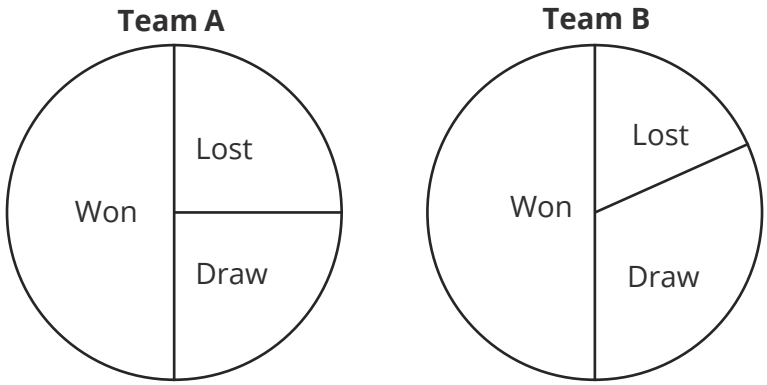
Pie Charts **Answers**

Calculator Allowed

1. The pie charts below show the proportion of games two football teams won, drew and lost:



Team A played 40 games.

a. How many games did Team A win?

They won half their games.

40 ÷ 2 = 20

They won 20 games.

b. How many games did Team A lose?

They lost a quarter of their games.

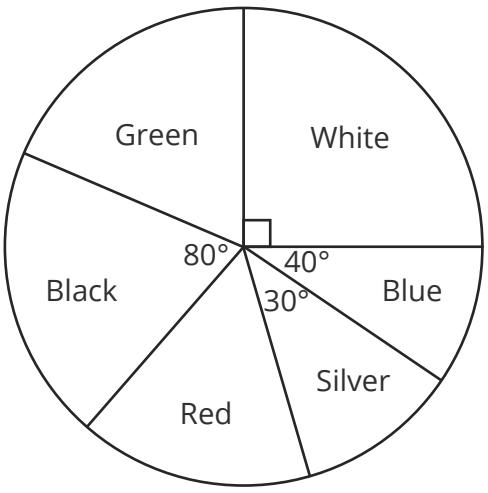
40 ÷ 4 = 10

They lost 10 games.

c. Andy says Team A and Team B won the same amount of games, because the won sector is the same size for each team. Is Andy right?

You don't have enough information to say. They won the same proportion of their games, so if Team B also played 40 games then Andy is correct. If Team B played fewer games, they will have won a smaller number. If Team B played more games, they will have won a larger number.

2. The pie chart below shows the different coloured cars observed in a car park.



a. If 40 black cars were observed, calculate the number of blue cars in the car park.

The sector representing black cars is 80°. The sector representing blue cars is 40°. This means there are half as many blue cars as black cars.

40 ÷ 2 = 20 blue cars

b. In total, 180 cars were observed. How many white cars were there?

The sector representing white cars is 90°, a quarter of the circle.

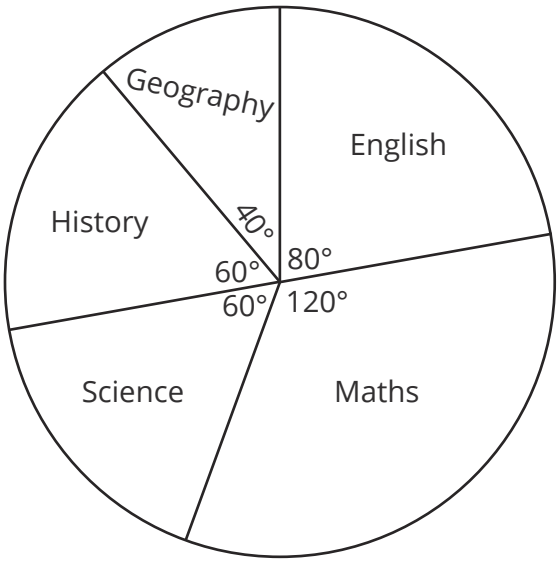
180 ÷ 4 = 45 white cars

c. How many silver cars were there?

