

Mean, Mode & Median

Mean

How do you find it?

- you need to find the sum of the numbers...all of them added together, you then need to divide this answer by the number of numbers in the set.

The mean should be used...

- if the data is numerical...just numbers,
- if there are no extreme values...unusually large or small numbers.

Mode

How do you find it?

- You need to find the number that appears most often in the set of data.
- There may be more than one mode!

The mode should be used...

- if the data is categorical...not numbers.

Median

How do you find it?

- you need to put all of the numbers in order starting with the smallest, you then need to pick out the middle one or average of the middle two.

The mode should be used...

- if the data is numerical...just numbers,
- if there are extreme values.

Question 12

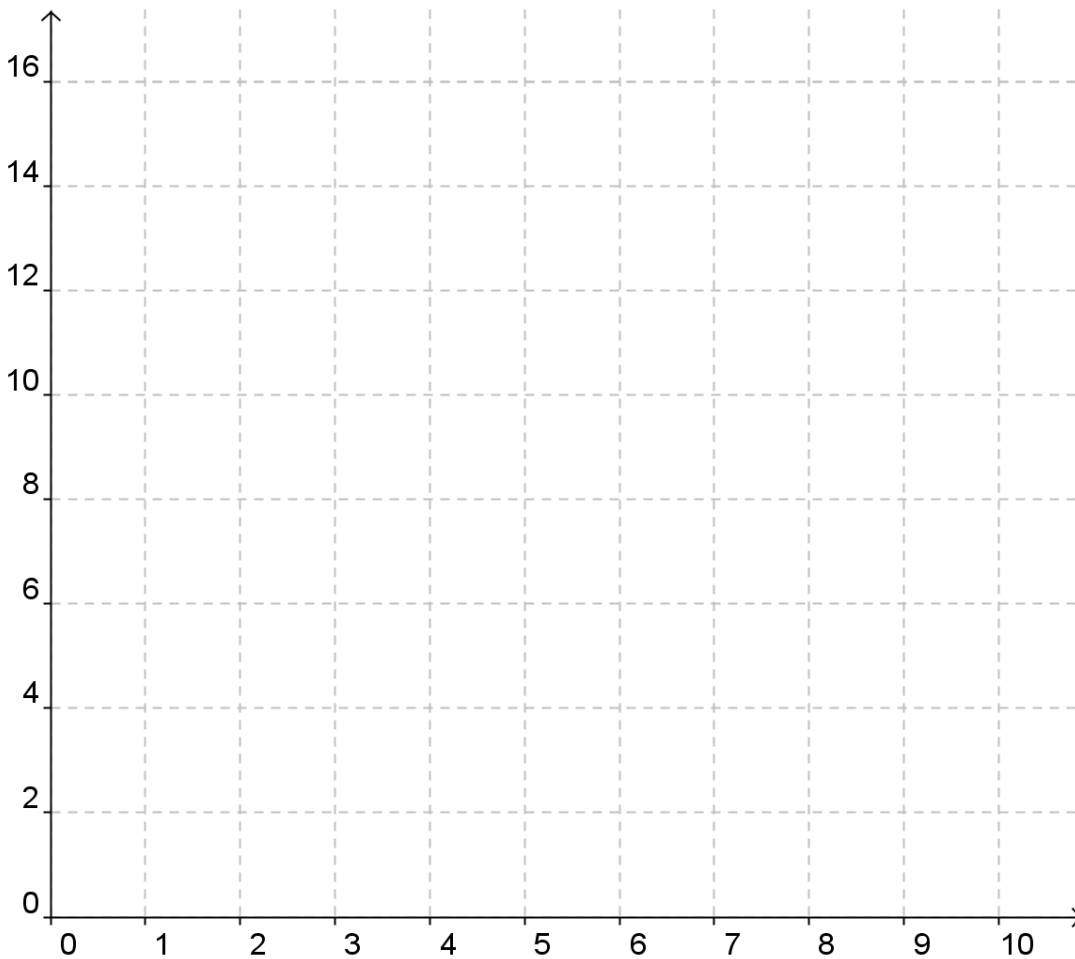
The number of raffle tickets bought by a group of 40 visitors to a school fair is shown in the table below.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 3 | 6 | 1 | 2 | 8 | 2 | 7 | 6 | 2 |
| 1 | 2 | 3 | 8 | 3 | 0 | 6 | 1 | 2 | 0 |
| 3 | 7 | 3 | 0 | 1 | 2 | 6 | 2 | 3 | 1 |
| 6 | 2 | 6 | 1 | 9 | 8 | 3 | 0 | 0 | 2 |

(i) Complete the following table. *Note: 0 – 2 includes 0 but does not include 2, and so on.*

| | | | | |
|--------------------------|-------|-------|-------|--------|
| Number of tickets bought | 0 – 2 | 2 – 6 | 6 – 8 | 8 – 10 |
| Number of visitors | | | | |

2. Represent this data on a histogram.



Range, and Interquartile range

Range

How do you find it?

you need to subtract the smallest number on the list from the largest one.

