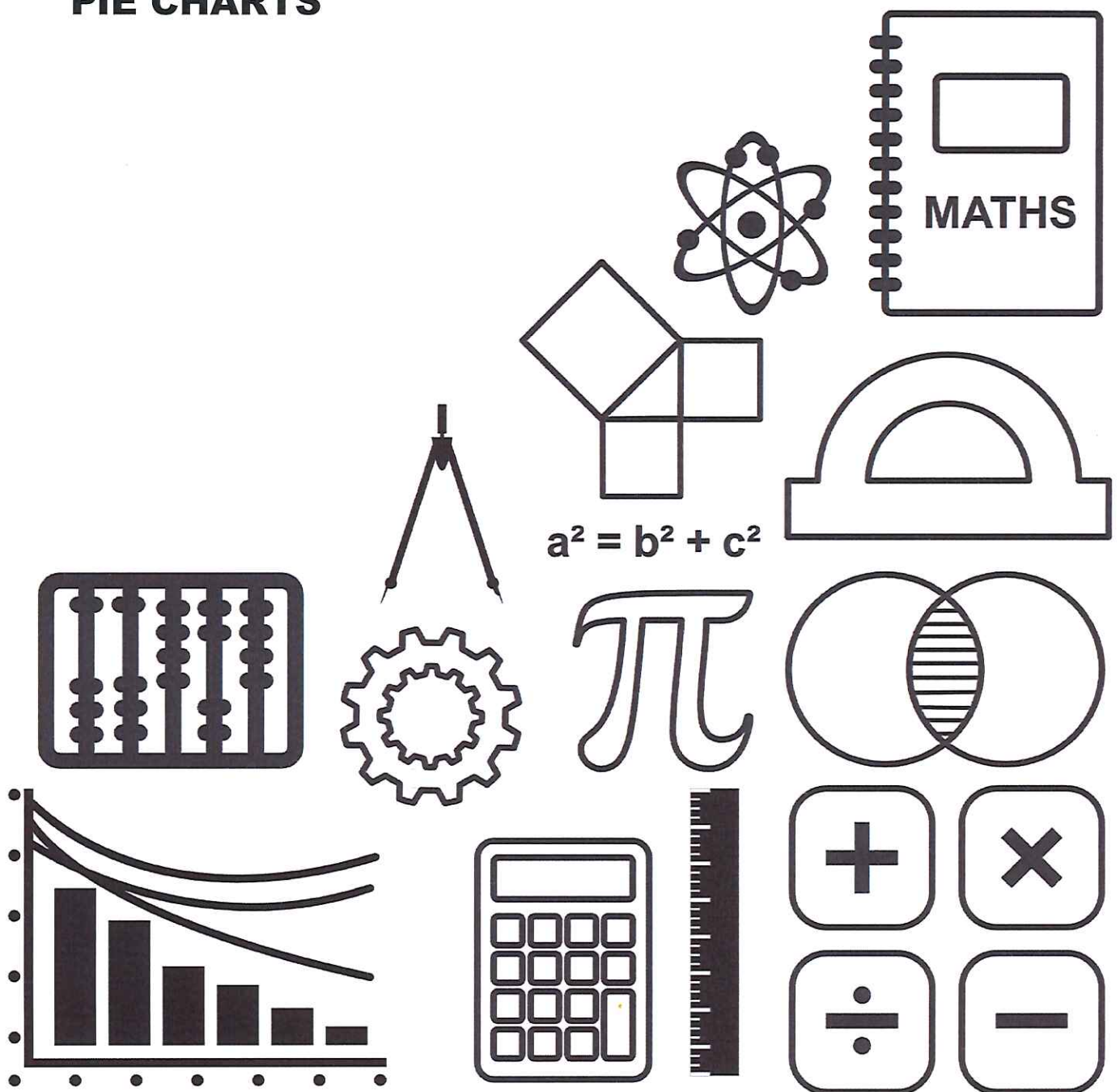


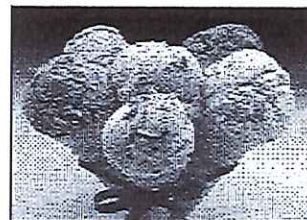
GCSE TOPIC BOOKLET PIE CHARTS



1.

