Edexcel GCSE Maths

Your notes

Statistical Diagrams

Contents

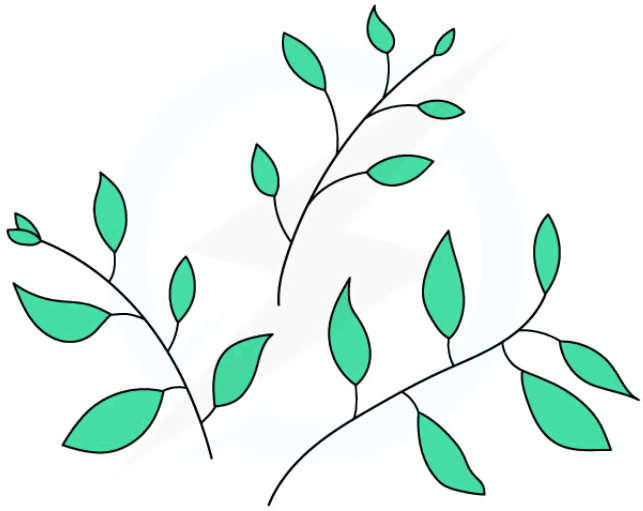
Stem & Leaf Diagrams

Your notes

Stem & Leaf Diagrams

What is a stem-and-leaf diagram?

- A **stem-and-leaf diagram** is a simple but effective way of showing data
  - the raw data is still available as the numbers themselves create the diagram
- A stem-and-leaf diagram
  - puts data into **order**
  - puts data into **classes** (**groups**)
- A stem-and-leaf diagram makes patterns in the data easy to see
  - as the data is in order it is useful for finding the **median** and **quartiles**
- Stem-and-leaf diagrams are particularly useful for two-digit data but can be used for bigger numbers
  - two-digit data could be something like 26 but could also be 2.6
  - due to this, it is essential a stem-and-leaf diagram has a key



How do I draw a stem-and-leaf diagram?

- The digits from each value in the data are split into two – **stems** and **leaves**
  - e.g. the data value 26 would be split into a **stem** of 2 and a **leaf** of 6
- As in nature though, a stem can have more than one leaf, so the **stems** become our **classes** in our data
  - e.g. the stem of 2 becomes a **class interval** – covering values from 20 to 29
  - Any other values in the 20's would join the same stem/class – so a stem of 2 could end up having two or more leaves
- To draw a stem-and-leaf diagram ...

  STEP 1

Unless the data is in order, always draw a rough stem-and-leaf diagram first
Work through the data one value at a time, splitting each into a stem and a leaf
Lightly cross each data value out as you use it - this will help to ensure none are missed out
This gets the data into the right format, grouped into its stems, with the correct number of leaves

STEP 2

Draw a final diagram with the stems in (ascending) order
For each stem, rearrange the leaves into (ascending) order
Ensure your leaves are lined up in neat columns (so the size of each stem/class can be easily seen)

STEP 3

Add a key to your diagram to explain how the two digits have been split into stems and leaves
e.g. does 2|6 mean 26 or 2.6? The key will let us know!


Your notes

How do I find the median and quartiles from a stem-and-leaf diagram?

- For the **median** ...
  - Lightly cross out numbers from the **beginning** and **end**
    - i.e. - cross out the lowest number and the highest number
    - be careful with the highest number - it will be at the **end** of the last stem
  - Continue crossing out the next lowest/highest numbers until you meet in the middle
    - if two numbers remain in the middle, find the midpoint between them
    - if the midpoint isn't obvious then add them together and halve
- For the **lower quartile** ...
  - Find the median first
    - Repeat the process for the median but on the lower half of the data
      (*up to* but not including the median)
- For the **upper quartile** ...
  - Find the median first
    - Repeat the process for the median but on the upper half of the data
      (*from* but not including the median)
- Since the **interquartile range** is the difference between the lower and upper quartiles, it can be easily calculated
  - **IQR = UQ – LQ**
- A common mistake when finding the median and quartiles is to not put the number back into its original format and to only use the leaf
  - e.g. Median = 6 instead of Median = 26

Worked example

A hospital is investigating a new drug that claims to reduce blood pressure. They give a set of patients the new drug and three hours later record the amount the blood pressure of every patient has reduced (or increased) by. The results, measured in mmHG (millimetres of mercury) are given below.

12 31 24 18 21 34 40 19 23 17 16

a) Draw a stem and leaf diagram to show these results.

The data is not in order so the first step is to draw a rough diagram.
All values are two digit so split each so that the first (tens) digit is a stem and the second (units) digit is a leaf.

	Blood pressure reduction				
1	2	8	9	7	6
3	1	4			
2	4	1	3		
4	0				

For the final diagram put stems and leaves in order and add a key.

	Blood pressure reduction				
1	**2**	**6**	**7**	**8**	**9**
2	**1**	**3**	**4**		
3	**1**	**4**			
4	**0**				

Key: 1|2 means a blood pressure reduction of 12 mmHG

b) Use your stem and leaf diagram to find the median blood pressure reduction and the interquartile range.

For the median cross off highest and lowest numbers until we meet in the middle.

	Blood pressure reduction				
1	~~2~~	~~6~~	~~7~~	~~8~~	~~9~~
2	(1)	~~3~~	~~4~~		
3	~~1~~	~~4~~			
4	~~0~~				

Your notes

Your notes

The median is a leaf of 1 in the stem of 2.

Median = 21

Repeat for the lower half and upper half of the data to find the lower and upper quartile.

	Blood pressure reduction				
1	2	6	7	8	9
2	1	3	4		
3	1	4			
4	0				

The LQ is a leaf of 7 in the stem of 1; LQ = 17. The UQ is a leaf of 1 in the stem of 3; UQ = 31.
The question asks for the interquartile range.

IQR = UQ - LQ = 31 - 17 = 14

Median = 21 mmHG
Interquartile range = 14 mmHG

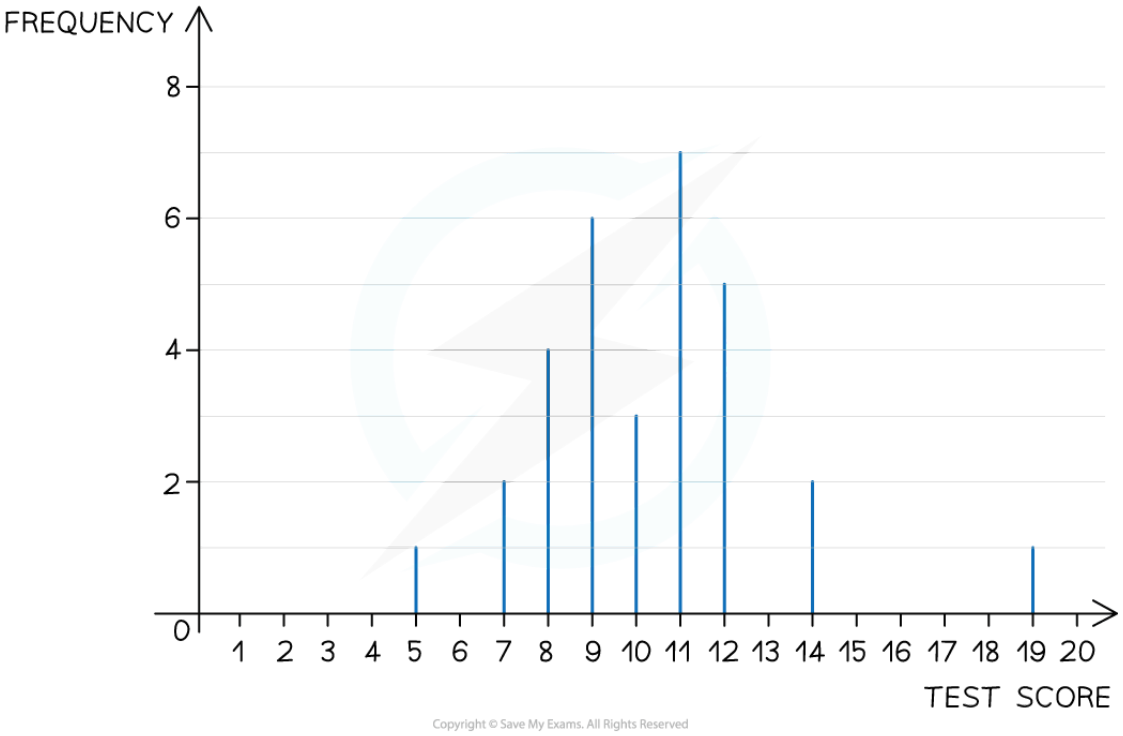
Bar Charts & Pictograms

Your notes

Line Charts, Bar Charts & Pictograms

What is a line chart and what is it used for?

