

1. A group of students visited the USA.  
The table shows information about the numbers of hamburgers the students bought on the visit.

<b>Number of hamburgers</b>	<b>Number of students</b>
0	1
1	1
2	4
3	8
4	8
5	7

Work out the total number of hamburgers that these students bought.

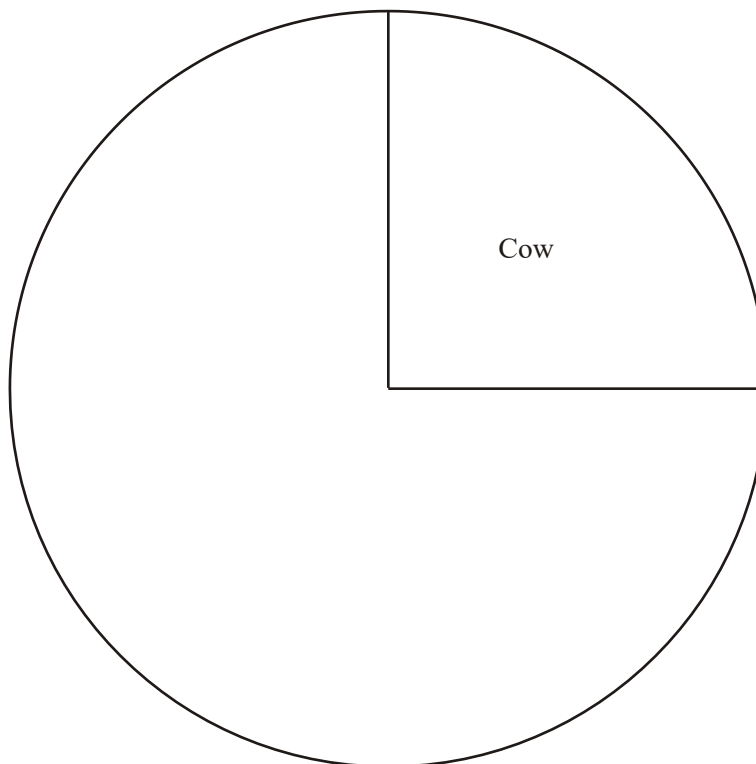
.....  
(Total 3 marks)

2. Mr Irvine has a farm.

The table gives information about the number of animals on his farm.

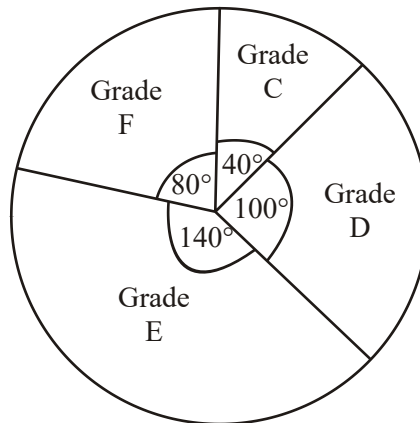
Animal	Frequency	
Cow	15	
Hen	12	
Pig	5	
Sheep	28	

Complete the accurate pie chart to show this information.



(Total 4 marks)

3. The pie chart gives information about the mathematics exam grades of some students.



Mathematics exam grades

Diagram **NOT** accurately drawn

- (a) What grade was the mode?

.....

(1)

- (b) What fraction of the students got grade D?

.....

(1)

8 of the students got grade C.

(c) (i) How many of the students got grade F?

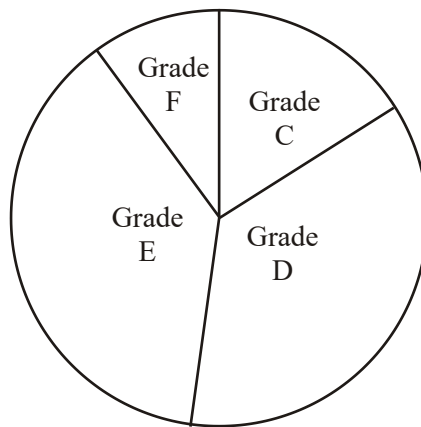
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(ii) How many students took the exam?