The range should be used...

if the data is numerical...just numbers,

if there are no extreme values...unusually large or small numbers.

Interquartile range

How do you find it?

you need to put all of the numbers in order starting with the smallest,

you then need to find a quarter of the total number of numbers in the set,

you remove this many numbers from the bottom of the list,

you then remove the same number of numbers from the top of the list,

finally you subtract the biggest number you are left with from the smallest number you are left with.

Note: it is just finding the range of the middle half of the numbers!

The interquartile range should be used...

if the data is numerical...just numbers,

if there are extreme values...unusually large or small numbers.

You can be given...

- List of numbers...an array,
- Frequency table,
- Grouped frequency table.

Range

To find the range, just subtract the smallest number from the biggest one.

Interquartile Range

1. Put the numbers in ascending order
2. Use the formula $\frac{1}{4}(n + 1)$ to tell you which number on the list is the **lower quartile**.
3. Then use the formula $\frac{3}{4}(n + 1)$ to tell you which number is the **upper quartile**.
4. The difference between these two numbers is the interquartile range.

Example 1

If the list of numbers was 2, 3, 4, 8, 9, 10 12... there are 7 numbers on the list... $n = 7$.

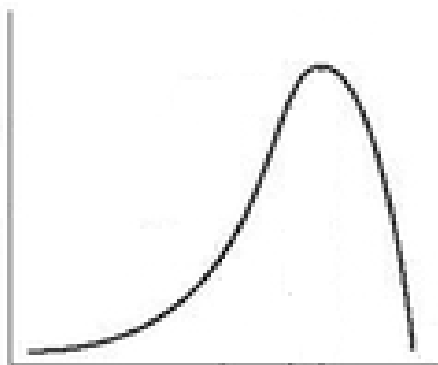
$$\text{So } \frac{1}{4}(n + 1) = \frac{1}{4}(7 + 1) = \frac{1}{4}(8) = 2 \dots \text{so the 2}^{\text{nd}} \text{ number is the lower quartile!}$$

2, 3, 4, 8, 9, 10 12...so 3 is the lower quartile.

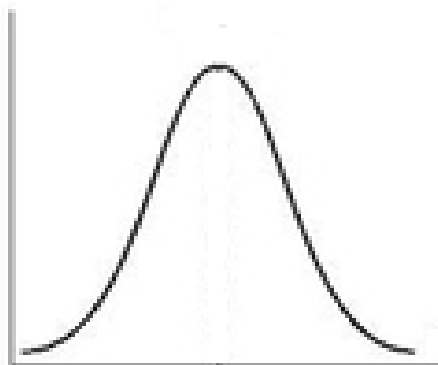
$$\text{And } \frac{3}{4}(n + 1) = \frac{3}{4}(7 + 1) = \frac{3}{4}(8) = 6 \dots \text{so the 6}^{\text{th}} \text{ number is the upper quartile!}$$

2, 3, 4, 8, 9, 10 12...so 10 is the lower quartile. The interquartile range is upper quartile – lower quartile = $10 - 3 = 7$

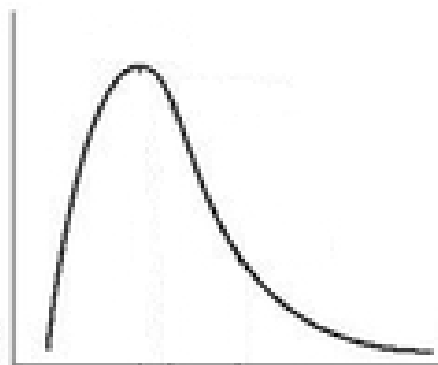
When describing the **shape** of a graph, say whether it is **symmetrical**...not leaning to one side, or **skewed**...leaning to one side.