- Sometimes called a **vertical line chart**, this a visual way to represent **discrete** data
  - **Line charts** are used for **numerical** data (rather than categorical data)
    - They are particularly useful when there are lots of different options to show
      e.g. Results of a test where scores are given as percentages
- The **vertical axis** shows the **frequency**
  - The scale should start at zero and increase in equal amounts
- The **horizontal axis** shows the different **outcomes**
  - A vertical line is drawn for each outcome and its height is its frequency



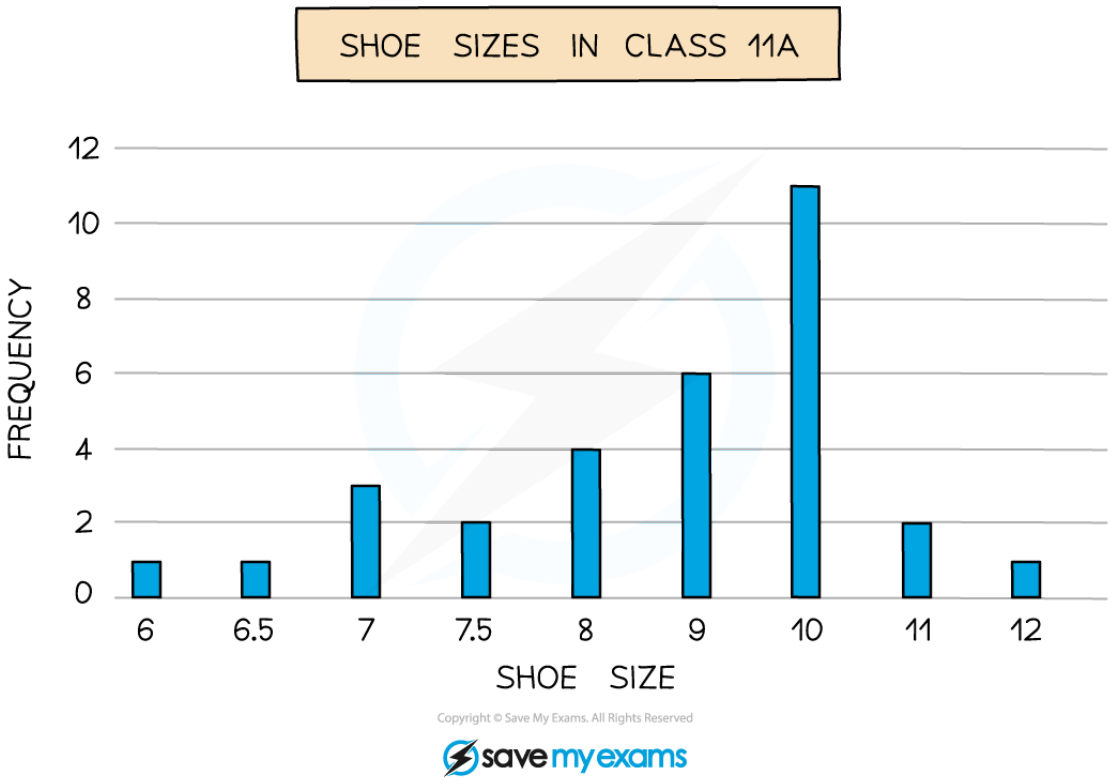
- You can easily identify the **mode** using a line chart
  - The **mode** is the most common outcome
  - This will be the **outcome** with the **highest** (tallest/longest) line
  - e.g. In the line chart above, 11 was the **modal** test score, with a frequency of 7
- You can quickly see how the data is **spread** using a line chart
  - Lines may be crowded around a particular group of options with only a few elsewhere
  - This may help identify anomalies or outliers in the data

- e.g. In the line chart above we can see
  - the majority of the test scores, out of 20, were between 7 and 12
  - one pupil scored 19 out of 20, much higher than anyone else in the class

Your notes

What is a bar chart and what is it used for?

- A **bar chart** is a visual way to represent **qualitative** and/or **discrete** data
  - e.g. colours of cars, shoe sizes, names of students
- A bar chart is very similar to a line chart
  - but tend to be used when there are only a **small number** of possible **outcomes**
  - and tend to be used for **categorical** (non-numerical) data
- The **vertical axis** shows the **frequency**
  - The scale should start at zero and increase in equal amounts
- The **horizontal axis** shows the different **outcomes**
- Bars are used for each outcome and the height is the frequency
  - Each bar should have the same width
  - There should be a gap between each bar



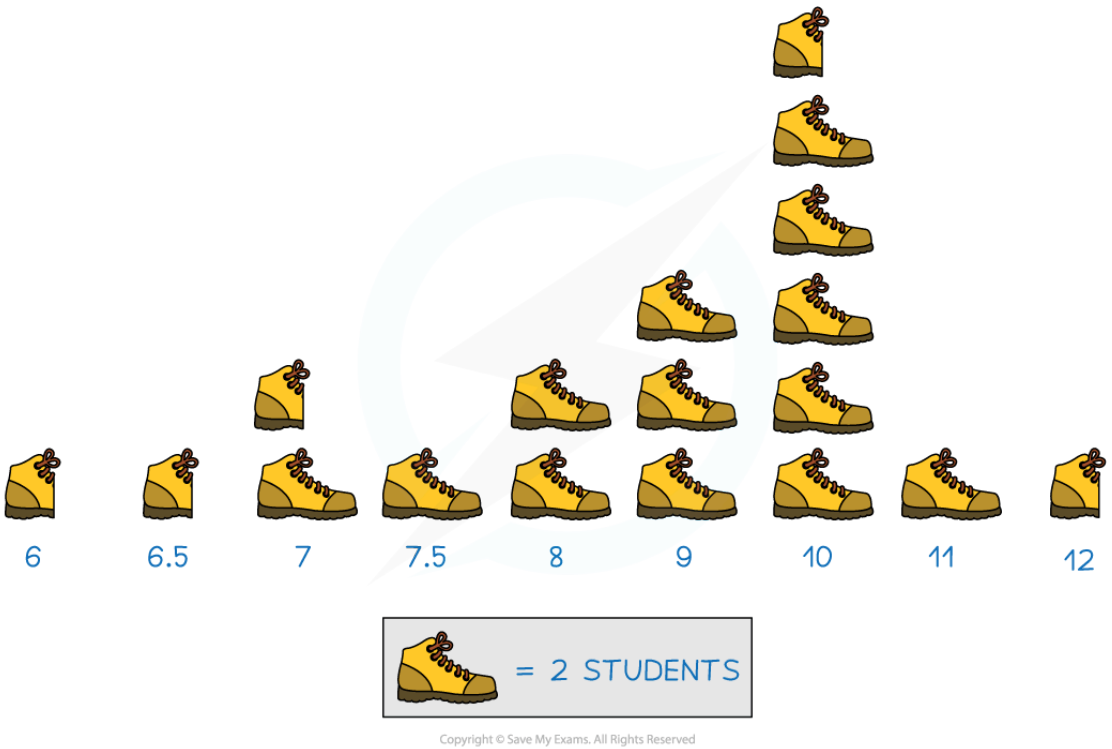
- You can easily identify the **mode** using a bar chart
  - The **mode** is the most common outcome
  - This will be the **outcome** with the **highest** bar
  - e.g. In the bar chart above, 10 is the **modal** shoe size with a frequency of 11
- You can use a **comparative bar chart** to compare two (or more) data sets