.....

(3)

This accurate pie chart gives information about the English exam grades for a different set of students.



English exam grades

Sean says “More students got a grade D in English than in mathematics.”

(d) Sean could be **wrong**.  
Explain why.

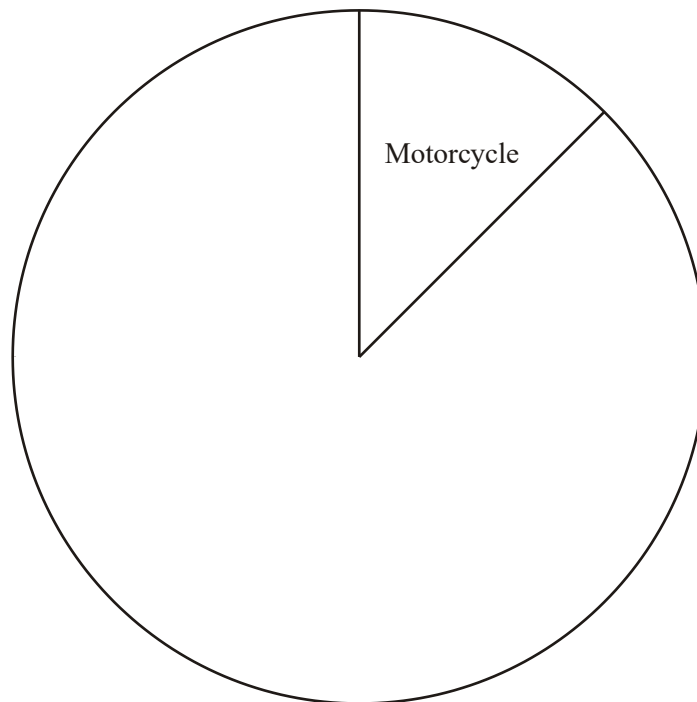
.....  
.....

(1)  
(Total 6 marks)

4. The table shows information about 40 vehicles crossing a bridge.

Type of vehicle	Number of vehicles	Size of angle
Motorcycle	5	$45^\circ$
Car	16	
Bus	11	
Other	8	

Complete the pie chart to show this information.



(Total 3 marks)

5. Michael carried out a survey of some students.  
He asked them the type of TV programme they liked best.

The accurate pie chart shows some of this information.



Michael chooses one of the students at random.

- (a) (i) Find the probability that this student likes Soaps best.

.....

- (ii) Find the probability that this student does **not** like Soaps best.

.....

(2)

6 students said they liked the News best.

(b) How many students took part in the survey?

.....

(2)  
(Total 4 marks)

6. The table shows information about the ages of the 240 people at a club.

Age ( $t$ years)	Frequency
$15 \leq t < 20$	95
$20 \leq t < 25$	90
$25 \leq t < 30$	35
$30 \leq t < 35$	15
$35 \leq t < 40$	5

A pie chart is to be drawn for the information in the table.

(a) Work out the size of the angle for people in the class  $20 \leq t < 25$

.....°

(2)

(b) Write down the modal class.

.....