One sunny Sunday morning, the owner of *Lizzy's Ices* ice cream van recorded the number of ice-cream sales.

Flavour of ice cream	Number sold
Vanilla	22
Strawberry	17
Chocolate	12
Banana	15
Toffee	6



- (a) Draw a pie chart to represent the number of ice-cream sales made by *Lizzy's Ices*. You should show how you calculate the angles of your pie chart. [4]

Working:

$$\text{Total sold} = 22 + 17 + 12 + 15 + 6 = 72$$

$$\text{Angle at centre} = 360^\circ$$

$$\text{1 Icecream} = 360 \div 72 = 5^\circ$$

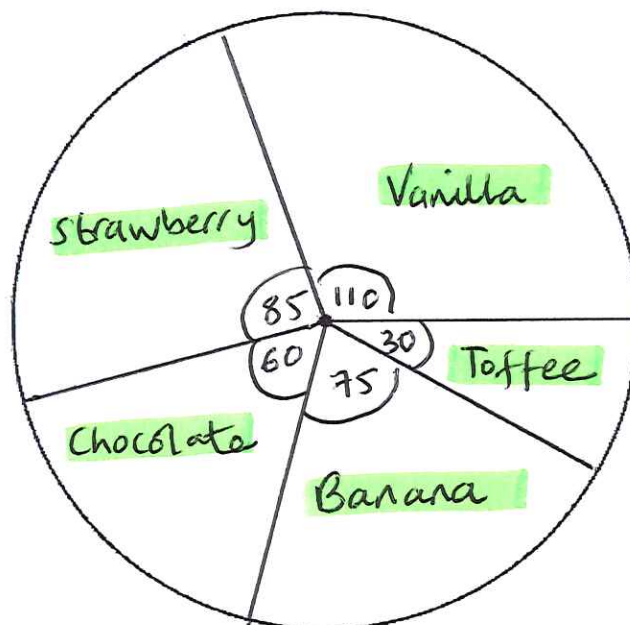
$$\text{Vanilla} = 22 \times 5 = 110^\circ$$

$$\text{Banana} = 15 \times 5 = 75^\circ$$

$$\text{Strawberry} = 17 \times 5 = 85^\circ$$

$$\text{Toffee} = 6 \times 5 = 30^\circ$$

$$\text{Chocolate} = 12 \times 5 = 60^\circ$$



- (b) On the same Sunday morning, another ice-cream van, *Cameron's Cones*, sold 90 ice creams.
Of these 90 ice creams, 18 were chocolate flavour.
Who sold the higher proportion of chocolate flavour ice creams?
You must show your working. [5]