- For each outcome you would have a bar for each data set to show the frequencies
- The bars for each data set for each outcome would be side-by-side with no gap
- You would use **colours** or **shading** and a **key** to clearly show which bars belong to which data set

Your notes

What is a pictogram and what is it used for?

- A **pictogram** is an alternative to a bar chart
  - It is a visual way to represent **qualitative** and/or **discrete** data
  - Like bar charts, pictograms tend to be used for **categorical** (non-numerical) data
- There are no axes on a pictogram
  - Frequency is represented by symbols
  - It is essential a key is included in a pictogram to state the frequency shown by one symbol
  - Half and quarter symbols are often used
- Pictograms should adhere to similar rules to bar charts to make them easy to read and interpret
  - All symbols should be the same size/shape
  - Symbols should be lined up so the highest frequency (the mode) and other features can be easily seen
- A pictogram for the shoe sizes of class 11A would look like this



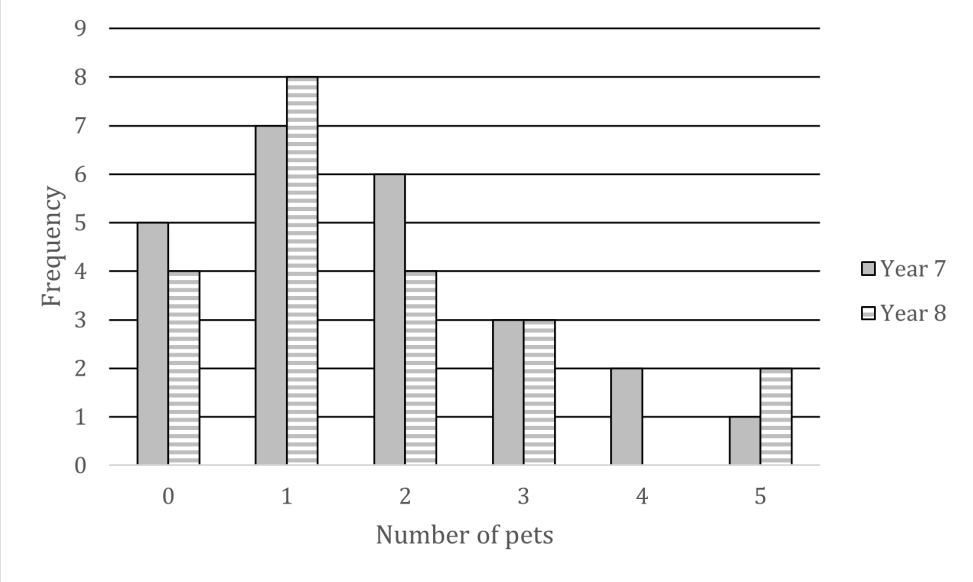
Examiner Tip

- If asked to draw a line chart or a bar chart with no frequency axis provided
  - think about whether it would be sensible or not for the frequency axis to go up in 1's or higher
  - going up in 2's often makes for a smaller, smarter diagram
  - going up in 4's, possibly 5's and 10's may be suitable depending on the frequencies involved
- If asked to draw a pictogram, pick a symbol that is
  - easy to duplicate so it can be drawn at the same size over and over again
  - easy to draw half or a quarter of

Your notes

Worked example

Mr Barr teaches students in both Year 7 and Year 8. He records the number of pets that students in each year have and uses a bar chart to represent this information.



a) Write down the mode for the number of pets for the Year 7 students.

The mode for Year 7 is one pet as that has the highest (shaded) bar

b) How many Year 8 students are there altogether?

Add up the heights (frequencies) of the year 8 (striped) bars.

$4 + 8 + 4 + 3 + 0 + 2 = 21$

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Pie Charts

Your notes

Pie Charts

What is a pie chart?

- A pie chart is a circle which is divided into slices (sectors) to show **proportion**
- They show the **relative size** of categories of data compared to each other, rather than their actual size or number
  - For example if we were looking at the proportions of men and women working in a company, we are more interested in the relative sizes than the actual numbers of men and women
- There are 360° in a circle, and we can use this to help us calculate the size of each slice of the pie chart

How do I draw a pie chart?

- This is shown easiest through an example
- The following data is collected for a class of 30 students about their favourite colour

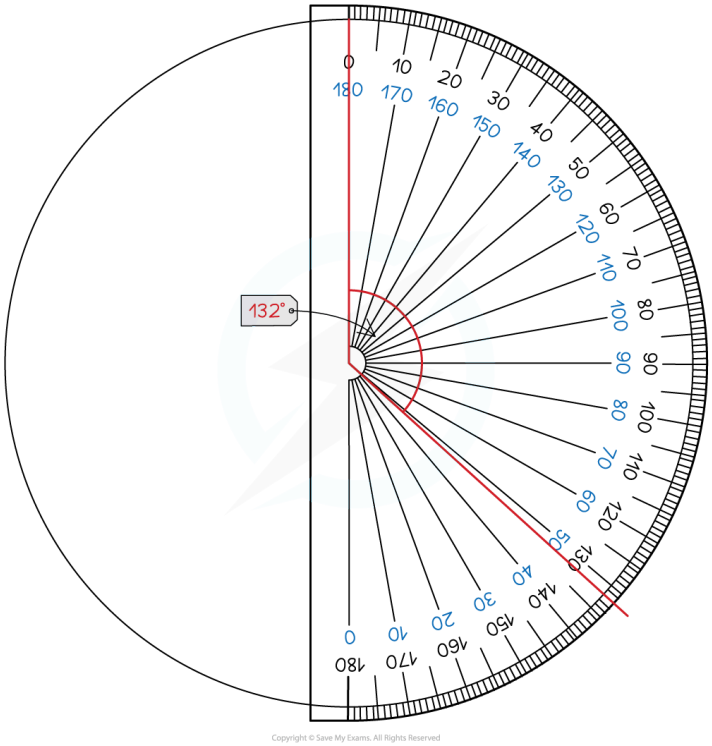
Colour	Red	Purple	Blue	Green	Yellow	Orange
Students	11	4	9	3	2	1

