

Pie charts and divided bar graphs (Extending)

Thursday, 7 February 2019 5:12 pm

★ By the end of the lesson I would hope that you have the knowledge and understanding for the following points:

- Know what a pie chart is
- Know how to read a pie chart
- Know how to construct (draw) a pie chart
- Know how to read a divided bar graph

RECAP

In the lessons which came before this one, we were looking at how to represent Numerical and Categorical data in different ways. We have looked at:

- Dot plots
- Column graphs
- Line graphs
- Stem-and-leaf plots

And now we're going to look at the most dreaded of all ... the pie chart ... which is also known as a sector graph!

The cake chart?

I wonder who named it a pie-chart.

Would it have been easier if we'd called it the cake chart.

I mean, cakes get cut into slices, and we have no problem with that!

Yet, the fact that pie-charts get cut into slices mean that people get really confused.



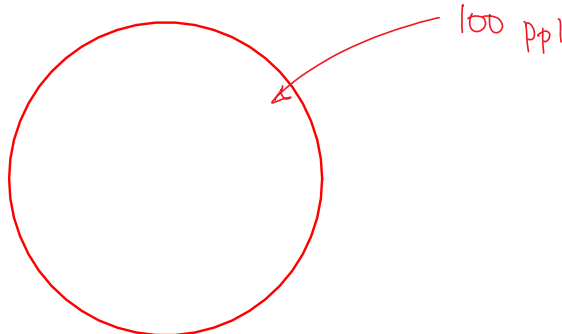
Pie charts: The basics

Pie charts are used to show numbers.

Each slice of a pie chart shows a different amount of the total.

Imagine I have 100 people and I want to represent them all in a pie-chart.

The following might be one way I do it ...



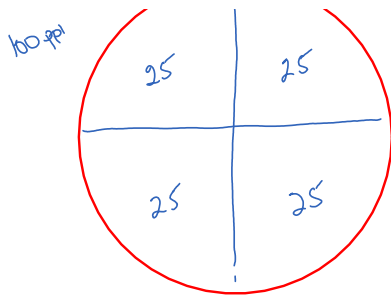
What if I now split my pie into 2 equal pieces ... how many people are represented by each piece now?



I want to have 4 pieces now. How many people are there in each piece?

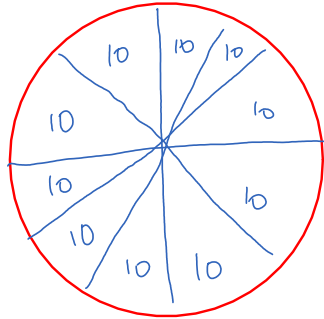


$$\frac{100}{4} = 25$$



$$\frac{100}{4} = \underline{\underline{25}}$$

What about 10 pieces?



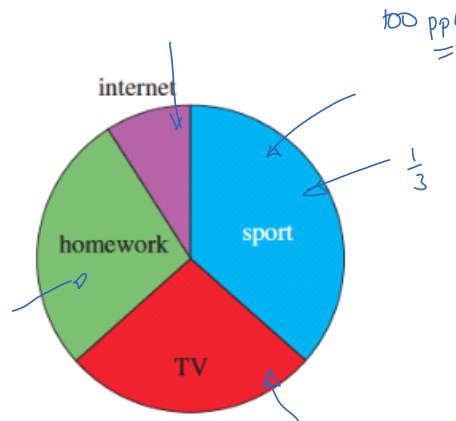
$$\frac{100}{10} = 10 \text{ ppl}$$

The trick to pie charts is:

- Know how many people in total there are
- Know how many equal slices of pie make up one pie chart.

Different sized slices

If 100 people were asked their favourite past time and the following graph was created, can we tell how many people liked each activity?



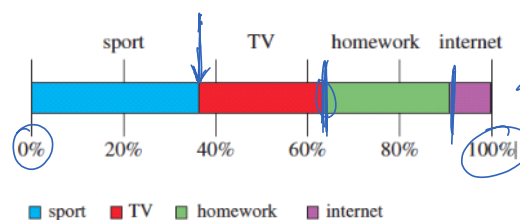
Not accurately!

But, we can describe what the data is telling me ...

A different way of displaying data: The divided bar graph

Sometimes, it makes more sense to use a divided bar graph.

