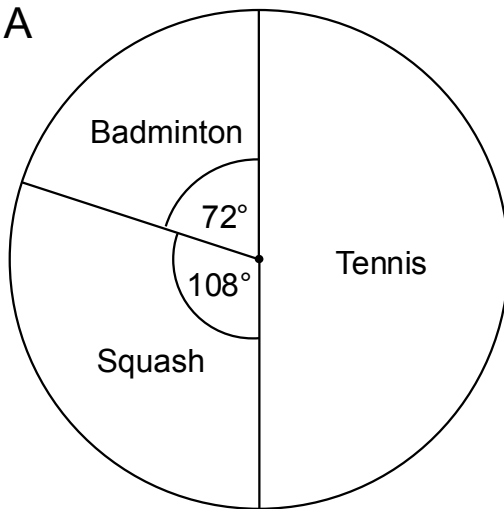


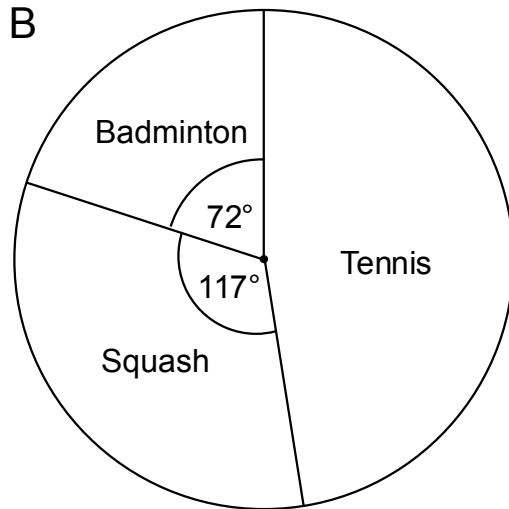
Pie Chart Puzzles

1.

A



B

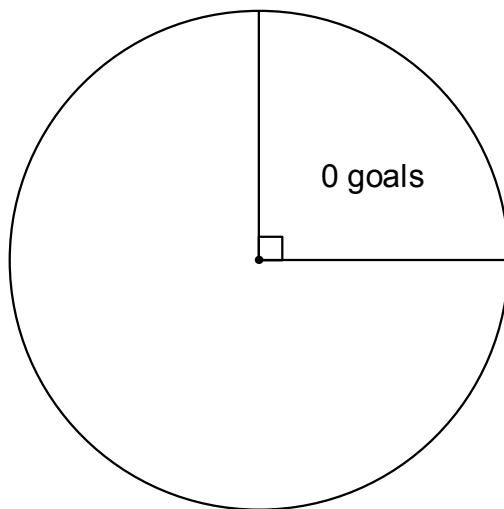


A group of children had to choose to play one of three sports – tennis, squash or badminton. Pie chart A shows their choices.

One of the children changes sport. Pie chart B shows their choices after this change.

Use the pie charts to work out how many children chose to play badminton.

2.



The diagram shows an incomplete pie chart for the number of goals a football team scored in matches during one season.

In these matches, the team scored 1 goal 50% more often than it scored 0 goals.

The team scored 2 goals in the same number of matches as it scored 0 goals.

The team scored 3 goals in three fewer matches than it scored 0 goals.

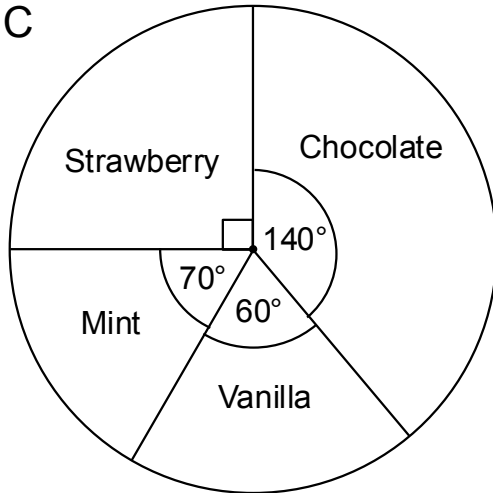
The team never scored more than 3 goals.

a) Copy and complete the pie chart.

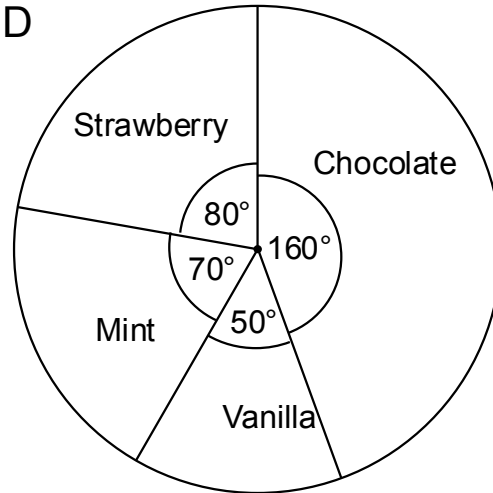
b) Work out the total number of matches the team played in the season.

3.

C



D

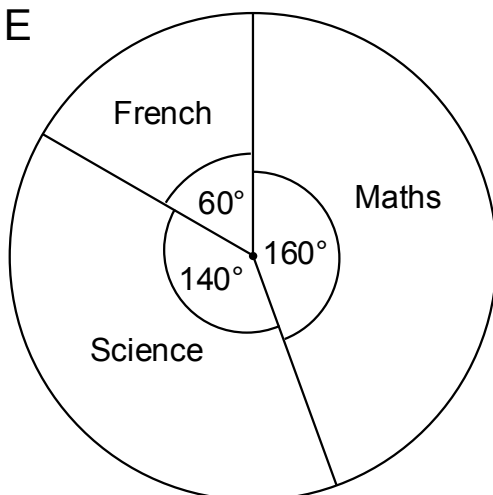


A group of children each had an ice cream. Pie chart C shows their choices. The next day, the same group of children each had an ice cream. Pie chart D shows their choices.

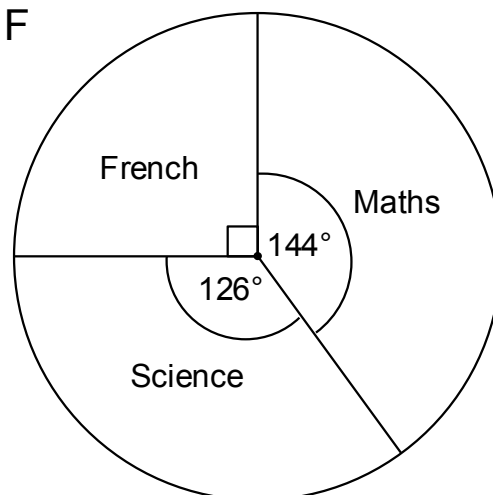
Work out the smallest number of children there could be in the group.

4.

E



F



Pie chart E shows the number of students at revision classes for Maths, Science and French. The next week, all the same students attend. There are also two extra students who both attend the French revision class. Pie chart F represents the numbers in the second week.

Work out how many students attended the Maths revision class.

5.

A focus group consists of people who are asked their views on current issues. The group are asked what they think about proportional representation.

When most of the group have responded, a pie chart is drawn showing the results. The angle of the sector representing “*Strongly For*” is 99° .

There are five more members of the group. Two of these five are “*Strongly For*”. When these five are added, the pie chart is revised and the angle of the sector representing “*Strongly For*” is now 104° .

Work out how many of the whole group are “*Strongly For*” proportional representation.

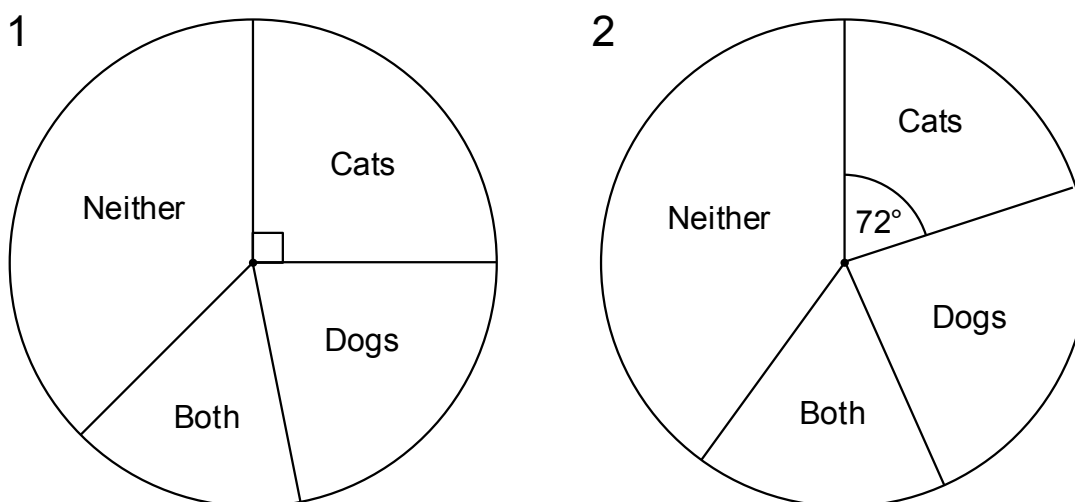
Pie Chart Puzzles – Teachers' Notes

These puzzles will hopefully add a bit of interest and challenge to the topic of pie charts. The first three should be accessible to many students and the last two will challenge the more able, requiring them to devise a strategy to use.

After doing them, you could get students to make up their own problems and swap them.

The last two are tackled in the answers given here by setting up and solving equations. In the first, the number in one group is made the variable while in the second the total number is made the variable. There are other approaches that would also work.

If students can't get started on them, you could put another problem of the same type on the board and discuss it. Here's one you could use:



The pupils in a class were asked whether they had one or more cats or dogs or both at home. Pie chart 1 shows the results.

Two pupils leave the class. Both had cats but no dogs at home. Pie chart 2 shows how the results would look now.

Work out how many pupils there were in the class originally.

Solution:

Let there be p pupils in total to begin with

There are $\frac{90}{360} p$ pupils with only cats

After two pupils leave, there are $(p - 2)$ pupils in total in the class

There are now $\frac{72}{360} (p - 2)$ pupils with only cats

We can also say there are $\frac{90}{360} p - 2$ with only cats

So,

$$\frac{72}{360} (p - 2) = \frac{90}{360} p - 2$$

$$72p - 144 = 90p - 720$$

$$576 = 18p$$

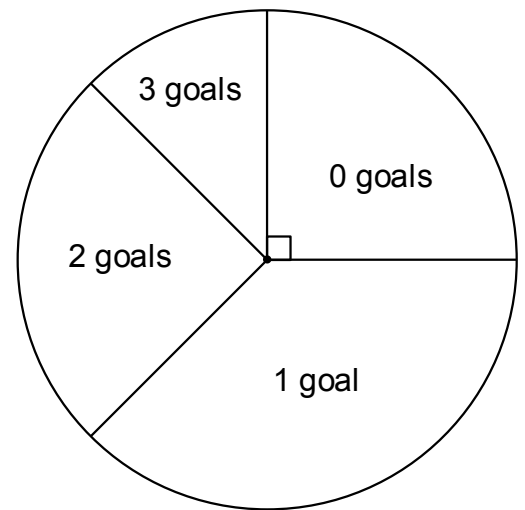
$$p = 32$$

Pie Chart Puzzles – Answers

1. Angle for squash has increased by $117 - 108 = 9^\circ$
 The child must have changed to squash
 So, one child is represented by 9°
 Angle for badminton is 72°
 Number who chose badminton = $72 \div 9 = 8$

2. a) 0 goals is represented by 90°
 1 goal is represented by $1.5 \times 90 = 135^\circ$
 2 goals is represented by 90°
 3 goals is represented by $360 - (90 + 135 + 90)$
 $= 360 - 315 = 45^\circ$

- b) 3 goals scored in three fewer games than 0 goals
 Difference between 0 and 3 goals = $90 - 45 = 45^\circ$
 So, 1 goal is represented by $45 \div 3 = 15^\circ$
 Total number of matches = $360 \div 15 = 24$



3. One of the angles has increased by 20° and two have decreased by 10°
 Smallest number when one child is represented by 10°
 Smallest number of children = $360 \div 10 = 36$
4. Suppose that in the first week x students attend the French class
 As French is represented by 60° , total number = $(360 \div 60) \times x = 6x$
 In the second week, $x + 2$ students attend French and the total number of students is $6x + 2$
 In the second week, French is represented by 90° so total = $(360 \div 90) \times (x + 2) = 4(x + 2)$
 So,
- $$4(x + 2) = 6x + 2$$
- $$4x + 8 = 6x + 2$$
- $$6 = 2x$$
- $$x = 3$$

Therefore, in pie chart E: 3 students are represented by 60°
 1 student is represented by $60 \div 3 = 20^\circ$
 Number attending Maths = $160 \div 20 = 8$

5. In the first pie chart, let there be y people in total
 Number strongly for = $\frac{99}{360}y$
 In the second pie chart there are $y + 5$ people in total
 Number strongly for is given by $\frac{99}{360}y + 2$ and by $\frac{104}{360}(y + 5)$
 So,

$$\frac{99}{360}y + 2 = \frac{104}{360}(y + 5)$$

$$99y + 720 = 104(y + 5)$$

$$99y + 720 = 104y + 520$$

$$200 = 5y$$

$$y = 40$$

Therefore, $\frac{104}{360} \times (40 + 5) = 13$ people in the whole group are “Strongly For”