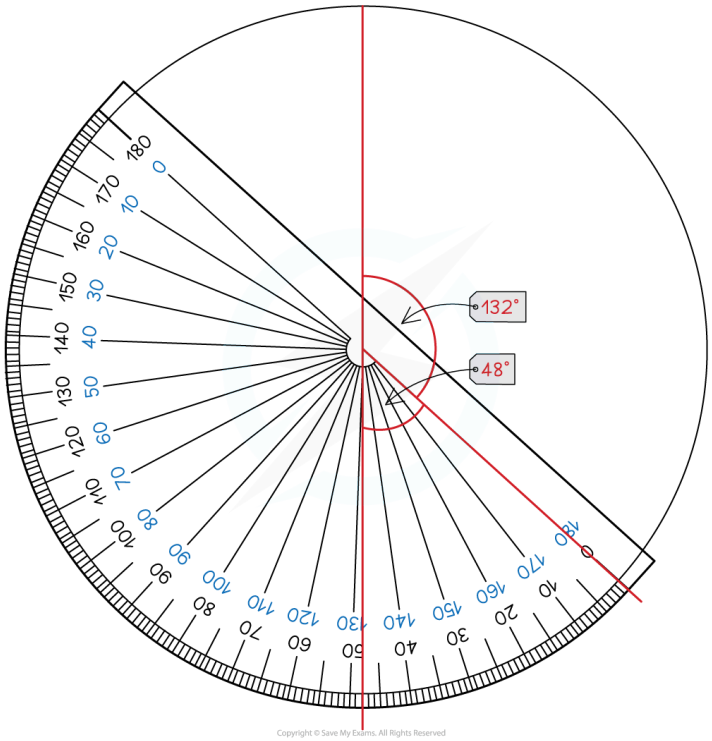
- STEP 1 – Find the number of degrees that represents 1 student
  There are 30 students in total, so 360° = 30 students
  Divide both sides by 30, so 12° = 1 student
- STEP 2 - Calculate the angle for each category by finding a fraction of 360°
  11 students out of 30 said red was their favourite colour, so this is $\frac{11}{30} \times 360° = 132°$
  4 students out of 30 said purple, so this is $\frac{4}{30} \times 360° = 48°$
  Repeat this for each category, they should sum to 360° in total

Colour	Red	Purple	Blue	Green	Yellow	Orange
Students	11	4	9	3	2	1
Angle	132°	48°	108°	36°	24°	12°

- STEP 3 – Draw the pie chart, using a protractor to measure the angles
  Start by drawing a vertical line from the centre of the circle to the top ("12 o'clock")
  Then use your protractor to measure the first angle, and draw a line to this point
  Move your protractor to this line, and repeat for each category
  You should include a key or labels to show which slice represents which category

Your notes





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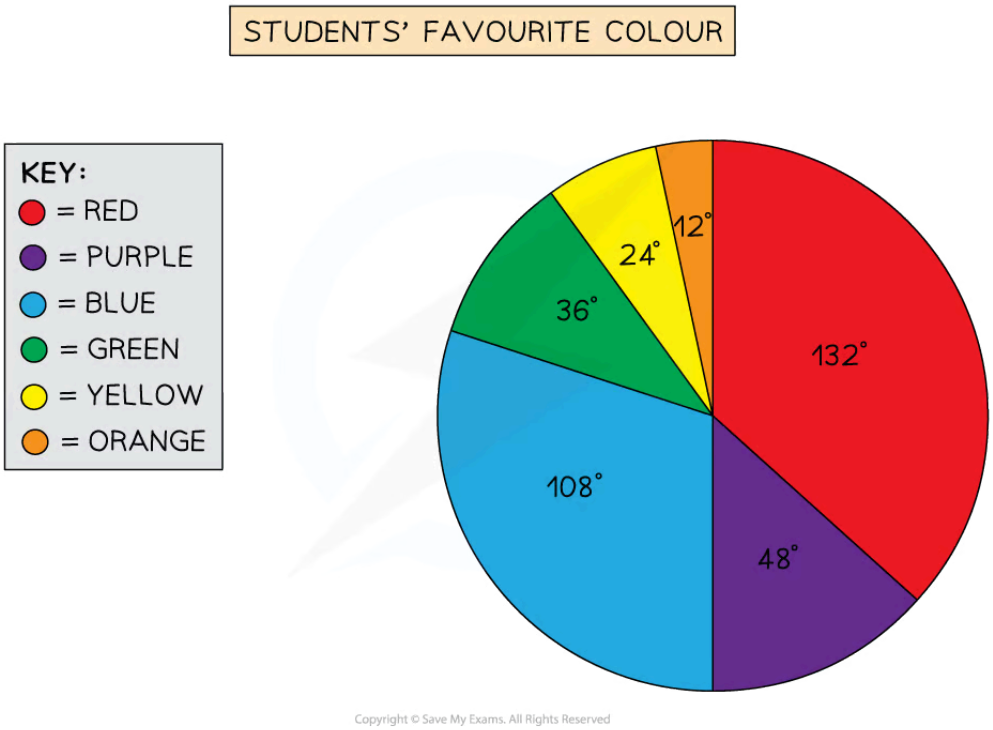


How do I interpret a pie chart or find missing information?

- It is easy to spot from a pie chart which category is the largest or smallest proportion, but you may be asked to do something more advanced like finding some missing information
- Remember that **all** of the data is represented by **360°**
- You can use this to find either how many degrees each person/piece of data is represented by, or how many people/pieces of data 1 degree represents
- For example if you are told that there is a slice measuring 30° which represents 15 people
  - 30° = 15 people
  - 1° = 0.5 people (by dividing by 30)
- 2° = 1 person (by dividing first statement by 15 or doubling the second statement)
  You can then use this information to help solve problems or find missing information

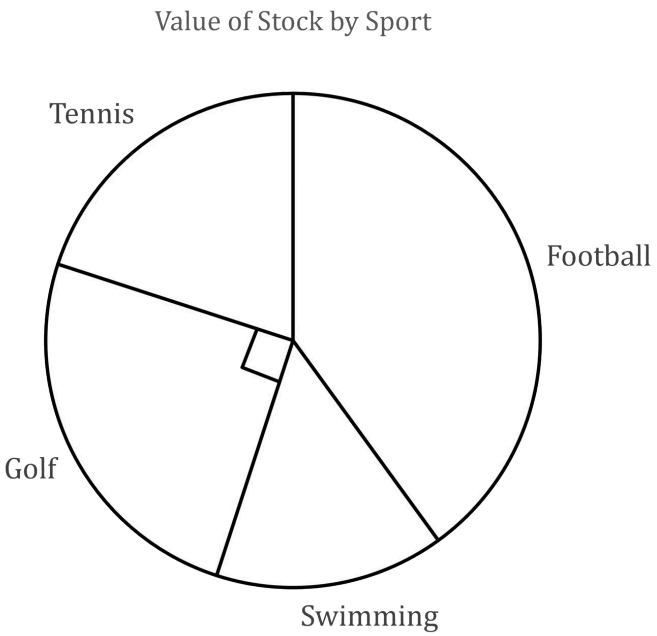
Examiner Tip

- If you are given a pie chart in an exam, it may not be to scale
- If it is not to scale, do not try to use your protractor to measure it!
- You will instead have to use the above methods to calculate the information you need

Your notes

Worked example

The following pie chart is created to show the total value of items stocked in a sports shop for 4 different sports.



a) Using the angle marked on the pie chart, and the fact that the shop stocks $12 000 worth of Golf items, find the total value of the shop's stock across the 4 sports.

The angle marked on the diagram is 90°.

$$\frac{90}{360} = \frac{1}{4}$$

So a quarter of the stock is for Golf.
We can multiply this by 4 to find the total value of the shop's stock.

$$\$12\,000 \times 4 = \$48\,000$$

Total value is $48 000

b) Given that the angle on the pie chart for Tennis is 72°, find the value of Tennis items the shop stocks.

The fraction of the value of the shop's stock will be the same as the fraction of the circle for each category.

Therefore the value of tennis items will be

$$\frac{72}{360} \times \$48\,000 = \$9\,600$$

Value of tennis items is $9 600

Your notes

Frequency Polygons

Your notes

What is a Frequency Polygon?

- **Frequency polygons** are a very simple way of showing frequencies for **continuous**, **grouped** data and give a quick guide to how frequencies change from one class to the next

What are the key features of a frequency polygon?

- Apart from plotting and joining up points with straight lines there are 2 rules for frequency polygons:
  - Plot points at the **MIDPOINT** of class intervals
  - Unless one of the frequencies is 0 do not join the frequency polygon to the x-axis, and do not join the first point to the last one
- The result is not actually a polygon but more of an open one that 'floats' in mid-air!
- You may be asked to draw a frequency polygon and/or use it to make comments and compare data

How do I draw a frequency polygon?

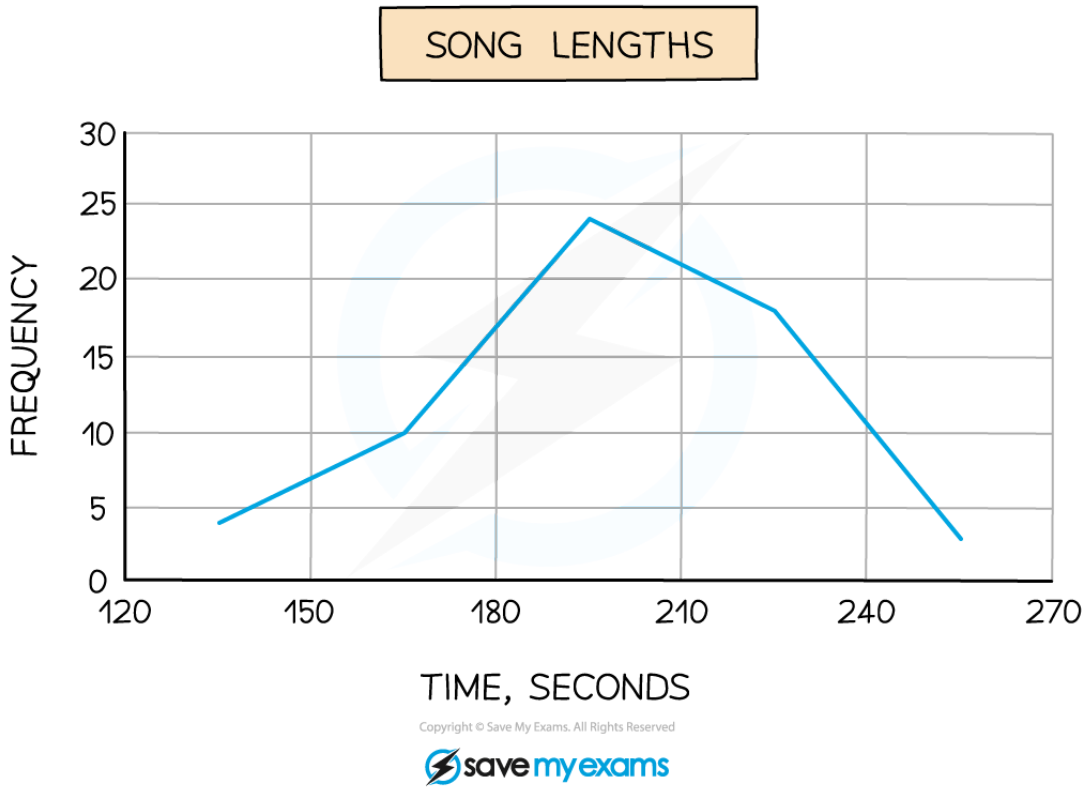
- This is easiest shown by an example

e.g. The lengths of 59 songs, in seconds, are recorded in the table below

Song length t seconds	Frequency
$120 \leq t < 150$	4
$150 \leq t < 180$	10
$180 \leq t < 210$	24
$210 \leq t < 240$	18
$240 \leq t < 270$	3

Frequencies are plotted at the midpoints of the class intervals, so in this case we would plot the points (135, 4), (165, 10), (195, 24), (225, 18) and (255, 3).
Join these up with straight lines (but do **not** join the last to the first!)

Your notes



How do I use and interpret a frequency polygon?

- Think about what you could you say about the data above, particularly by looking at the diagram only?
  - The two things to look for are **averages** and **spread**
    - The **modal class** is $180 \leq t < 210$
    - It would be acceptable to say that 195 seconds is (an estimate of) the **modal** song length
    - The diagram (rather than the table) shows (an estimate of) the **range** of song lengths is 255 – 135 = 120 seconds
    - If 2 frequency polygons are drawn on the same graph **comparisons** between the 2 sets of data can be made

Examiner Tip

- Jot down the midpoints next to the frequencies so you are not trying to work them out in your head while also concentrating on actually plotting the points

Worked example

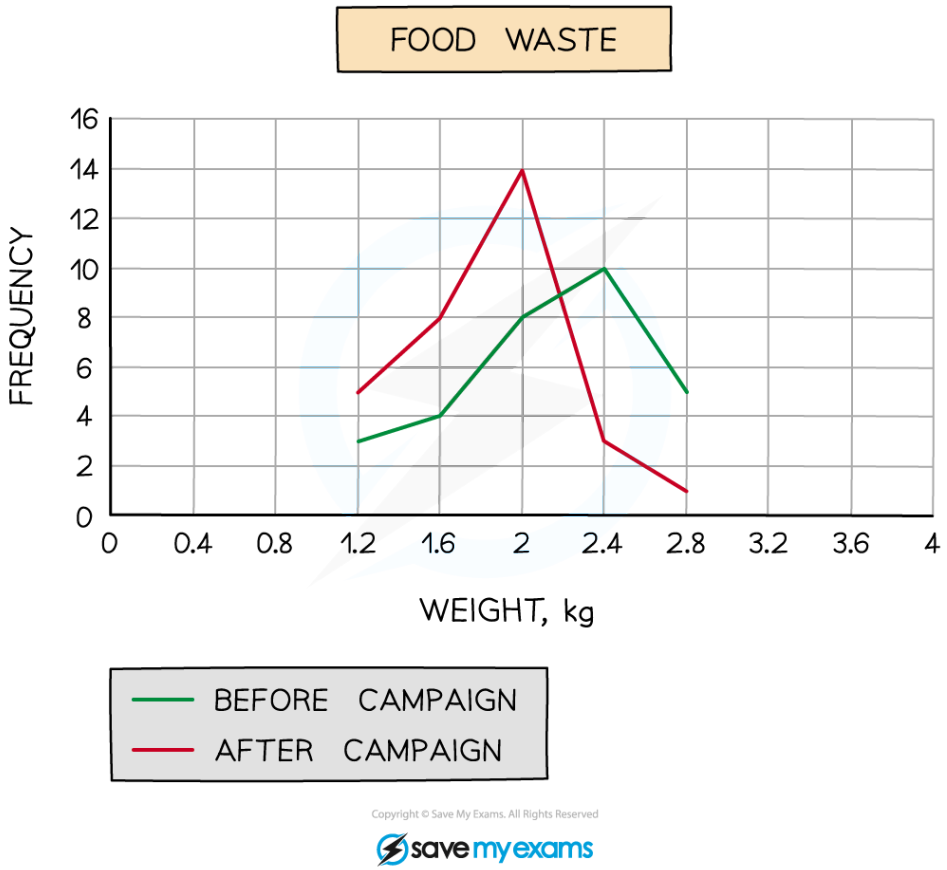
A local council ran a campaign to encourage households to waste less food.
To compare the impact of the campaign the council recorded the weight of food waste produced by 30 households in a week both before and after the campaign.
The results are shown in the table below.

Food waste w kg	Frequency (before campaign)	Frequency (after campaign)
$1 \leq w < 1.4$	3	5
$1.4 \leq w < 1.8$	4	8
$1.8 \leq w < 2.2$	8	14
$2.2 \leq w < 2.6$	10	3
$2.6 \leq w < 3$	5	1

a) On the same diagram, draw two frequency polygons, one for before the council's campaign and one for after.

Your notes

Your notes



Remember to include a key to show which frequency polygon is which.

b) Comment on whether you think the council's campaign has been successful or not and give a reason why.

The council campaign has been successful as the modal amount of waste has reduced from 2.4 kg of food waste per week to 2 kg

Remember to look for average(s) and/or spread - the mode (average) is appropriate in this case.

Time Series Graphs

Your notes

Time Series Graphs

What is a time series graph?

- A **time series graph** is sometimes called a **line graph** (which is different to a **line chart**)
- A time series graph shows how a quantity (**continuous** data) changes over time
  - e.g. How the outside temperature changes during a week
- **Measurements** of the quantity are taken at particular times
  - **Measurements** should be taken at **regular** time intervals
  - These are then **plotted** as points on a time series graph and **joined** together with **straight lines**
  - The straight lines help us to **identify patterns** and **features** in the data
- Time series graphs can show changes over **short** or **long periods** of **time**
  - e.g. Changes to the temperature of two chemicals for the first few **minutes** after they've been mixed
  - e.g. Changes to the temperature of the earth over several **years**

How do I draw a time series graph?

- The **horizontal** axis (*x*-axis) will be the **time** axis
- The **vertical** axis (*y*-axis) will be the **quantity** being measured/recorded
- **Plot** the data as a series of **points**
  - Be careful if both axes are both numerical with with similar values
  - The data collected should be able to be plotted along the horizontal axis at regular intervals
    - otherwise the graph could be misleading
- Join one point to the next, in order, with **straight lines**
  - Use a ruler
- Sometimes a time series graph may have more than one data set/line
  - e.g. one line for car emissions, one line for motorbike emissions
  - Plot one data set and join the points up before moving on to the second data set
    - This will ensure you do not muddle the points up
    - You could use crosses (×) for one set of points, and dots (•) for the other
    - You could use different colours or dotted/dashed lines when joining the points up
    - Always include a **key** in such cases to make it clear which line is which data set

How do I use and interpret a time series graph?

- This involves looking at **general** patterns in the data as well as **specific** points
  - If a question asks you to interpret/describe a time series graph look for
  - a **general** trend
    - e.g. The rate of inflation may fluctuate (go up and down) but is generally going down over a decade
  - **unusual** 'one-off' readings - **'spikes'** or **'dips'**

- e.g. On 4 July 1990, around 26 million people watched the men's England football team lose on penalties to West Germany; shortly afterwards there was a sudden increase ('spike') in electricity use as many viewers went to put the kettle on!

- Other things to look for
  - a **horizontal** line between points - **no change** (constant)
  - the **steepest** line (**gradient**) would indicate the **greatest change**
    - this could be an **increase** ('uphill' line, like /)
    - or a **decrease** ('downhill' line, like \)
- If a time series graph has points plotted at **irregular** intervals then
  - the gradients of the lines will not be accurate
  - it will be more difficult to determine some of the features of the data set
- For line graphs with two (or more) data sets, be clear about which line you are describing
  - Use the **key**
  - Double check which data set is 'higher' or 'lower' (or they may be equal) at a particular time

Examiner Tip

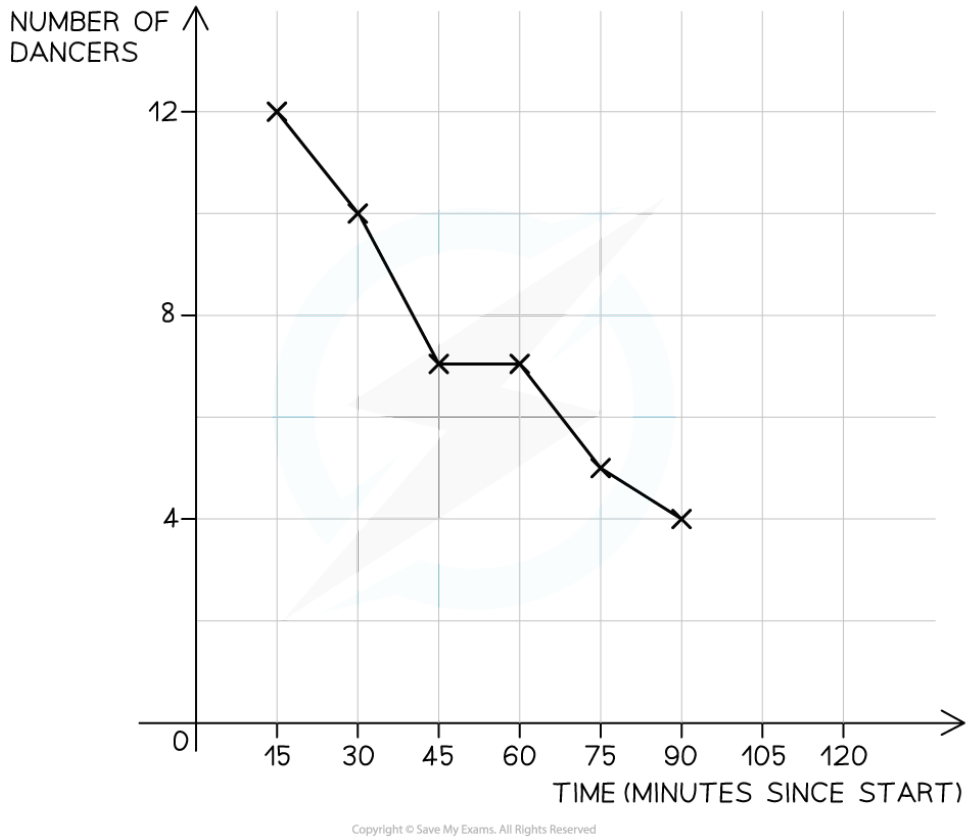
- If you are asked to **describe** or **interpret** a given line graph then use it carefully
  - **Draw lines** on the given graph from the correct **time** or **measurement** to ensure an accurate reading
  - **Highlight** any particular **points** that you mention in your description

Your notes

Worked example

Your notes

In a two hour charity 'dance-a-thon' dancers can join and leave the dance floor as they choose.
The number of dancers on the dance floor is recorded every 15 minutes.
The times-series graph below shows the data for the first two hours of the 'dance-a-thon'.