Skewed to the **left**
(look at your left foot)



Symmetrical
aka Normal



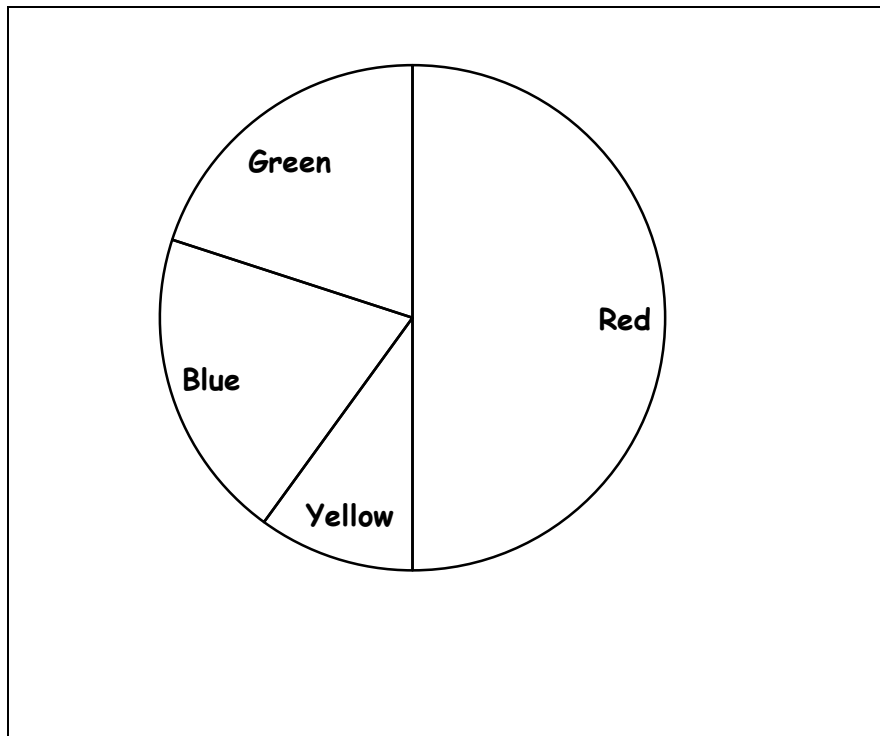
Skewed to the **right**
(look at your right foot)

Pie Charts

INTERPRETING PIE CHARTS

Question 16

90 people's favourite colour

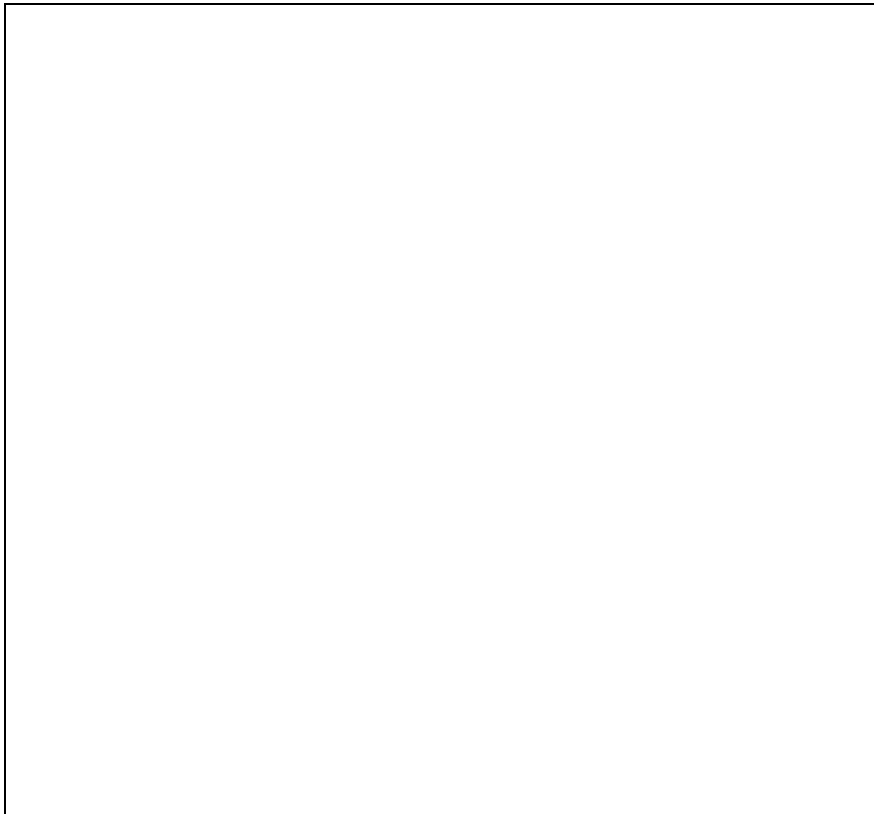


| Favourite colour | Degrees | Value |
|------------------------|---------------|-------|
| Red | 180° | |
| Yellow | 36° | 9 |
| Blue | 72° | |
| Green | 72° | |
| 1 person = ___ degrees | | |