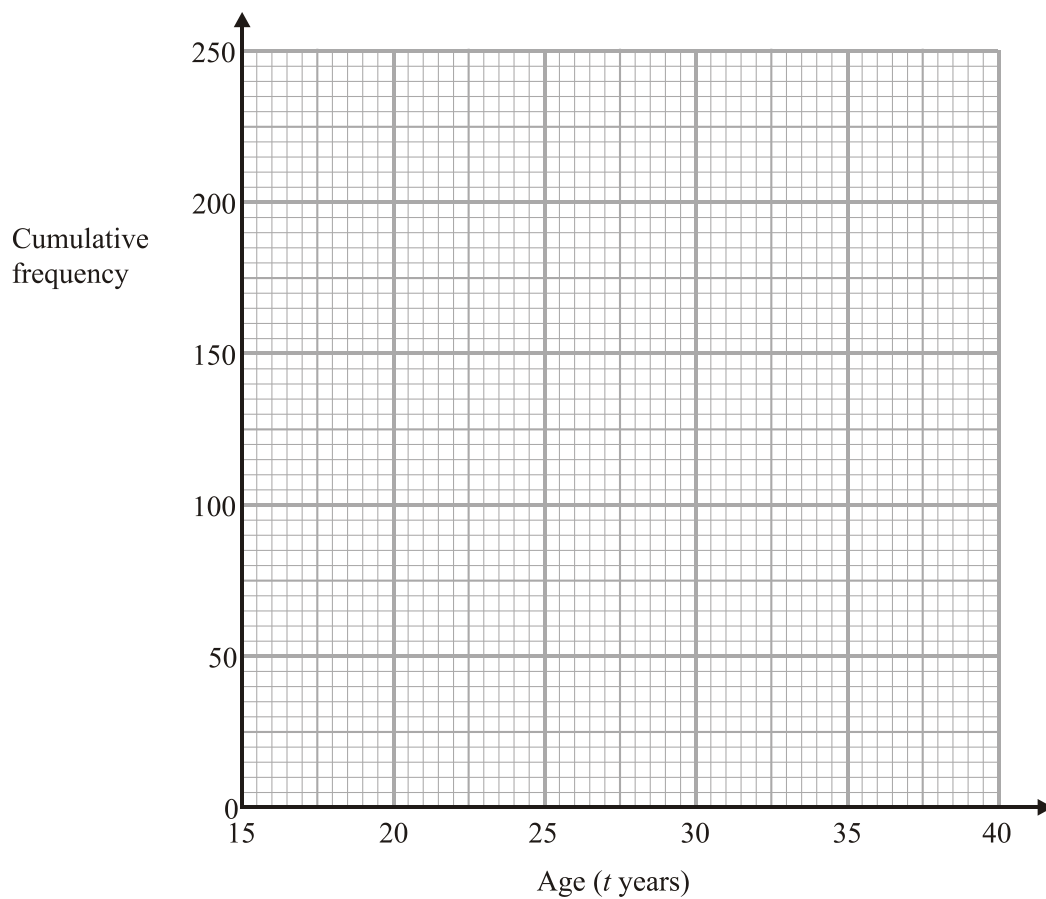
(1)

(c) Complete the cumulative frequency table.

Age ( $t$ years)	Cumulative frequency
$15 \leq t < 20$	
$15 \leq t < 25$	
$15 \leq t < 30$	
$15 \leq t < 35$	
$15 \leq t < 40$	

(1)

(d) On the grid, draw the cumulative frequency graph for your table.



(2)



(e) Use your graph to find an estimate for the median age of the people.

..... years

(1)

(Total 7 marks)

01. 100

3

- $0 \times 1 = 0$
- $1 \times 1 = 1$
- $2 \times 4 = 8$
- $3 \times 8 = 24$
- $4 \times 8 = 32$
- $5 \times 7 = 35$

*MI col 1 × col 2 (at least 3 shown)*  
*MI (dep) sum of totals*  
*AI cao*  
*SC: MI MI A0 for 101*

[3]

02.  $\Sigma \text{freq} = 60$   
 $= 90$   
 $360 - 60 = 6$   
 $= 72$   
 $15 \times 6 = 90$  Cow  
 $= 30$   
 $12 \times 6 = 72$  Hen  
 $= 168$   
 $5 \times 6 = 30$  Pig  
 $28 \times 6 = 168$  Sheep

4

*M1 evidence of method for at least one angle (could be implied by 1 correct angle drawn, or 1 other than  $90^\circ$  in the table).*

*A2 All three angles drawn ( $\pm 4^\circ$  tolerance, any order) (A1 at least 2 angles of 3 correctly drawn  $\pm 4^\circ$ , or all 3 angles, other than  $90^\circ$ , in the table)*