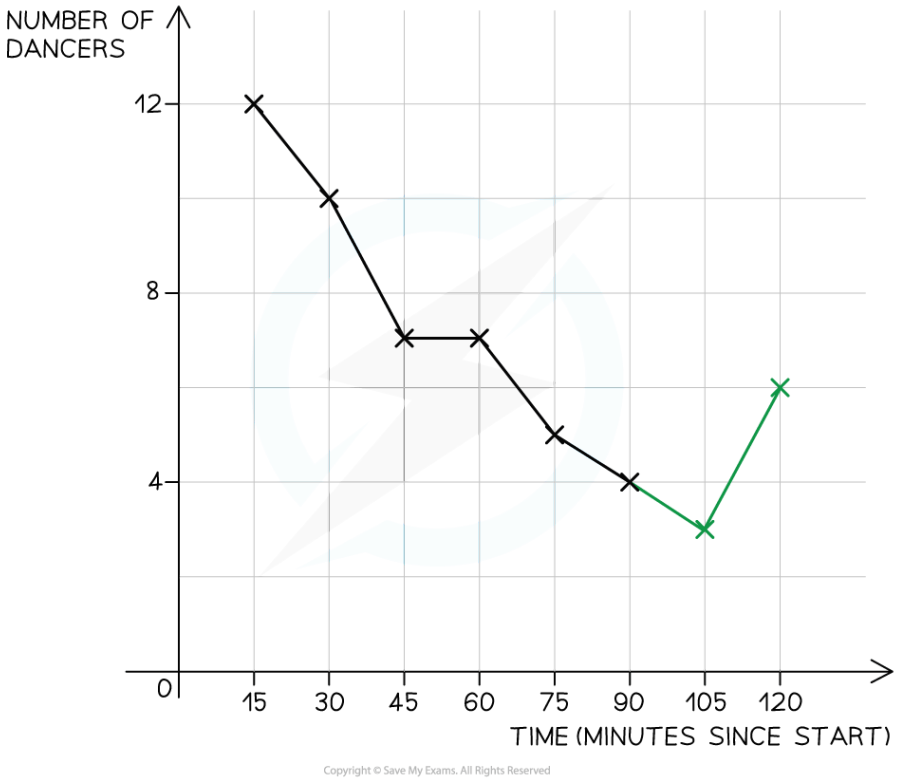


At 1 h 45 m and 2 h the number of dancers were 3 and 6 respectively.

a) Add these two recordings to the time-series graph.

Plot the points 105 minutes (1 h 45 m) on the time axis against 3 on the number of dancers axis and 120 minutes against 8 dancers.

Your notes



b) Use the time-series graph to find

i) the time at which there were the fewest number of dancers,

ii) the two times at which the number of dancers remained the same.

i) Look for the lowest point on the graph, including those added in part a).

The lowest point is (105, 3)

The final answer is the ***time.***

105 minutes (1 h 45 m)

ii) The keyword here is **remain** - a horizontal line would indicate the number of dancers *remaining* the same.

There is a horizontal line between 45 and 60 minutes

The number of dancers remained the same at 45 m and 60 m (1 h)

c) Comment on the general pattern of the number of dancers shown by the time-series graph.

Apart from the last point, and where it remained the same, the number of dancers decreased over the two hours.

In general, the number of dancers decreased during the first two hours of the 'dance-a-thon'

Avoid speculating on why this might be - e.g. **DO NOT** write "people get tired".
If a question wants you to do this, it will use phrases like "suggest a reason for ..." or similar.


Your notes

Working with Statistical Diagrams


Your notes

Reading & Interpreting Statistical Diagrams

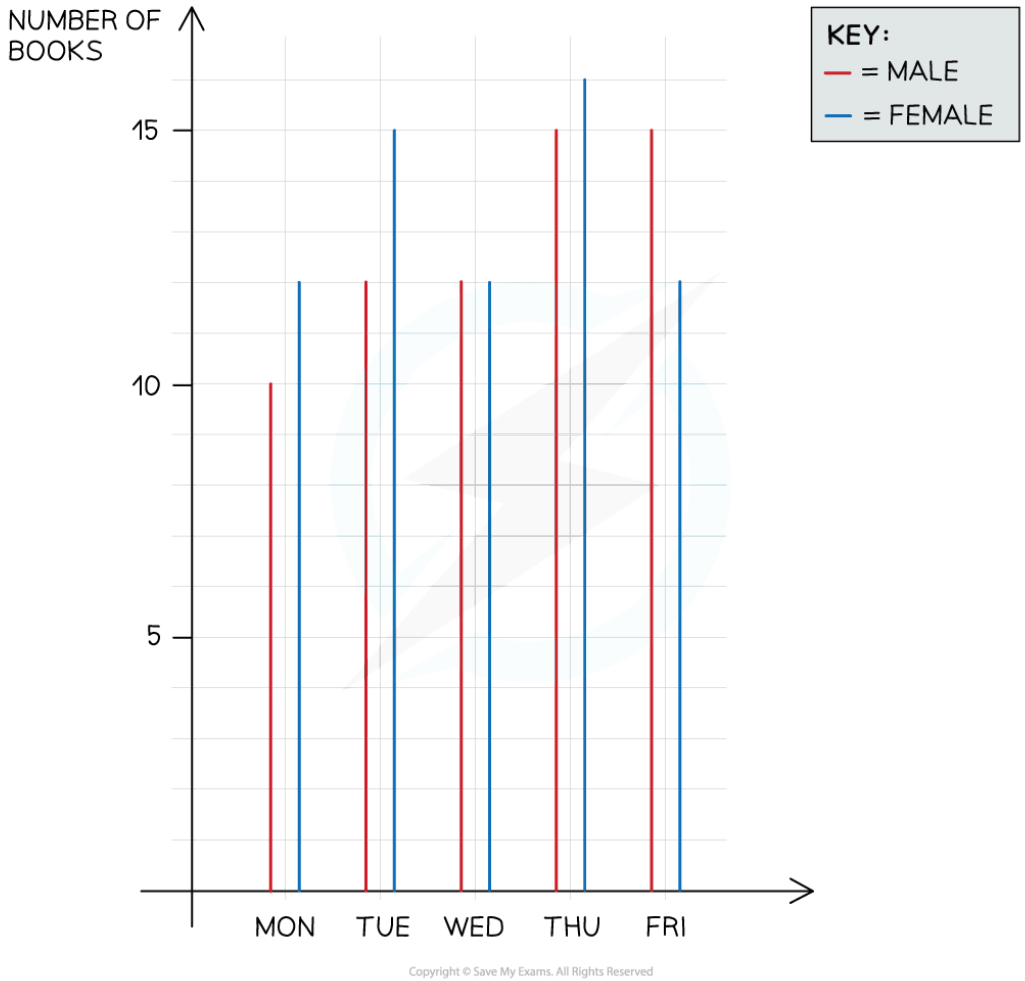
How do I read and interpret statistical diagrams?

- Rather than present you with a list of values (raw data), questions may present information using a **statistical diagram**
  - Such diagrams may or may not be the ones that are already familiar
  - **Unfamiliar diagrams** will be reasonably **straightforward** to read and interpret
    - you won't need any new skills for such diagrams
- **Reading** and **interpreting** statistical diagrams requires gathering any required information from a diagram
  - this enables meaningful statistics like the **mean, median, mode, range** and **interquartile range** to be calculated
  - from these, conclusions about the data can be made
- **Important** things to look for in diagrams include
  - a **key,** and/or **shading,** that indicate what certain parts of the diagram mean
    - e.g. a (dual) bar-chart may show year 7 data in solid shading and year 8 data in striped shading
  - information given through the **labels** on the axes
  - key words on diagrams such as **frequency**
  - anything unusual or unexpected mentioned in words, whether they come before or after a diagram
  - anomalies (outliers)
- You may also be asked to comment on a given statistical diagram
  - this may be to point out something that could be **misleading** or **incorrect**
    - e.g. uneven gaps in axes values
    - e.g. a missing key

Your notes

Worked example

The dual line chart below shows the number of books loaned from a library by male and female adults each day for a week.



a) Work out the mean number of books loaned per day by males during this particular week.

We need the number of books from the males (red line) for each of the five days and then find their mean.

$$\text{Mean} = \frac{10+12+12+15+15}{5} = \frac{64}{5} = 12.8$$

Mean number of books loaned per day by males is 12.8

b) Work out the median number of books loaned by women per day by females during this particular week.

We need the number of books from the females (blue line) for each of the five days.

$$12, 15, 12, 16, 12$$

To find the median, these will need to be put into ascending order, then the middle value found.

$$12, 12, \textcircled{12}, 15, 16$$

The median number of books loaned per day by females is 12

c) Determine whether the males or females had the greater range of books loaned per day during this particular week.

