Pie charts (7)

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Introduction

A pie chart is a very useful, visual way of displaying data. The sectors in the pie give a reasonably clear indication of the size of each grouping in the data. Do not use a pie chart if your data has too many groups since there will be too many sectors and so it will not give a quality impression of the data.

1 Drawing a pie chart

We find the angle needed for each sector of the pie chart using this formula:

$$\text{Sector angle} = \frac{\text{Frequency of group}}{\text{Total frequency}} \times 360^\circ$$

Example. Draw a pie chart to show the amount of time Flora spent completing the homework for 4 different subjects on one evening:

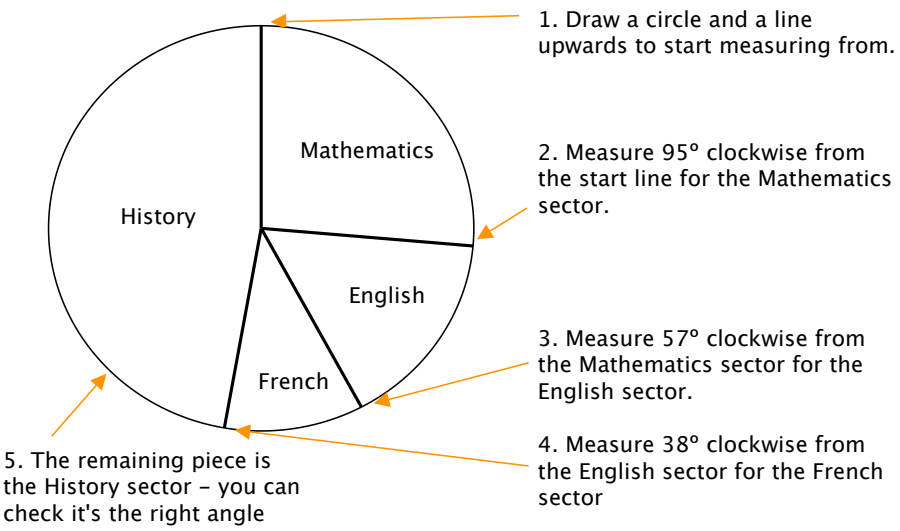
Subject	Time (minutes)
Mathematics	25
English	15
French	10
History	45

The total amount of time for all homework is $25 + 15 + 10 + 45 = 95$ minutes. We can now find the angle for each sector in the pie chart:

Subject	Time (minutes)	Sector angle
Mathematics	25	$\frac{25}{95} \times 360 = 94.736\cdots \approx 95^\circ$
English	15	$\frac{15}{95} \times 360 = 56.842\cdots \approx 57^\circ$
French	10	$\frac{10}{95} \times 360 = 37.894\cdots \approx 38^\circ$
History	45	$\frac{45}{95} \times 360 = 170.526\cdots \approx 171^\circ$

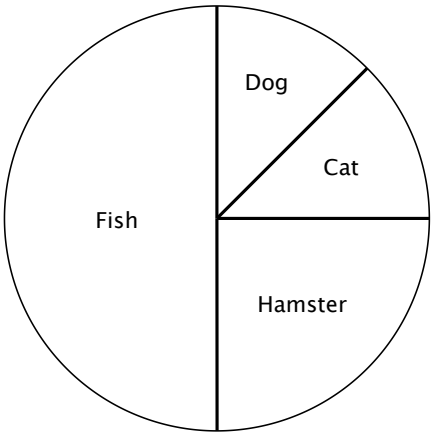
Notice that $95+57+38+171 = 361$. The angles do not quite add up to 360° since we rounded each value to the nearest degree.

Now we can draw the pie chart:



2 Interpreting Pie charts

If the angles are straightforward, a pie chart can be easy to interpret. For example:



How many children had each type of pet?

$$\begin{array}{r|l} \text{Fish} & \frac{1}{2} \text{ of the } 24 \text{ children} = 12 \text{ children} \\ \text{Hamster} & \frac{1}{4} \text{ of the } 24 \text{ children} = 6 \text{ children} \\ \text{Dog} & \frac{1}{8} \text{ of the } 24 \text{ childern} = 3 \text{ children} \\ \text{Cat} & \frac{1}{8} \text{ of the } 24 \text{ childern} = 3 \text{ children} \end{array}$$

If the angles are more difficult, use the formula for drawing the pie chart in reverse i.e.

$$\text{Sector angle} = \frac{\text{Frequency of group}}{\text{Total frequency}} \times 360°.$$

Rearranging this gives:

$$\text{frequency of group} = \frac{\text{Sector angle}}{360} \times \text{Total frequency}$$

Example. On a pie chart showing the favourite sports of 70 people, the angle for football is $102.9°$, to one decimal place. How many people chose football as their favourite sport?

$$\begin{aligned}\text{Frequency of football} &= \frac{102.9}{360} \times 70 \\ &= 20.008333\ldots \\ &= 20 \text{ people}\end{aligned}$$

We get a decimal due to earlier rounding when working out the angle (it probably wasnt exactly $102.9°$). Hence, 20 people chose football.