*B1 (dep on at least 1 angle drawn correctly, and exactly 4 sectors) for labels (names of animals only)*

*NB mark table or pie chart to the benefit of the candidate if inconsistent*

**[4]**

03. (a) Grade E 1  
*B1 for E, e Grade E, e, or  $140^\circ$*
- (b)  $100/360$  1  
*B1  $5/18$  oe*
- (c) (i)  $8 \times 2 = 16$  3  
*B1 cao*
- (ii)  $360/40 \times 8 = 72$   
*M1  $360/40 \times 8$  oe, or  $360/80 \times "16"$  oe, or " $16$ "  $\times 4.5$  or attempts to find an association eg  $8 + 16 + 20 + 28$   
A1 cao or ft from (i)*
- (d) Reason 1  
*B1 reason (eg %, not actual numbers; do not know how many students, etc)*

**[6]**

04.	Motorcycle Car Bus Other	(45°) 144° 99° 72°	
	Pie chart		3
		<p><i>B3 for fully correct, labelled pie chart, angles <math>\pm 2^\circ</math></i>  <i>(B2 for correct angles with no labels or for one angle drawn correctly and labelled)</i>  <i>(B1 for 1 angle correctly drawn and not labelled or for correct angles in table or sight of <math>360 \div 40</math> or <math>45 \div 5</math> or sight of <math>9^\circ</math>)</i></p>	[3]
05.	(a) (i)	$\frac{90}{360}$ oe	1
		<p><i>B1 for <math>\frac{90}{360}</math> oe (accept 25% or 0.25 or <math>\frac{1}{4}</math>)</i>  <i>Condone any incorrect cancelling if correct answer is seen</i>  <i>Do not accept 1:4 or 4:1 or 1 out of 4 or 3 in 4 etc</i></p>	
	(ii)	$\frac{270}{360}$ oe	1
		<p><i>B1 for oe (accept 75% or 0.75 or <math>\frac{3}{4}</math>)</i>  <i>Condone any incorrect cancelling if correct answer is seen</i>  <i>Do not accept 3:4 or 4:3 or 3 out of 4 or 3 in 4 etc</i>  <i>SC: B1 for 1 – (a)(i)</i>  <i>SC: B0 in (i) and B1 in (ii) for correct answers but consistent writing of probabilities incorrectly in BOTH parts (a)(i) and (a)(ii) e.g. 1 out of 4 and 3 out of 4</i></p>	
	(b)	$(360 \div 30) \times 6$ 72	2
		<p><i>M1 for <math>360 \div 30</math> o.e. e.g. <math>30^\circ</math> is a twelfth or <math>6 \div 30</math> or <math>30 \div 6</math> or 1 person is <math>5^\circ</math> o.e. or sight of <math>12 \times 6</math> or <math>360 \div 5</math> or attempt add 5 frequencies 3 of which are correct or any partial equivalent method</i>  <i>A1 cao</i></p>	[4]

06. (a)  $\frac{90}{240} \times 360$  2  
 $= 135$   
*M1 for  $\frac{90}{240}$*   
*A1 for 135*
- (b)  $15 \leq t < 20$  1  
*B1 for  $15 \leq t < 20$  Accept  $15 - 20$*
- (c) 95 185 220 235 240 1  
*B1 for all correct*
- (d) Points 2  
*B1 ft for at least 4 or 5 pts plotted correctly (+ 1 sq) at ends of interval dep on sensible table (cf; no more than 1 error)*  
 curve or line segment  
*B1 (dep on previous B1) for pts joined by curve/line segments provided no gradient is negative*  
*(SC: B1 if 4 or 5 pts plotted not at ends but consistently within each interval **and** joined)*
- (e)  $20.5 - 22.0$  1  
*B1 ft from a cf graph using  $cf = 120 (.5)$*

[7]

**01. Paper 2**

This question was demanding but it had a fair success rate. The common wrong answers were 15 and 29, obtained by summing the Number of hamburgers column and the Number of students column respectively.