Question 17

Type of pet that 60 people had

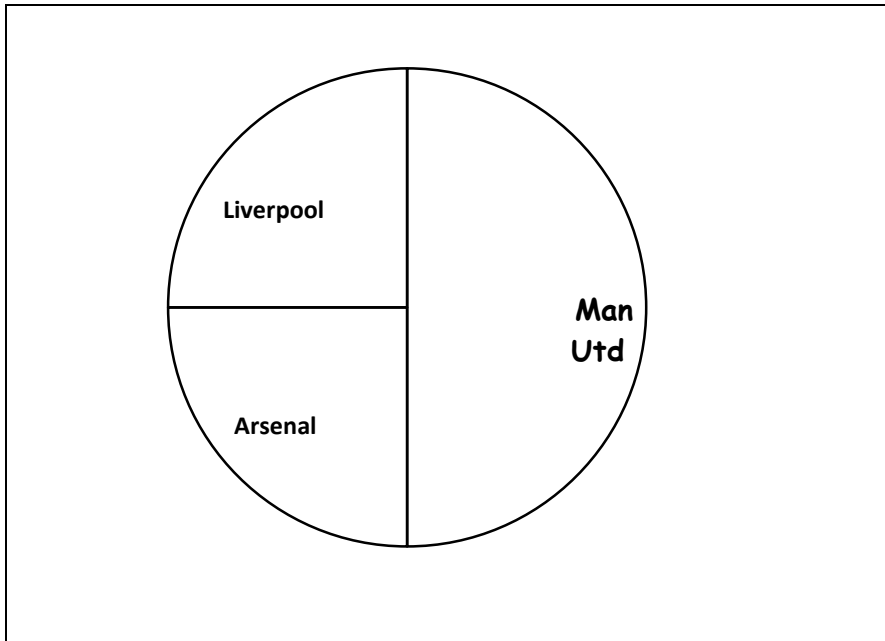
Based on the data provided construct a pie chart in the circle given



| Pet | Degrees | Value |
|-------------------------|------------------|-------|
| Dog | 180 ⁰ | |
| Cat | 36 ⁰ | |
| Budgie | 36 ⁰ | |
| Goldfish | 36 ⁰ | |
| Other | | |
| 1 person = ____ degrees | | |

Question 18

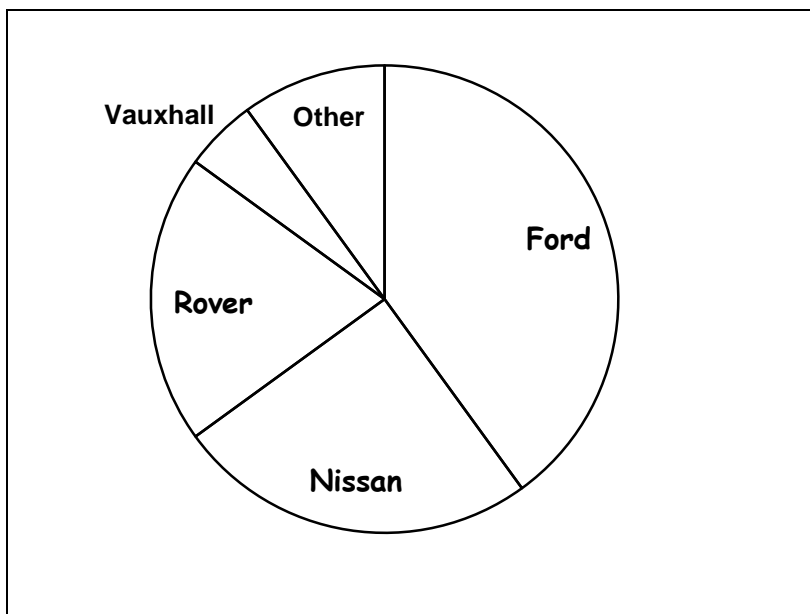
Favourite football team of 120 people



| Favourite colour | Degrees | Value |
|------------------------|---------|-------|
| Liverpool | | |
| Man Utd | | |
| Arsenal | | |
| 1 person = ___ degrees | | |