If we wanted to show the same information as the pie-chart shown above ... this is what we would have:



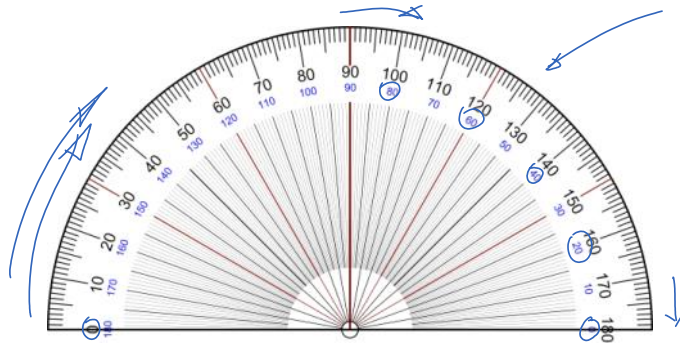
sport 0% → 38%
TV 38% → 62%

Notice all the important information:

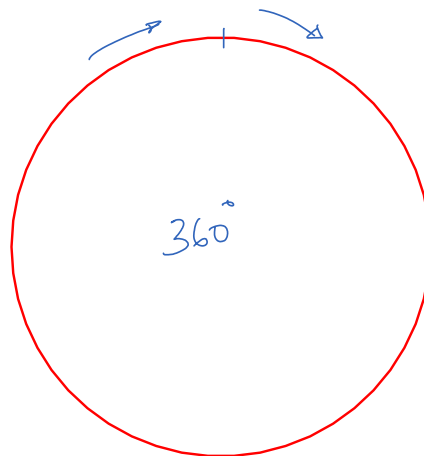
- Key
- Percentages
- Colours
- Max is 100%

How do I draw a pie-chart?

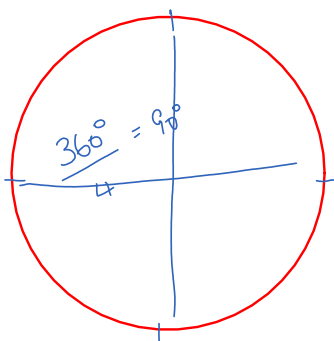
Firstly, you're going to need to recap the use of the following item:



Let's go back to angles.
How many degrees are there in a circle?

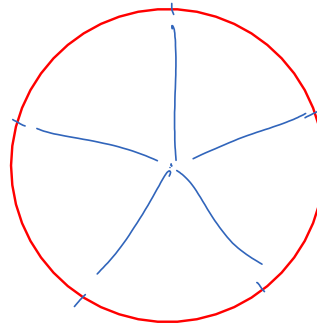


If I want to draw 4 equal sized slices, how many degrees would I need?



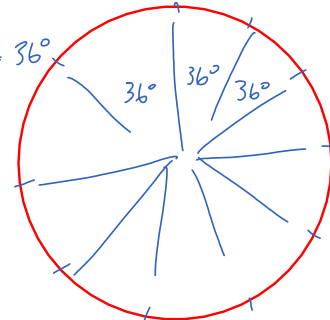
$$\begin{array}{r} 72^\circ \\ 5 \overline{) 360} \end{array}$$

If I wanted to have 5 equal slices, how many degrees would I need?



$$\frac{360^\circ}{10} = 36^\circ$$

If I wanted 10 equal slices how many degrees would I need?



Sadly, not all things in life are made of equal slices.
We need a way of knowing how many degrees to make each slice, if the frequencies are different.

|| Let's look at an example from the *Cambridge Essentials Textbook series*:

On a particular Saturday, Sanjay measures the number of hours he spends on different activities.

Television	Internet	Sport	Homework
1 hour	2 hours	4 hours	3 hours

Represent the table as:

- a a pie chart
- b a divided bar graph



10 hours!