Using the lists/values from the parts a) and b) ...

$$\text{Male range} = 15 - 10 = 5$$
$$\text{Female range} = 16 - 12 = 4$$

The males had the greater range of books loaned per day (5 compared to 4 so their range was 1 book higher)

Your notes

Comparing Statistical Diagrams


Your notes

What is meant by comparing statistical diagrams?

- Some questions may present you with data as a diagram rather than as a list of values
- You may then be asked to compare one diagram with another that represent different characteristics
    - e.g. one diagram/table may be for 'dogs' data, the other for 'cats'
        - so dogs and cats data/results can be compared;
    - e.g. one diagram/table may be taken at one point in time, the other at a later date
        - this would allow comparisons that may reveal a change (improvement) over time
- When data is presented as a diagram, it may be an unfamiliar diagram that you have not seen elsewhere on the course
    - in such cases the diagram will be explained in the question or through a key
    - such diagrams tend to be straightforward and fairly easy to interpret and read

How do I compare statistical diagrams?

- By commenting on differences or similarities using some of the following
    - averages - **mean, median** and **mode**
    - spread - **range** and **interquartile range**
    - unusual data values (**anomalies** or **outliers**)
- You should aim to make at least **two pairs** of comments when asked to compare data
    - The **first pair** of comments should use an average - **mean** or **median,** rather than mode
        - a **comparison** of an **average** mentioning the numbers involved
          e.g. class A's median of 11 was higher than class B's median of 6
        - what that comparison means in the **context** of the question
          e.g. on average class A scored higher marks on the test than class B
    - The **second pair** of comments should use a measure of spread - **range** or **interquartile range**
        - a **comparison** of a **measure** of **spread** mentioning the numbers involved
          e.g. class A's interquartile range of 5 was higher than class B's interquartile range of 3
        - what that comparison means in the context of the question
          e.g. the test scores in class A showed more variation than the scores in class B
- The mode can be mentioned if appropriate - for example with non-numerical data
    - the mode is a relatively simple average so there are not always many marks available for using it
- Before doing any comparisons of data or diagrams you may have to calculate averages and spread
- You may also be asked to suggest assumptions, or problems with the data that could affect the reliability of results and comparisons
    - e.g. do we assume that the test class A and class B took were the same?
    - e.g. were class A and class B of similar ability/age?
    - It may be we cannot tell from the information given in the question
        - but they are considerations that would influence how valid comparisons are

Examiner Tip

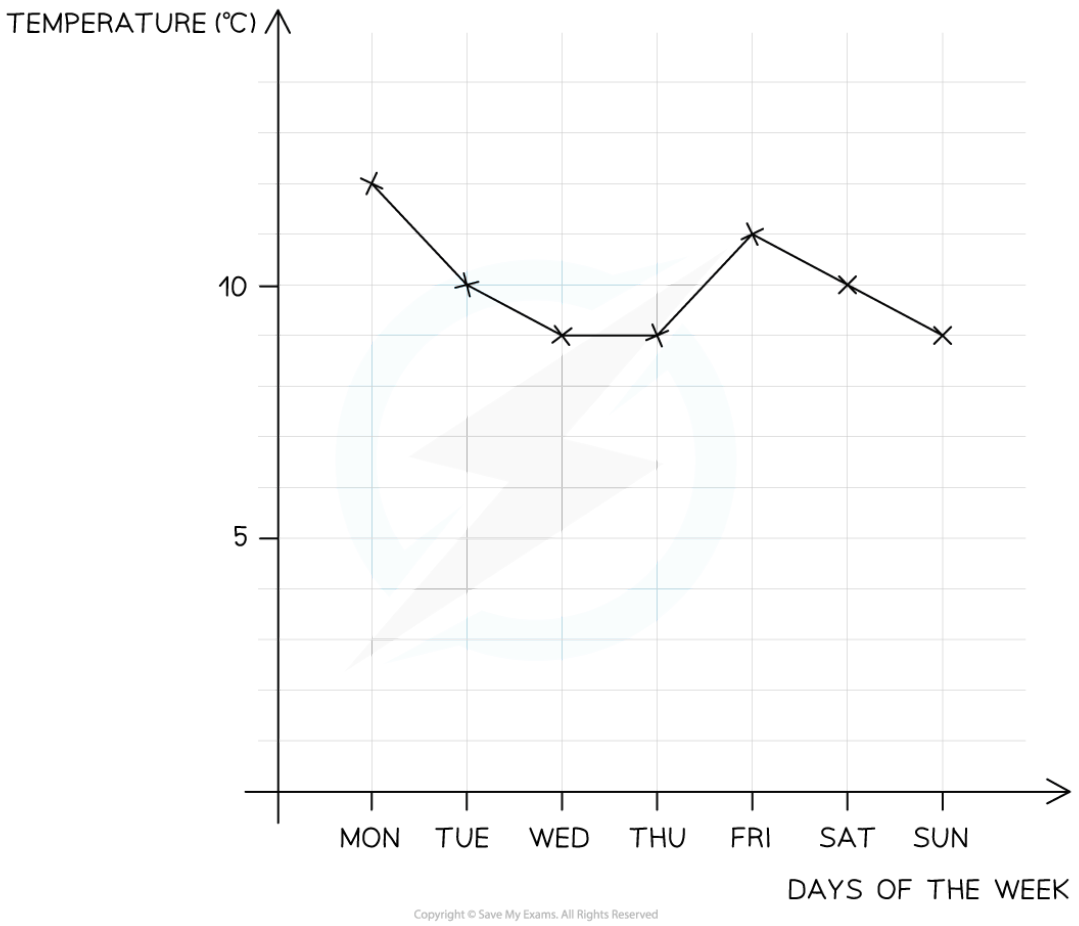
- When asked to compare data or diagrams consider how many marks are available
  - aim to write something different for each mark
    - 1 mark is often be for comparing the numbers involved
    - 1 mark is often for explaining what that then means in the context of the question

Your notes

Worked example

Your notes

The diagram below shows the temperatures, measured in °C, for each day of one week in the summer in the UK.



a) Find

i) the modal temperature,

ii) the mean temperature for the week,

iii) the range of temperatures for the week.

i) The modal (mode) temperature is the temperate that occurred during the week more than any other. Look for the temperature that occurred on the most number of days. Notice this is not the same as the highest temperature.

The modal temperature is 9 °C

ii) The mean needs calculating.

$$\text{Mean} = \frac{12+10+9+9+11+10+9}{7}$$

$$= \frac{70}{7} = 10$$

Mean temperature for the week is 10 °C

iii) The range also needs working out.

$$\text{Range} = \text{Hi} - \text{Lo}$$
$$= 12 - 9$$
$$= 3$$

Range of temperature for the week is 3 °C

b) For a different week in the UK, the following data is available.

Mean temperature (°C)	Range of temperatures (°C)
11	2.5

Compare the temperatures for the two different weeks.

Two pairs of comments - first pair comparing the means, second pair comparing the range.

The mean in the second week (11 °C) was 1 °C higher than the mean in the first week (10 °C)
On average, the temperature in the second week was higher than in the first week

The range in the first week (3 °C) was 0.5 °C higher the range in the second week (2.5 °C)
The temperatures were more spread out in the first week

c) State one assumption that should be made about the two weeks' temperatures so that comparisons are valid.

Consider the information - or lack of - given in the question. We are told when the first weeks' temperatures were collected but are not told anything in this respect for the second week.

The two weeks' temperatures were recorded at a similar time of year
e.g. both in the spring, or both in the same month

Your notes