Question 19

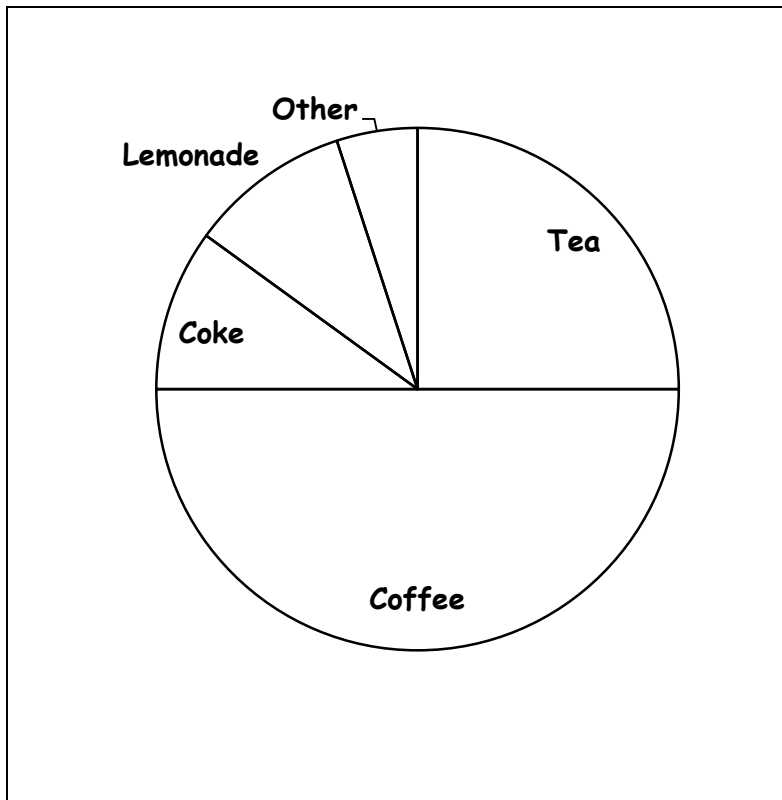
Make of ___ cars



| Make of car | Degrees | Value |
|-------------------------|------------------|-------|
| Ford | 144 ⁰ | |
| Nissan | 90 ⁰ | |
| Rover | 72 ⁰ | 8 |
| Vauxhall | | |
| Other | 36 ⁰ | |
| 1 person = ____ degrees | | |

Question 20

Favourite drink of 80 people



| Drink | Degrees | Value |
|-------------------------|------------------|-------|
| Tea | 90 ⁰ | |
| Coffee | 180 ⁰ | |
| Coke | 36 ⁰ | |
| Lemonade | | |
| Other | 18 ⁰ | |
| 1 person = ____ degrees | | |

- (i) What fraction of people said Tea was their favourite drink?

- (ii) What fraction of people said Lemonade was their favourite drink?

- (iii) What percentage of people said Coffee was their favourite drink?

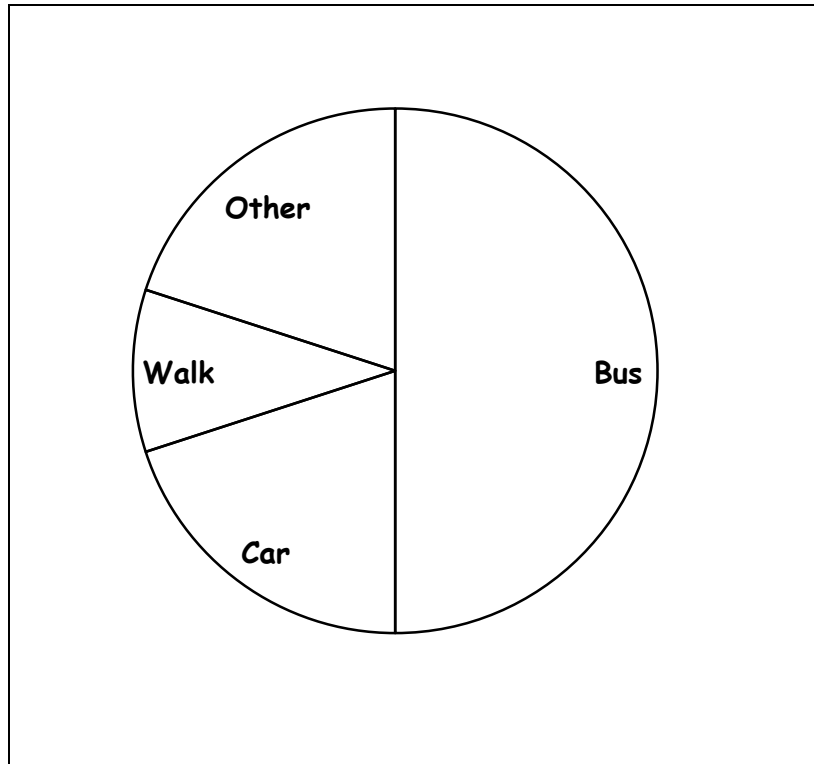
- (iv) What percentage of people said Other was their favourite drink?