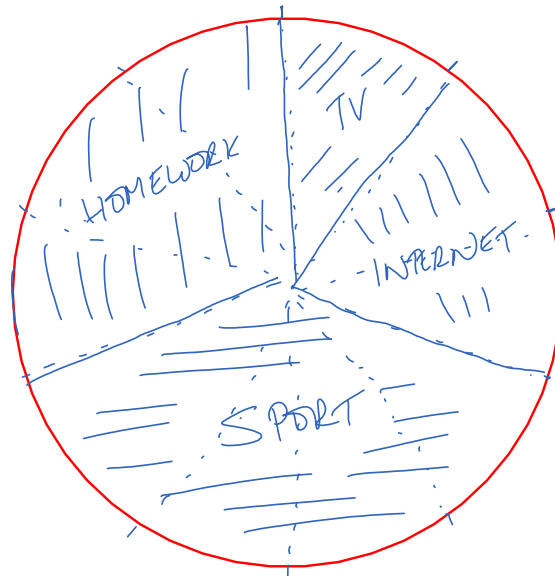
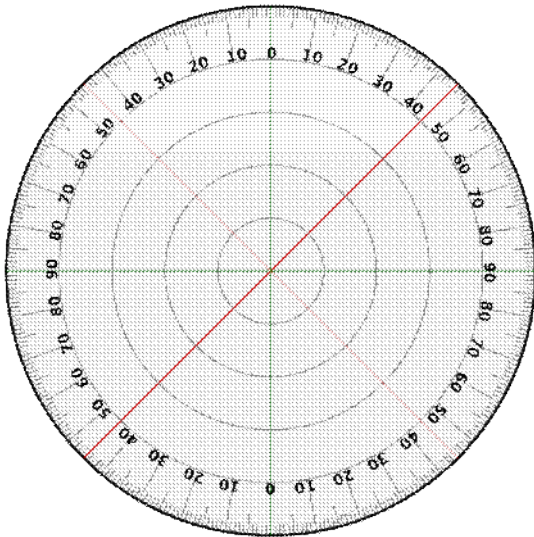
We see that we need to make slices to stand for 1 hour, 2 hours, 4 hours and 3 hours.

So, we have 360° which we now need to split into 10 equal slices.
So, we can work out how many degrees each slice needs

$$\text{Degrees per slice} = \frac{360^\circ}{\text{number of slices}}$$



$$\frac{360^\circ}{10} = 36^\circ$$



- Number of degrees to draw
- 36
 - 72
 - 108
 - 144
 - 180
 - 216
 - 252
 - 288
 - 324
 - 360

Drawing a divided bar graph

Divided bar graphs are awesome!
They work very much like a pie-chart, but they are a rectangle.
Using the same question, we can draw a divided bar graph using the same idea.

On a particular Saturday, Sanjay measures the number of hours he spends on different activities.

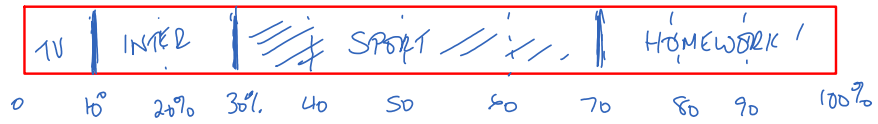
Television	Internet	Sport	Homework
1 hour	2 hours	4 hours	3 hours

Represent the table as:

- a a pie chart
- b a divided bar graph

1
2
4
3 = 10 hrs

We have, once again, a total of 10 sections.
So, we need to split the rectangle below into 10 sections.
We would normally do this with a ruler.
We make sure that we mark the sections very lightly.



Now we have 10 sections we can colour in the right number of sections to make the divided bar graph.

Barry making things hard again!

Remember, that Barry is going to try and trick you again. He loves the word **proportion**!

All this means is write it as a fraction!

So, if we were to write the following question as proportions ... this is what we do!

10 hrs

On a particular Saturday, Sanjay measures the number of hours he spends on different activities.

Television	Internet	Sport	Homework
1 hour	2 hours	4 hours	3 hours

Represent the table as:

- a a pie chart
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$$TV = \frac{1}{10}$$

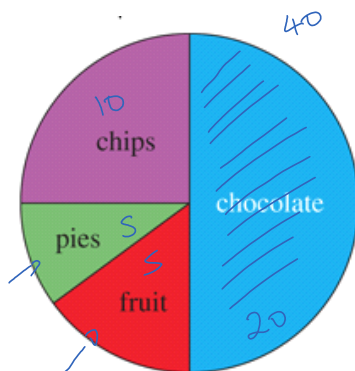
$$Int = \frac{2}{10} = \frac{1}{5}$$

$$Sport = \frac{4}{10} = \frac{2}{5}$$

$$HWK = \frac{3}{10}$$

Finding numbers from pie-charts

The last thing we might be asked to do, is find numbers from pie-charts. Imagine we have the following pie-chart, and I know it represents 40 people.



How many people like each of:

- Chocolate 20
- Fruit 5
- Pies 5
- Chips? 10

$$\frac{1}{2} \text{ of } 40 = 20$$

$$\frac{1}{4} \text{ of } 40 = 10$$

$$\frac{1}{8} \text{ of } 40 =$$