**Paper 4**

Most marks were gained in this question. Common errors amongst the minority included mere addition of the number of hamburgers (to 15), or incorrect addition of their products.

**02. Foundation Tier**

Little working was seen in candidate's answers to this question and it was rare to see the pie chart completed accurately. However, most candidates attempted the question and it seemed that some attempted to draw the angles by eye rather than by calculating them and then using a protractor. Some candidates used the third column in the table to record tally marks.

**Intermediate Tier**

Again few candidates presented any working, nor did they add any detail to the table, preferring to move straight into drawing the pie chart. The success rate in this question was high, with many gaining full marks. Those who did not get full marks usually had one or two angles drawn inaccurately.

- 03.** Part (a) was well answered, but few candidates gained the mark in part (b). Many attempted to estimate the fraction of the diagram, hence many gave  $\frac{1}{4}$  or  $\frac{1}{3}$  as the answer. Of those who used the  $100^\circ$ , the error for many was in giving it out of a number other than  $360^\circ$ .

In part (c) most candidates gained some credit, sometimes by showing evidence of using inventive methods. Some found and used a scaling factor such as 4.5. Others found an association using the relationship of the angles, showing  $8 + 16 + 20 + 28$ , or equivalent methods.

Part (d) was a discriminator, and it was encouraging to find half the candidates were able to distinguish between proportion and actual values, giving an acceptable explanation why Sean was wrong.

- 04.** 44% of candidates had a reasonable attempt at this question and scored 2 or 3 marks. 50% of candidates scored no marks though very few candidates did not attempt the question, but a significant number of candidates did not have protractors and/or rulers. Quite a few candidates had no idea of how to calculate the angles and most showed no working such as  $360 \div 40$  or  $45 \div 5$  or even  $9 \times \dots$ . The accurate use of the protractor was not always evident and many could not draw the obtuse,  $144^\circ$ , and drew its supplement instead. Some candidates managed to get the mark for the angles in the table and many gained 2 marks for one angle correctly drawn and labelled. It was pleasing to see that almost all candidates labelled their attempts at the bar chart. Candidates should also be encouraged to work in a soft pencil so that incorrect work can be erased there were many instances of indecipherable pie charts where candidates had tried to correct work that couldn't be rubbed out.

- 05.** On this paper we did not test the drawing of a pie chart, instead we gave candidates a pie chart and asked them to interpret it.

Parts (a)(i) and (ii) were both correct in 35% of cases. The mark-scheme was set up to accept answers written as fractions, decimals and percentages but 1 mark compensation was given for those candidates that wrote both answers as 1 out of 4 and 3 out of 4. We also allowed one mark in part (a)(ii) for those candidates that wrote an answer that was 1 – their answer to a(i). No marks at all were awarded for those candidates that wrote any of their probabilities as ratios as a ratio of 1:4 or 3:4 are probabilities out of 5 and 7 respectively.

In part (b), only 30% of candidates scored full marks for an answer of 72. One mark was awarded for a method that realised that  $30^\circ$  was a twelfth of  $360^\circ$  or one person was represented by  $5^\circ$  or for a partial method to add at least 3 correct frequencies out of the five; 8% gained this method mark which more candidates could have gained this method mark if they had shown their attempt to add.

- 06.** The majority of candidates were not able to calculate the angle for a pie chart. Many related the number of people (240) to  $360^\circ$  as  $2/3$ , or used 35 instead of 95. Working was rarely shown. The usual wrong answer in part (b) was 25 to 30 using the middle on the table. The table was usually completed correctly, but there were many examples of incorrect addition, surprising since calculators were available. Attempts at graphing were also disappointing, with a significant number of candidates showing inaccuracy in plotting, or plotting at points other than at the top end of the class interval, a greater proportion than recently seen. Few were able to use their graphs to arrive at a value for the median, many using 150 or 125, rather than the mid-way value from their graph.