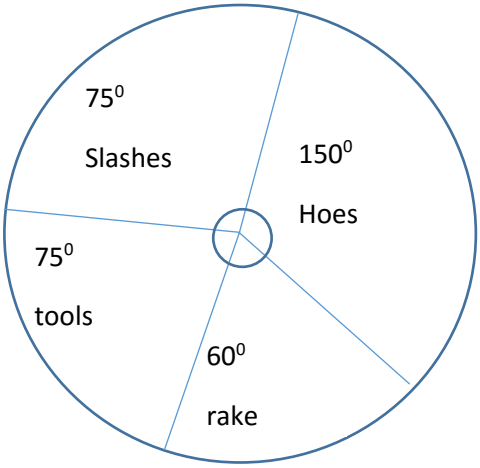
Rake = $\frac{12}{72} \; x \; 360 = \; 60^0$

Slashers = $\frac{15}{72} \; x \; 360 = \; 75^0$

Hoes = $\frac{30}{72} \; x \; 360 = \; 150^0$

Rest without tools= 360 – (60 + 75 +150)

= 75^0



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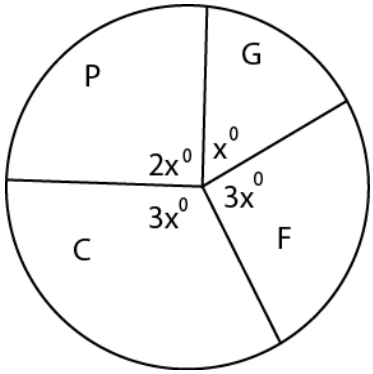
3. The pie Chart below shows how a farmer has divided his land. C is for cash crops, G is for grazing. F is for food crops and P is for other purposes. The land available is 720 hectares.

a) How many hectares are left for grazing?



Finding the value of x

2x + x + 3x + 3x = 360 (angle sum of a circle)

$9x = 360^0$

$x = 40^0$

the number of hectares left for grazing = $\frac{40}{360}\ x\ 720$

= 80 hectares

(b) If he pays rent of Shs. 200 per hectare per year, how much will he pay for land reserved for cash crops?

Degrees for cash crop = 40 x 3 =120

Area for cash crop = $\frac{120}{360}\ x\ 720 = 240\ hectares$

Rent paid

1 hectare cost 200

240 hectares cost 240 x200 = 48000

4. A farmer planted his land as follows:

Maize $^2/_5$of the land.

Beans $^1/_3$ of the land.

Peas $^1/_5$ of the land, and

Elephant grass on the remainder.

Draw a pie chart to represent this information.

Expressing fraction into degrees

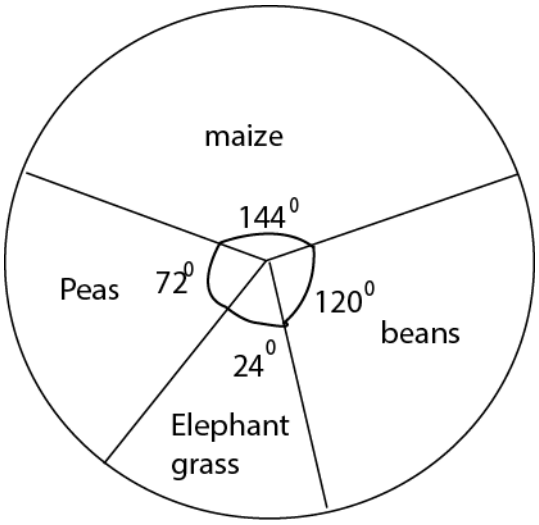
Maize = $\frac{2}{5}\ x\ 360 = \ 144^0$

Beans = $\frac{1}{3}\ x\ 360 = \ 120^0$

Peas = $\frac{1}{5}\ x\ 360 = \ 72^0$

Elephant grass = (360 – (144 + 120 + 72) = 24

Pie chart



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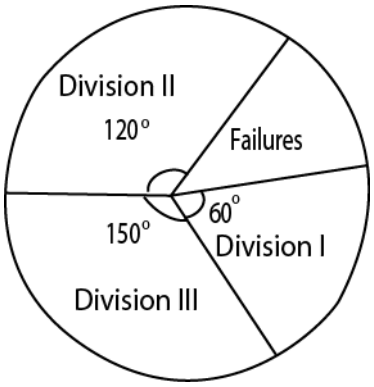


(e) How many candidates passed in division I?

Angle sum of a circle = 360^0

Number of candidates that passed in division I = $\frac{60}{360}\ x\ 60 = 10\ candidates$

(f) How many candidates passed in division II?

Angle sum of a circle = 360^0

Number of candidates that passed in division I = $\frac{120}{360}\ x\ 60 = 20\ candidates$

(g) How many candidates failed?

Angle sum of a circle = 360^0

Let the degree for failure x

x +120 +150 + 60 = 360

x = 30^0

Candidates that failed = $\frac{30}{360} x\ 60 =\ 5$

(h) Of those who passed, what fraction passed in division III?

Angle sum of a circle = 360^0

Number of candidates that passed in division III = $\frac{150}{360}\ x\ 60 = 25\ candidates$

Total student passed = 60 -5 = 55

Fraction = $\frac{25}{55} = \frac{5}{11}$

6. A piece of land is used as follows:

   5 hectares for growing coffee.

   10 hectares for growing cassava.

   20 hectares for growing matooke

   25 hectares for keeping animals.

   Represent the above information on a pie-chart. (Use a radius of 5 cm.)