- (v) What is the probability that a person, chosen at random, said their favourite drink is Coke?

- (vi) How many of the people asked said that Coke or Lemonade was their favourite drink?

Question 21

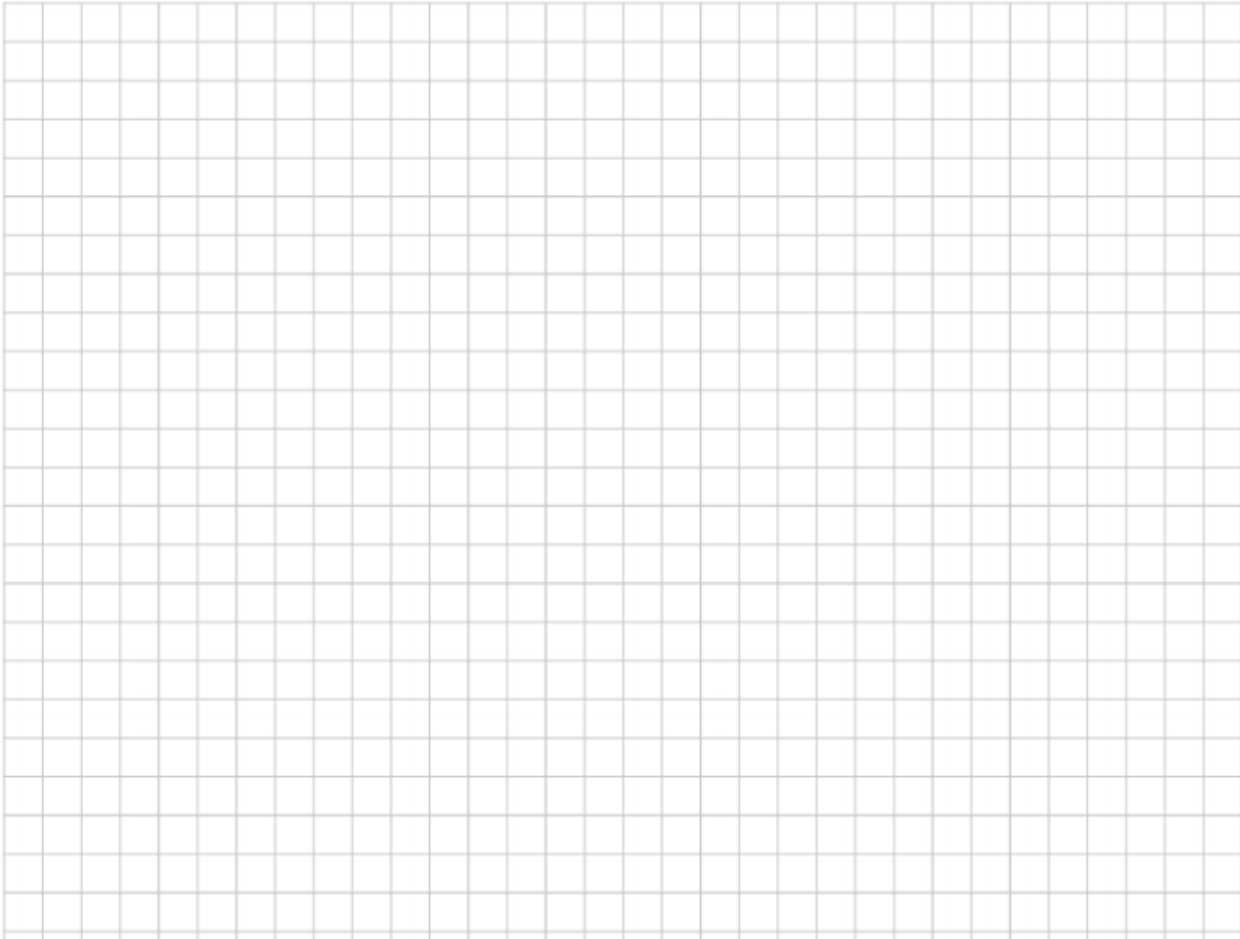
How 30 people travel to school



| Transport | Degrees | Value |
|-------------------------|---------|-------|
| Bus | | 15 |
| Walk | | 3 |
| Car | | 6 |
| Other | | |
| 1 person = ____ degrees | | |