The sector representing silver cars is 30°. 30° is $\frac{1}{3}$ of 90°, which represents 45 cars.

45 ÷ 3 = 15 cars.

3. The pie chart shows a group of students' favourite school subject.



a. What fraction of students chose maths? Write your answer in its simplest form.

$\frac{120}{360} = \frac{1}{3}$

b. If 450 students were asked, calculate the number of students that chose each subject.

Maths:

$\frac{1}{3}$ of 450 students = 450 ÷ 3 = 150 students

or, $\frac{120}{360} \times 450 = 150$ students

English:

$\frac{80}{360} = \frac{2}{9}$

$\frac{2}{9} \times 450 = 100$ students

or, $\frac{80}{360} \times 450 = 100$ students

Science:

$\frac{60}{360} = \frac{1}{6}$

450 ÷ 6 = 75 students

or, $\frac{60}{360} \times 450 = 75$ students

History:

$\frac{60}{360} = \frac{1}{6}$

450 ÷ 6 = 75 students

or, $\frac{60}{360} \times 450 = 75$ students

Geography:

$\frac{40}{360} = \frac{1}{9}$

450 ÷ 9 = 50 students

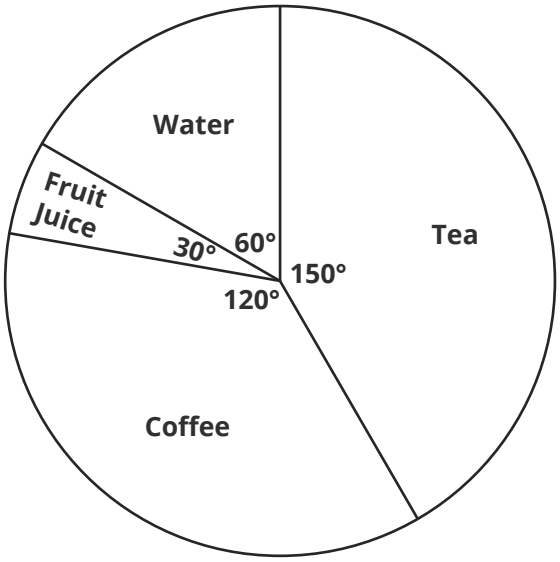
or, $\frac{40}{360} \times 450 = 50$ students

4. Construct an accurate pie chart to show the following set of data:

Total = 240 drinks

360 ÷ 240 = 1.5° per drink

Drink	Frequency	Angle
Tea	100	**1.5 × 100 = 150°**
Coffee	80	**1.5 × 80 = 120°**
Fruit Juice	20	**1.5 × 20 = 30°**
Water	40	**1.5 × 40 = 60°**
Total	**240**	**150 + 120 +30 + 60 = 360°**



5. The frequency table shows the number of calls received by some of the emergency services. Construct an accurate pie chart to represent this data.

Service	Calls Received
Fire	16
Police	14
Ambulance	15
Coast Guard	5
Total	**50**

All angles to the nearest whole degree:

Fire = 115°

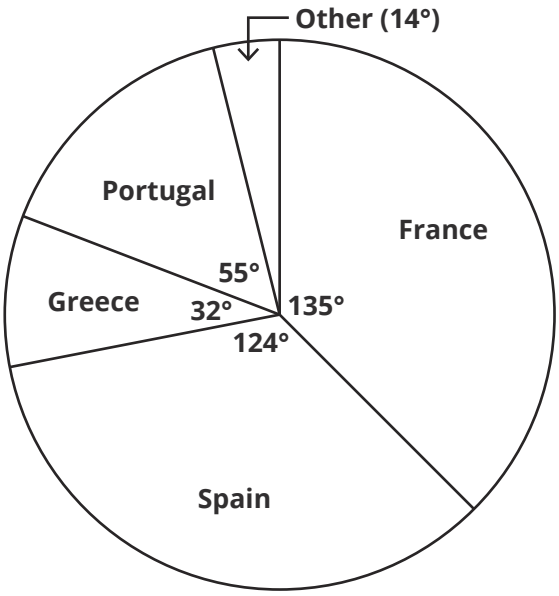
Police = 101°

Ambulance = 108°

Coast Guard = 36°

6. The following table shows the preferred holiday destinations of 250 people. Construct an accurate pie chart to show this information.

Holiday Destination	Frequency
France	94
Spain	86
Greece	22
Portugal	38
Other	10
Total	**250**



All angles to the nearest whole degree:

France: 135°

Spain: 124°

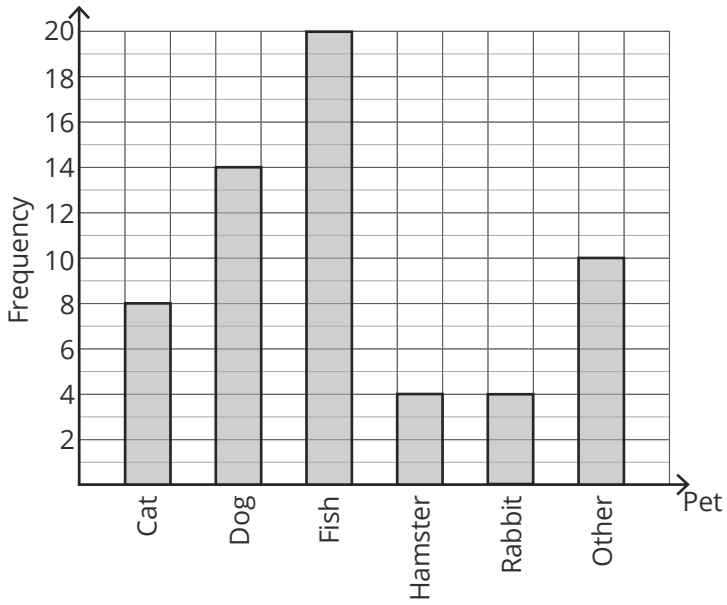
Greece: 32°

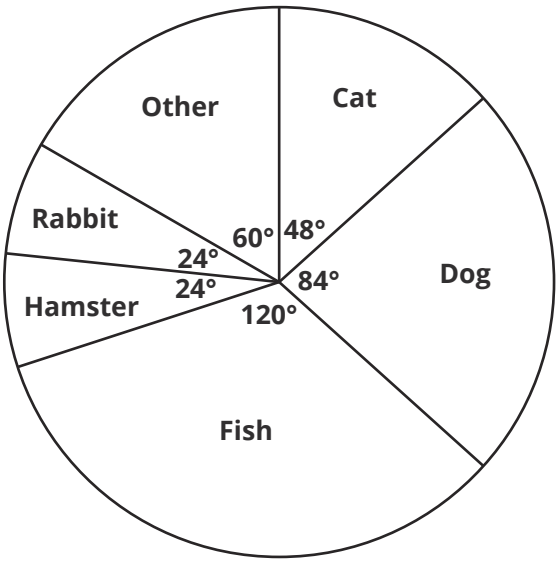
Portugal: 55°

Other: 14°

Challenge

The following bar chart shows the most popular pets in a school year group. Use a pie chart to represent the data given.





Pet	Frequency	Angle
Cat	**8**	**48°**
Dog	**14**	**84°**
Fish	**20**	**120°**
Hamster	**4**	**24°**
Rabbit	**4**	**24°**
Other	**10**	**60°**
Total	**60**	**360°**

Pie Charts

Calculator Allowed

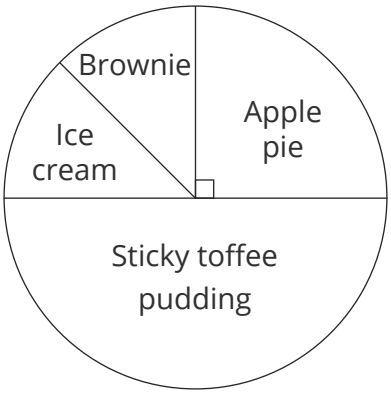
Prior Knowledge:

- How to draw angles using a protractor.
- Simplifying fractions.
- Rounding numbers to the nearest whole number.

A pie chart is a circular chart which is used to compare data. The circle is divided into sectors (or 'slices'). The size of each sector is proportional to its frequency.

Example One

Diners at a local restaurant were asked what their favourite dessert was. The results are displayed in the pie chart below.



a. 50 people chose apple pie. Calculate the number of people who chose sticky toffee pudding.

From the pie chart, we can see that the sector representing apple pie is 90° (a right angle). We know that there are 360° in a circle so, as a fraction of the circle, the sector representing apple pie takes up $\frac{90}{360}$. This simplifies to $\frac{1}{4}$, a quarter.

The sector representing sticky toffee pudding is $\frac{1}{2}$ the circle, or two quarters. If a quarter of the people chose apple pie, and that is 50 people, then 100 people (50 × 2 = 100) must have preferred sticky toffee pudding.

b. If the same amount of people chose ice cream and brownie, calculate how many chose brownie as their favourite dessert.

We know that $\frac{1}{4}$ of those asked chose apple pie and $\frac{1}{2}$ chose sticky toffee pudding. This means we have $\frac{1}{4}$ left, which represents those who chose either ice cream or brownie. The question tells us that the same amount of people chose ice cream and brownie. We know $\frac{1}{4}$ represents 50 people, therefore 25 people (50 ÷ 2 = 25) must have chosen brownie as their favourite desert.

c. Calculate the total number of people asked.

There are a few ways to answer this. We know the sectors for brownies and ice cream represent 25 people each, the sector for apple pie represents 50 people and the sector for sticky toffee pudding represents 100 people, so we can add these up to get 200 people (25 + 25 + 50 + 100 = 200).

We also know that the sector representing apple pie is $\frac{1}{4}$ of the circle and represents 50 people, so we can calculate 50 × 4 = 200 to get the same answer. We could use a similar method to calculate the total using the sectors representing sticky toffee pudding, brownies or ice cream.

With any method, we should get the same answer: 200 people were asked.

Example Two

Theo was sorting some books into their genres. The results are shown in the table below. Construct an accurate pie chart to show this data.

Genre	Frequency
Fiction	8
History	12
Biography	9
Sci-Fi	7

Begin by finding the total frequency.

8 + 12 + 9 + 7 = 36

Now, we need to work out the size of the angles for each sector.

There are 360 degrees in a circle, so to find the angle represented by one of whatever you are counting (in this case books), you divide 360 by the total frequency.

360 ÷ 36 = 10

Each book is worth 10°.

Now we know the angle each book is worth (10°), we can work out the angle of each sector by multiplying each frequency by the angle per book. We will put this in the angle column in our table. Sometimes this column will be drawn for you, sometimes you will have to draw it yourself.

Genre	Frequency	Angle
Fiction	8	**8 × 10 = 80°**
History	12	**12 × 10 = 120°**
Biography	9	**9 × 10 = 90°**
Sci-Fi	7	**7 × 10 = 70°**
		360°

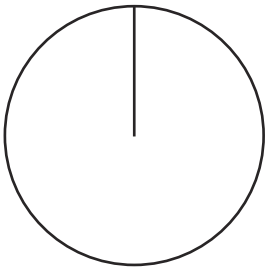
Once you've completed your angle column, it's a good idea to find the sum of your angles and check they add up to 360°. If they don't, you have made a mistake.

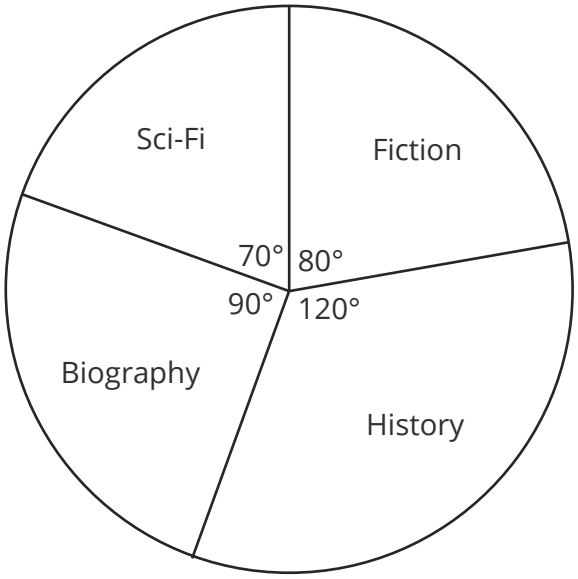
80 + 120 + 90 + 70 = 360°

In this example, we have whole number angles for each sector. In other examples, you may have a decimal answer.

Draw your pie chart with a pencil, protractor and ruler. Do not forget to label each sector.

If you do not have a starting point, draw a straight line from the centre to the edge of the circle.





Your Turn

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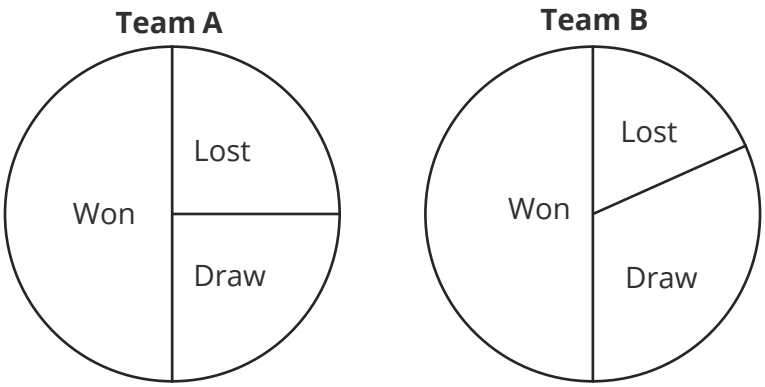

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a. How many games did Team A win?

b. How many games did Team A lose?

c. Andy says Team A and Team B won the same amount of games, because the won sector is the same size for each team. Is Andy right?

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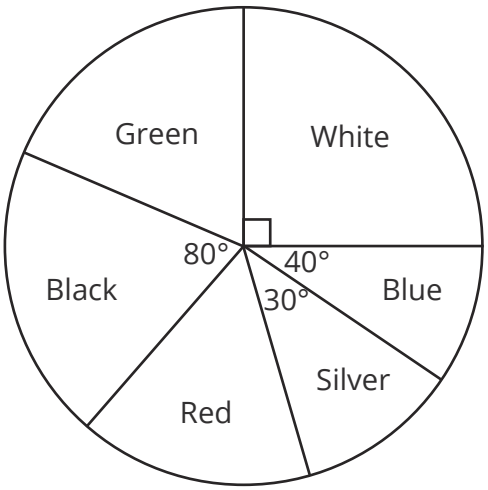

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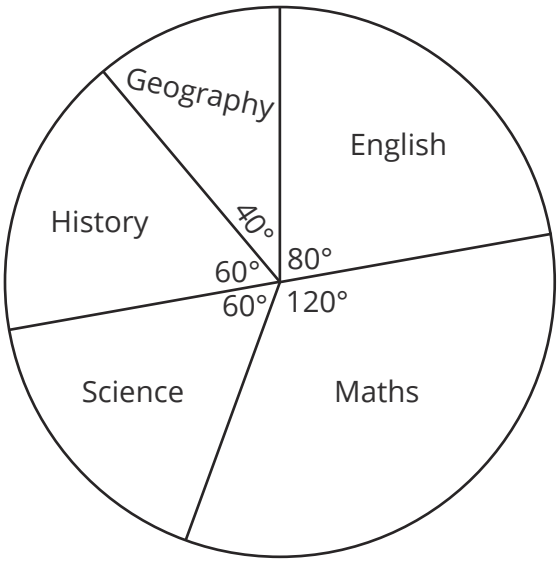
b. In total, 180 cars were observed. How many white cars were there?

c. How many silver cars were there?

3. The pie chart shows a group of students' favourite school subject.



a. What fraction of students chose maths? Write your answer in its simplest form.

b. If 450 students were asked, calculate the number of students that chose each subject.

Maths:

History:

English:

Geography:

Science:

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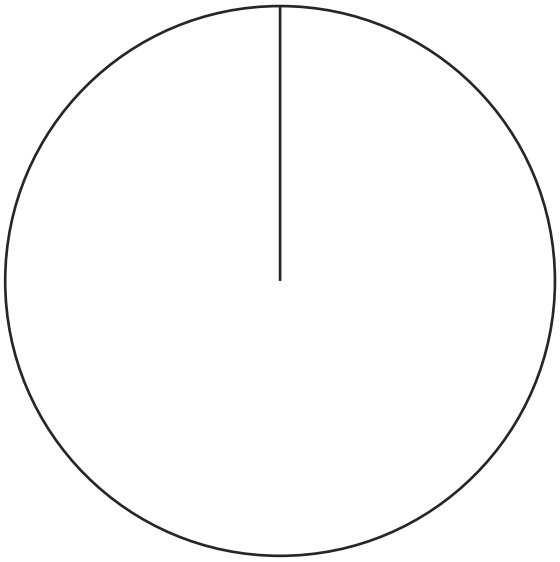
Total		



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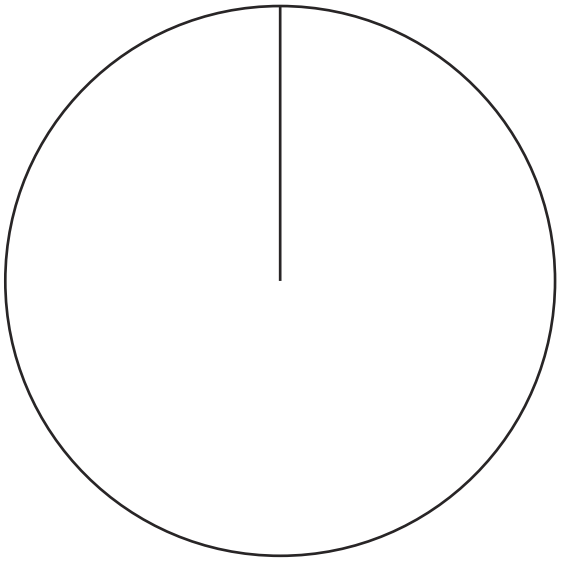

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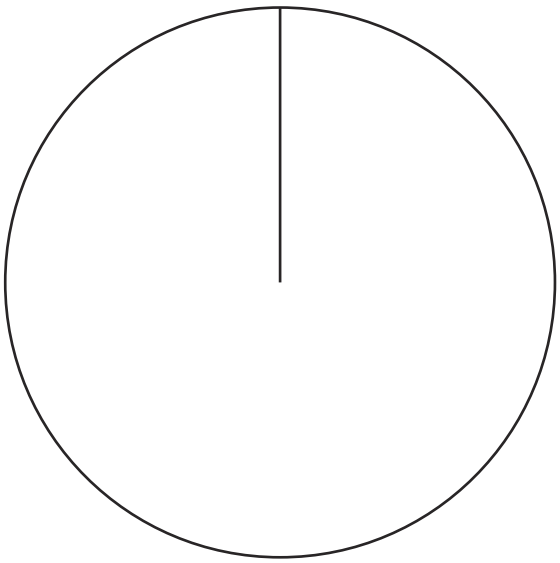

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