Total areas = (5 + 10 + 20 +25) = 60 hectares

Converting to degrees

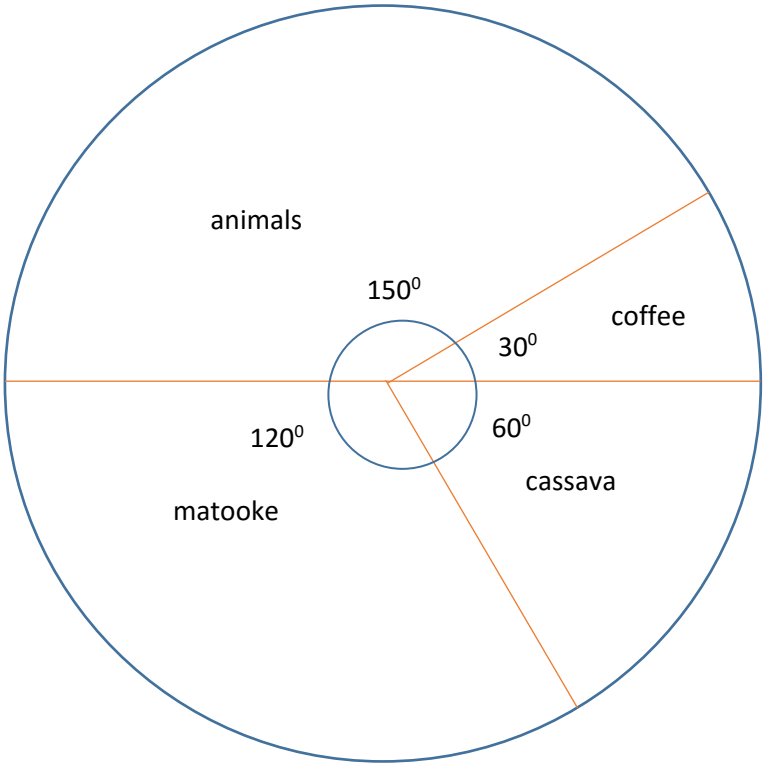
Coffee = $\frac{5}{60}\ x\ 360 = 30^0$

Cassava = $\frac{10}{60}\ x\ 360 = 60^0$

matooke = $\frac{20}{60}\ x\ 360 = 120^0$

animals = $\frac{55}{60}\ x\ 360 = 150^0$

The pie chart of piece



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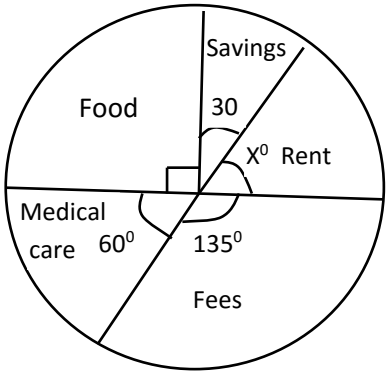


If he spends shs. 15,000 on rent, find his salary. (4 marks)

(a) First find the size of angle X

$X + 30 + 90 + 60 + 135 = 360$

$X + 315 = 360$

$X = 45^0$

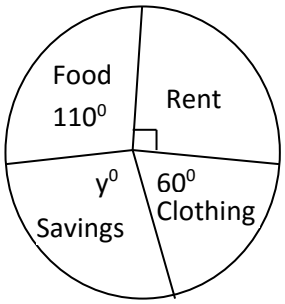
(b) Find Bbosa's salary

Let Bbosa's salary be P

$\frac{45}{360}\ P = 15{,}000$

$P = \frac{15000\ x\ 360}{45} = 120000$

8. The Pie –chart below shows how Matata spends his monthly salary. Study ***it carefully and answer the question that follow.***



(a) Find the value of y (2 marks)

$y + 60^0 + 110^0 + 90^0 = 360^0$ (angle sum of a circle)

$y = 100^0$

(b) If he spends shs 36,000 on clothing, how much does he does he earn per month? (2 mark)

Let the money he earns a month be Q

$$\frac{60}{360}Q = 36000$$

Q = 216,000

(c) How much more money does he spend on spend on food than he saves? (3 marks)

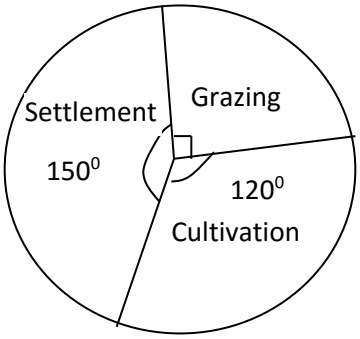
Money spend on food $= \frac{110}{360}\ x\ 216000 = 66{,}000$

Money for saving $= \frac{100}{360}\ x\ 216000 = 60{,}000$

Extra money spent on food than on saving = 66,000 – 60000 = 6000.

9. The pie- chart below shows how a farmer uses her land.

Use it to answer the question that follows.



Calculate the size of her land if she uses 72 acres for cultivation.

If the size of land is Q

$Then,\ \frac{120}{360}\ of\ Q = 72\ acres$ or $\frac{120\ x\ 360}{360\ x\ 120}\ x\ Q = 72\ x\ \frac{360}{120} acres$

$= \ 216\ acres$

10. The pie chart below shows how pupils of Mpaata Primary school are distributed in various clubs in the school. Use it to answer the questions that follow.

(a) There are 216 pupils in the debating club. Find the total number of pupils in the school.

Find the value of P first

90 + P + 54 + 2P = 360

3P +144 = 360

3P = 216

P = 72

Let the number pupils be x

$\frac{72}{360}P = 216$

P = $\frac{216\ x\ 360}{72}$ =1080

Therefore, the total number of pupils = 1080

(b) Express the number of pupils in the debating club as a percentage of the whole school. (02 marks)

The percentage = $\frac{216}{1080}\ x\ 100\% = 20\%$