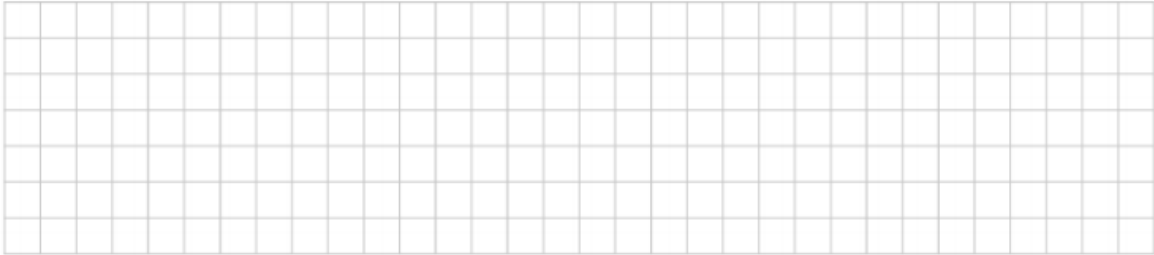
- (i) Explain how you know how many people travel to school in 'Other' ways
- (ii) What is the probability that a person, chosen at random, travels to school by Car? Simplify your answer if possible.
- (iii) What percentage of people travel to work by walking?
- (iv) If 300 people had completed the survey, how many people would you expect to travel to work by Bus? Show your working.
- (v) If 150 people had completed the survey, how many people would you expect to travel to work by Car?

(v) Display John's data in a pie chart. Show all of your calculations clearly.

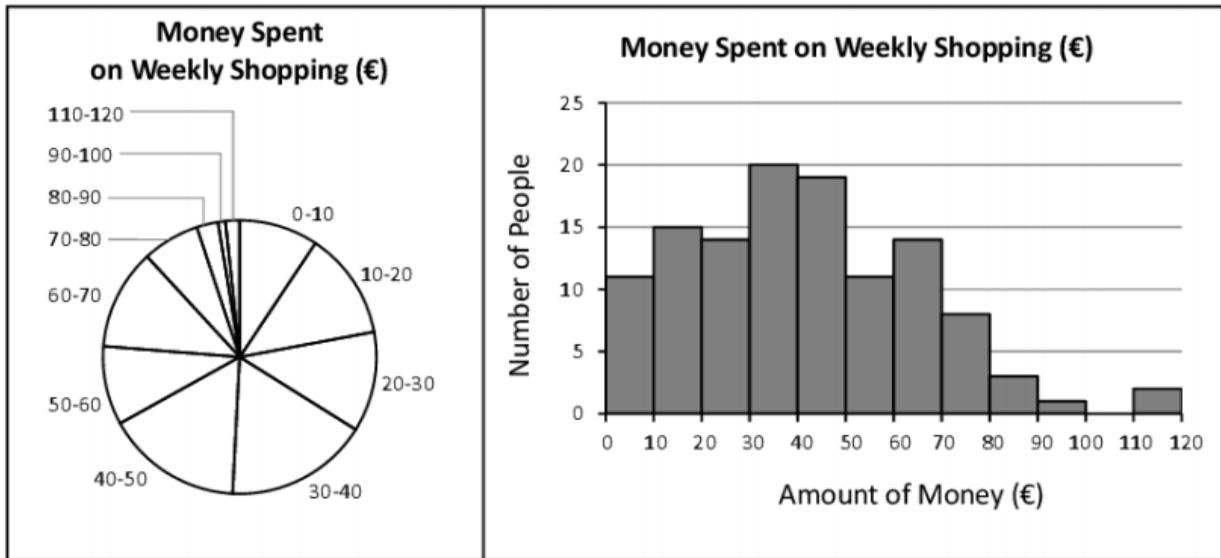


(b) Margaret wants to examine if people prefer to do their weekly shopping in *Tesco*, *Dunnes Stores*, *SuperValu*, or *Lidl*. She stands outside her local *Lidl* shop for one day, and asks everyone as they leave the shop where they prefer to do their weekly shopping.

Give one reason why Margaret's data may be biased.



- (c) Mary is interested in the amount of money people spend on their weekly shopping. She surveys people as they leave the local supermarket on a Saturday morning, and displays her results in the two graphs below.



- (i) Mary wants to show that about half of her sample spent less than €40 on their weekly shopping. Which graph do you think she should use? Give a reason for your answer.