$$\text{Cameron sells } \frac{18}{90} = \frac{1}{5}$$

$$\frac{1}{5} \text{ of } 360 = 5 \overline{) 360} = \underline{72^\circ}$$

Lizzie's chocolate angle was 60°

∴ Cameron sold the highest proportion of chocolate flavoured cones

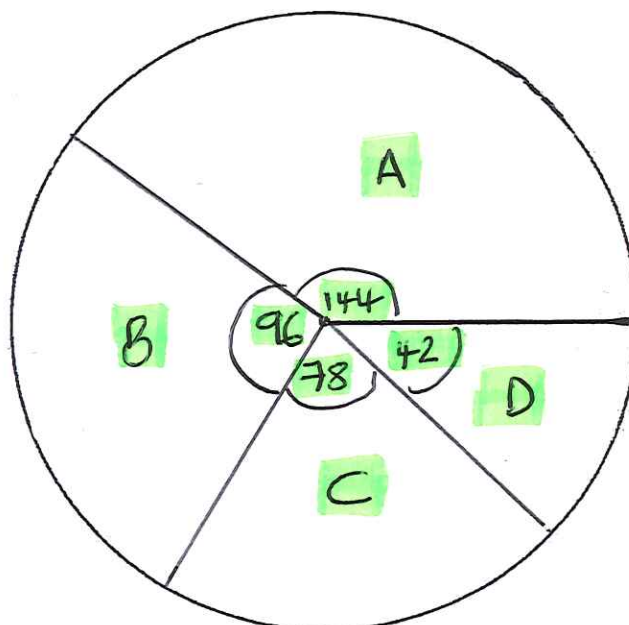
$$\left[\begin{array}{l} \text{or } \frac{1}{5} = 20\% \text{ (Cameron)} \\ \text{whereas (Lizzie) } \frac{12}{72} = \frac{1}{6} \\ \text{and } \frac{1}{6} < \frac{1}{5} \end{array} \right]$$

2.

The table shows the various types of car washes available at a garage and the number of each type used by motorists during one month.

Type of car wash	'A'	'B'	'C'	'D'
Number of car washes	96	64	52	28

Draw a pie chart to illustrate this data. You should show how you calculate the angles of your pie chart.



$$\text{Total car washes} = 240$$

$$\text{Each car wash} = 360^\circ / 240 = 1.5^\circ$$

$$A = 96 \times 1.5 = 144^\circ$$

$$B = 64 \times 1.5 = 96^\circ$$

$$C = 52 \times 1.5 = 78^\circ$$

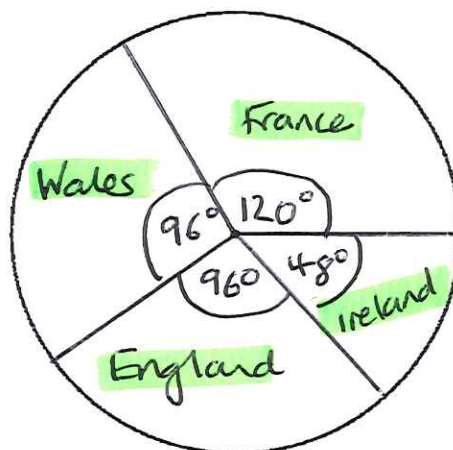
$$D = 28 \times 1.5 = 42^\circ$$

[4]

The winning team of the Six Nations Rugby Tournament from 2000 to 2014 is recorded in the table below:

YEAR	WINNING TEAM	YEAR	WINNING TEAM
2014	Ireland	2006	France
2013	Wales	2005	Wales
2012	Wales	2004	France
2011	England	2003	England
2010	France	2002	France
2009	Ireland	2001	England
2008	Wales	2000	England
2007	France		

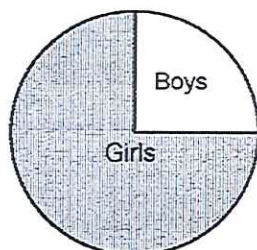
Use this data to draw a pie chart to illustrate the number of times that each team won the Six Nations Rugby Tournament from 2000 to 2014.
You must show how you calculate the angles of your pie chart. [5]



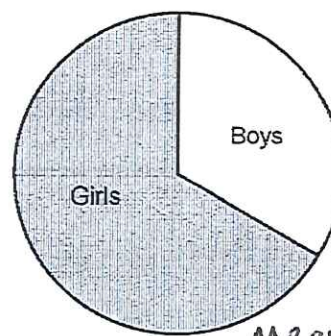
Ireland	2	Each win = $360 \div 15$ = 24°
Wales	4	
England	4	
France	5	
	<u>15</u>	
		Ireland = $2 \times 24 = 48^\circ$
		Wales = $4 \times 24 = 96^\circ$
		England = $4 \times 24 = 96^\circ$
		France = $5 \times 24 = 120^\circ$

4.

The pie charts show the proportion of boys to girls in class A and class B.



Class A



Class B

Measure the angles with a protractor.

There are more pupils in class B than in class A.

There are 4 boys in class A.

There are $1\frac{1}{2}$ times as many girls in class B than in class A.

How many boys are there in class B?

[4]

Class A has 4 boys ($\frac{1}{4}$)

$\therefore$ Class A has 3×4 girls = 12 girls ($\frac{3}{4}$)

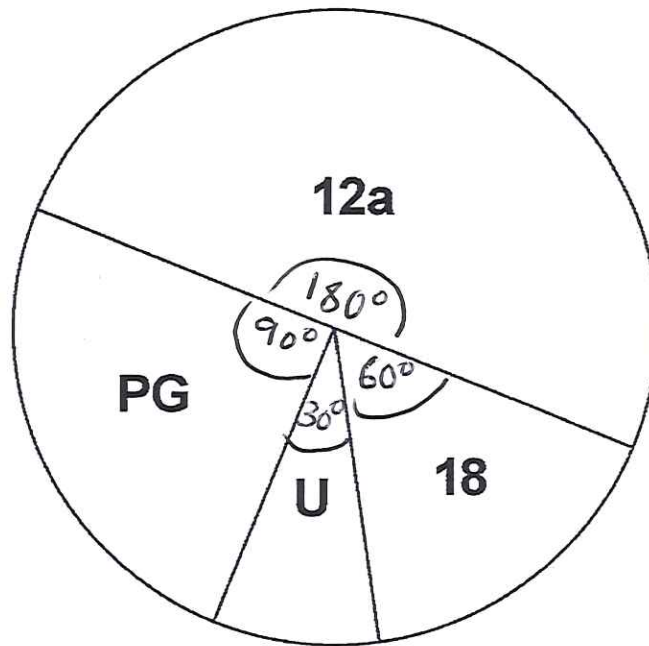
Class B = $1\frac{1}{2} \times 12$ girls = 18 girls

Class B has $\frac{1}{3}$ boys (120°) and $\frac{2}{3}$ girls (240°)

$\therefore$ Number of boys in class B is $\frac{1}{2}$ the number of girls = 9 boys ($18 \div 2$)

5.

The pie chart below represents the number of films in each age category shown at a multiscreen cinema. Altogether, 24 films were shown at the cinema.



Measure the angles first

Use this information to complete the pictogram to show the number of films in each age category. [4]

$$\begin{aligned} 12a &= 180^\circ / 360^\circ = \frac{1}{2}, \frac{1}{2} \text{ of } 24 = \underline{12} \\ PG &= 90^\circ / 360^\circ = \frac{1}{4}, \frac{1}{4} \text{ of } 24 = \underline{6} \\ U &= 30^\circ / 360^\circ = \frac{1}{12}, \frac{1}{12} \text{ of } 24 = \underline{2} \\ 18 &= 60^\circ / 360^\circ = \frac{1}{6}, \frac{1}{6} \text{ of } 24 = \underline{4} \end{aligned}$$

KEY:  = 4 films.

Film Category	
U	
PG	 
12a	  
18	

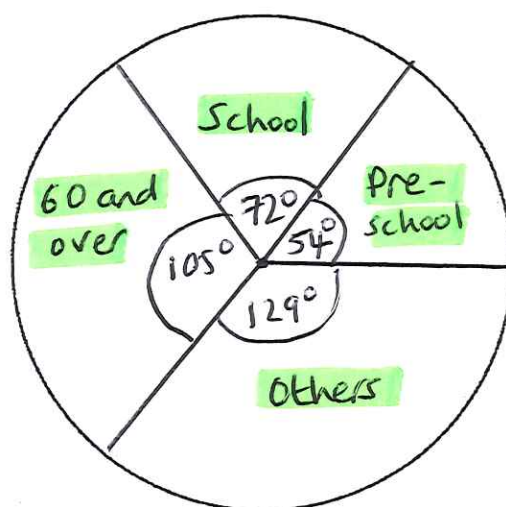
6.

A hospital collected data on the age group of each of 120 people that were treated as outpatients on a particular day.

The results are summarised below.

Age group	Number of people
Pre-school	18
School	24
60 and over	35
Others	43

Draw a pie chart to illustrate these results.
You should show how you calculated the angles of your pie chart..



Total number of people = 120

1 person = $360^\circ \div 120 = 3^\circ$

Pre-school = $18 \times 3^\circ = 54^\circ$

School = $24 \times 3^\circ = 72^\circ$

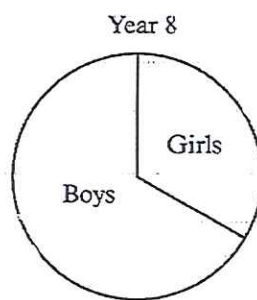
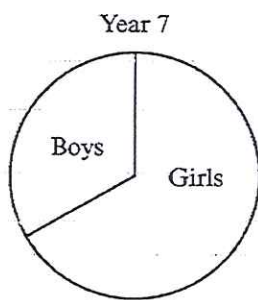
60 and over = $35 \times 3^\circ = 105^\circ$

Others = $43 \times 3^\circ = 129^\circ$

[4]

7.

The pie charts below represent the number of boys and the number of girls in two year groups.



Measure the angles with a protractor

There are 150 pupils in Year 7.

There are 40 more boys in Year 8 than there are boys in Year 7.

How many girls, in total, are there in Year 7 and Year 8?

Look at year 7 first

$$\text{Boys} = \frac{120}{360} = \frac{1}{3}, \quad \frac{1}{3} \text{ of } 150 = 50$$

$$\text{Girls} = \frac{2}{3} \text{ of } 150 = 100$$

100 girls, 50 boys

(7)

Now, year 8

40 more boys in year 8 than in year 7
= 90 year 8 boys

$$\text{Boys} = \frac{240}{360} = \frac{2}{3}, \quad \frac{2}{3} \text{ of } 150 = 100, \quad \frac{1}{3} = 45$$

$\therefore$ 45 girls in year 8

90 boys, 45 girls

[5]

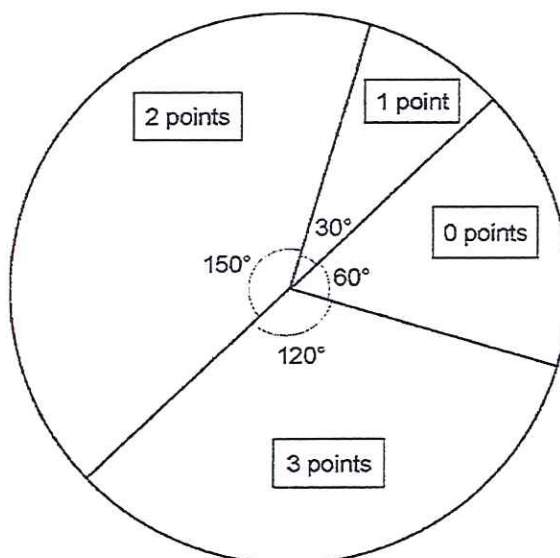
(8)

$$\text{Total number of girls} = 100 + 45 = 145$$

8.

Sara plays a game 72 times.
Each game results in Sara gaining 0 points, 1 point, 2 points or 3 points.

The pie chart below summarises the results of the 72 games played.



Use the information from the pie chart to complete the frequency table below, and then calculate the mean number of points Sara scored per game.
Give your answer correct to 1 decimal place. [5]

Points gained	Number of games
0	12
1	6
2	30
3	24

$$72 \text{ times} = 360^\circ$$

$$1 \text{ time} = 360 / 72 = 5^\circ$$

$$0 \text{ points} = 60^\circ \div 5 = 12$$

$$1 \text{ point} = 30^\circ \div 5 = 6$$

$$2 \text{ points} = 150^\circ \div 5 = 30$$

$$3 \text{ points} = 120^\circ \div 5 = 24$$

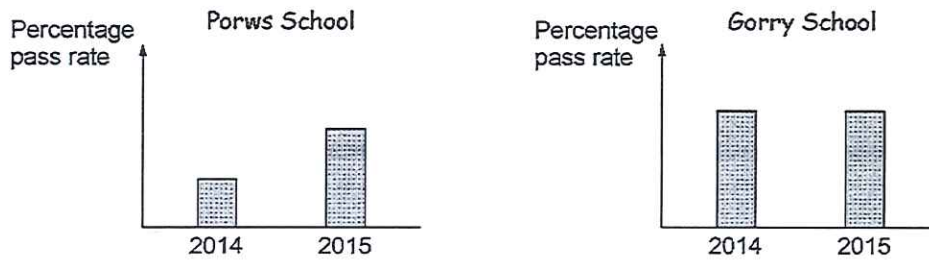
$$\text{Mean} = \underline{18} \text{ points}$$

$$\begin{aligned} \underline{\text{Mean}} &= (12 + 6 + 30 + 24) \div 4 \\ &= 72 \div 4 = \underline{18} \end{aligned}$$

9.

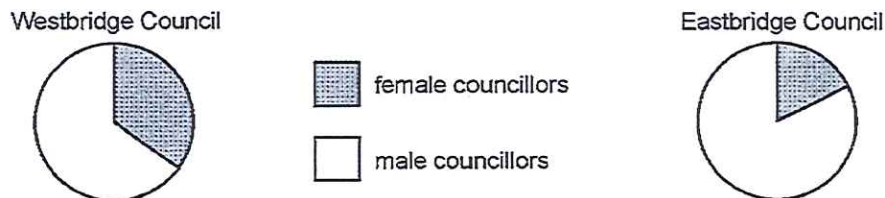
- (a) Explain why the following statement and diagrams may give a misleading impression. Include an example to show how this could happen. [2]

'Porws School celebrates, as percentage pass rate doubles, but no increase at Gorrry School.'



Because there is no scale on the percentage pass rate axis. Porws might have doubled from 2% to 4%, whereas Gorrry might have a 95% pass rate so it is very misleading (perhaps).

- (b) Explain why the statement beneath the following pie charts may not be true. [1]



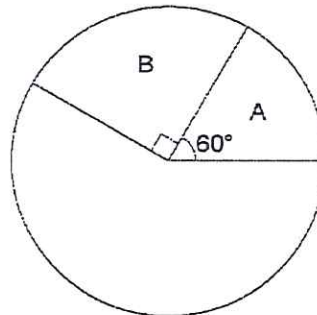
'There are more female councillors on Westbridge council than on Eastbridge Council.'

Because we do not know actual numbers of councillors. All we know is fractions.

10.

A number of people were asked to choose which of four brands of ice cream they liked the most. The brands were labelled A, B, C and D respectively.

Dimitar has begun to show the results using a pie chart.



He knows that:

- 10 people chose brand A,
- 30 people chose brand C.

Calculate how many people chose brand D.

[4]

$$\text{Brand A} = 60^\circ = 10 \text{ people}$$

$$\begin{aligned} \text{Brand C} &= 30 \text{ people} = 3 \times 10 \text{ people} \\ &= 3 \times 60^\circ = 180^\circ \end{aligned}$$

$$\text{Brand A, B and C use up } 60^\circ + 90^\circ + 180^\circ = 330^\circ$$

$$\therefore \text{Brand D must be } 360^\circ - 330^\circ = 30^\circ$$

$$\text{We know } 60^\circ = 10 \text{ people}$$

$$\therefore 30^\circ = 5 \text{ people}$$

Brand D was chosen by 5 people