Answer: _____

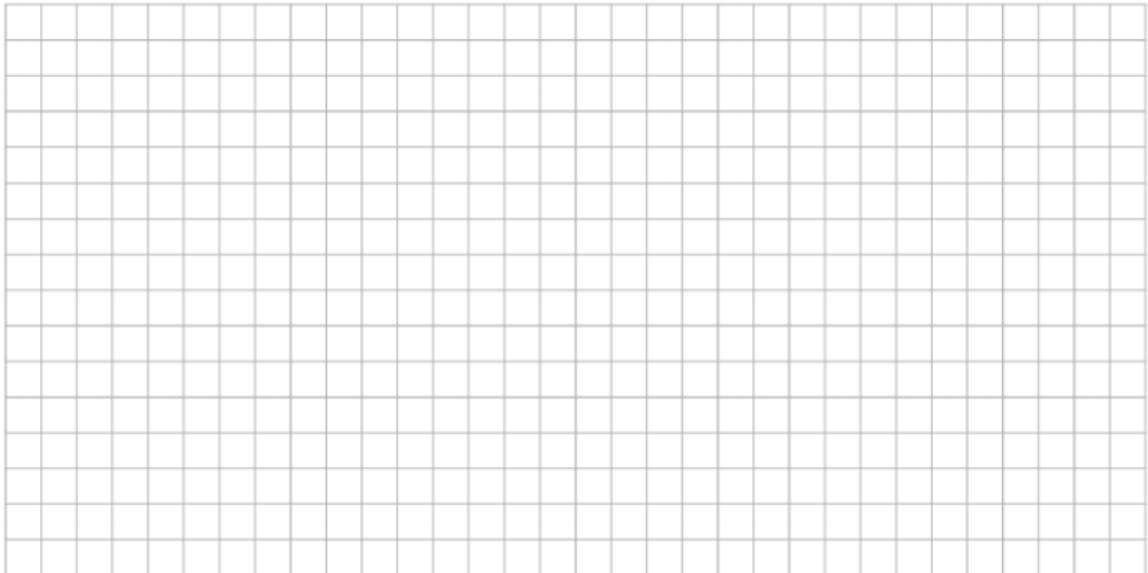
Reason: _____

- (ii) Mary wants to show that there were more people in the 30–40 group than in any other. Which graph do you think she should use? Give a reason for your answer.

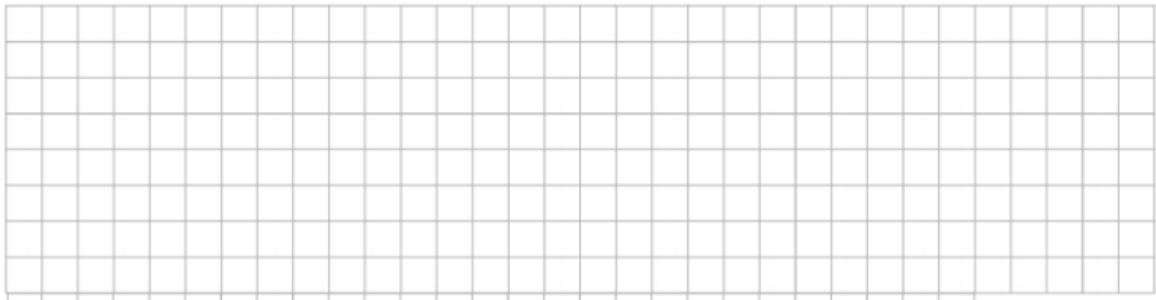
Answer: _____

Reason: _____

(b) Calculate the overall percentage of students who kept their mobile phones under their pillows.



(c) A new pie chart is to be drawn showing the mobile phone location for all students. Calculate the measure of the angle that would represent the students who kept their mobile phones under their pillows.



Question 25

The ages of the Academy Award winners for best male actor and best female actor (at the time they won the award) from 1992 to 2011 are as follows:

Male actor 54 52 37 38 32 45 60 46 40 36 47 29 43 37 38 45 50 48 60 50

Female actor 42 29 33 36 45 49 39 26 25 33 35 35 28 30 29 61 32 33 45 29

(a) Represent the data on a back-to-back stem-and-leaf diagram.

| Male actors | | | | | | Female actors | | | | |
|-------------|--|--|--|---|--|---------------|--|--|--|--|
| | | | | 2 | | | | | | |
| | | | | 3 | | | | | | |
| | | | | 4 | | | | | | |
| | | | | 5 | | | | | | |
| | | | | 6 | | | | | | |
| | | | | | | | | | | |

Key:

