

# SCATTER DIAGRAMS

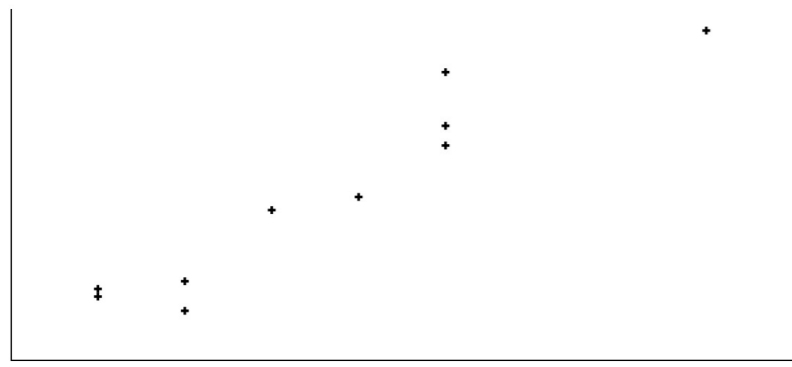
Scatter diagrams are used to see if a relationship exists between two sets of data or variables.

## Check first that you:

- understand coordinates and can plot points on a graph
- can understand and read scales on a graph
- know how to find the mean by dividing the total of the all values by the number of values.

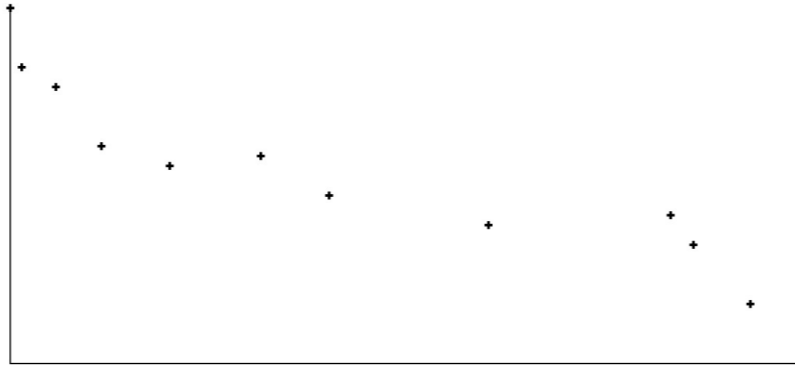
**Correlation** This describes the type of relationship between two sets of data.

### Positive Correlation



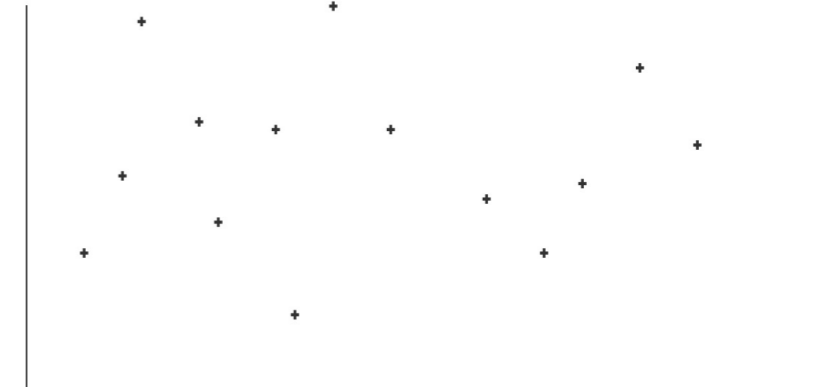
As values of one set of data increases values of the other set of data also increases. E.g. the time exercising and number of calories burned.

### Negative Correlation



As values of one set of data increases values of the other set of data decreases. E.g. the value of a car and its mileage.

### No Correlation



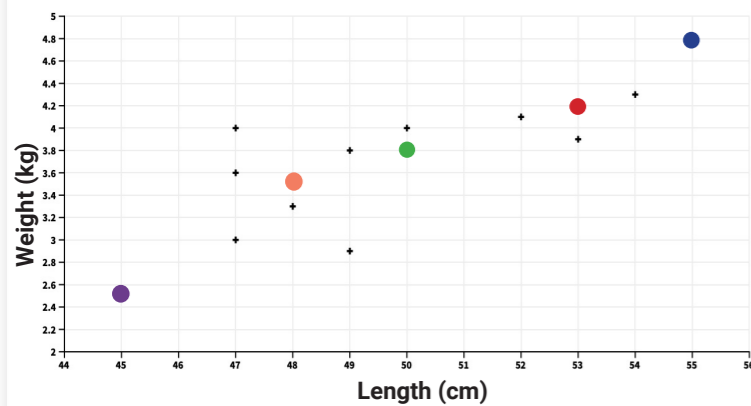
There is no relationship between values of the two sets of data. E.g. the height and salary of employees of a company.

Can you *give* your own examples? Can you *explain* why a scatter diagram does or doesn't show correlation?

**Drawing a scatter diagram** The table shows the length and corresponding weight of baby boys born at Cwmbran Hospital.

Length (cm)	45	55	49	48	53	49	48	50	53	47	47	50	47	52	54
Weight (kg)	2.5	4.8	3.8	3.5	4.2	2.9	3.3	4	3.9	4	3.6	3.8	3	4.1	4.3

a) Draw a scatter diagram to display this data.



**Take care** when reading the scale on each of the axes. They may not be the same!

We plot the length (horizontal axis) against the weight (vertical axis). Here are the first five points highlighted on the diagram.

Length (cm)	45	55	49	48	53
Weight (kg)	2.5	4.8	3.8	3.5	4.2

We don't connect the points on a scatter diagram.

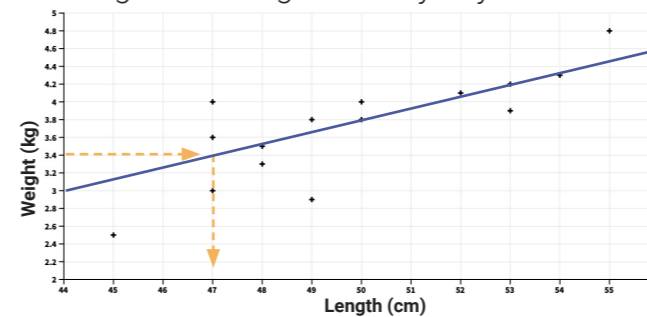
b) Describe the relationship between the weight and length of baby boys shown by the scatter diagram.

The diagram shows positive correlation between the length and weight of baby boys. As the length of the baby increases the weight also increases.

**Line of Best Fit** When there is positive or negative correlation we can draw a line of best fit by eye on the scatter diagram. This line allows us to estimate a value of one variable if we know a value of the other variable.

### Line of Best Fit by eye

c) Draw a line of best fit by eye for the scatter diagram for length and weight of baby boys.



Draw a straight line that follows the trend of the data. You should try and get as many as possible of the points on the line and an equal number of points above and below the line.

d) Use the line of best fit to estimate the length of a baby that weighs 3.4kg.

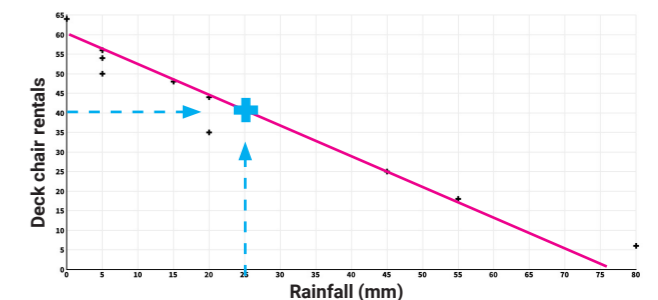
Draw a straight line from 3.4kg on the vertical axis (weight) to the line of best fit. Where they meet draw a line down to the horizontal axis to read off an estimate for the length.

47cm

### Line of Best Fit using the mean

The scatter diagram below shows recorded rainfall (to the nearest 5mm) at Barry Island and the number of deck chair rentals over a period of 10 days.

Draw a line of best fit knowing the mean rainfall was 25mm and the mean number of deck chair rentals was 40.



Plot the mean rainfall value, 25 mm on the horizontal axis against the mean number of deck chair rentals, 40 on the vertical axis. Draw a straight line that goes through this mean point that follows the trend of the data. You should also try and get as many as possible of the points on the line and equal number of points above and below the line.

**Take care** the line of best fit won't necessarily need to go through the point of intersection of the axes.

**Remember** if the mean isn't given, we need to find it by adding the values for one variable on the horizontal axis and dividing by the total number of values. Then we repeat for the other variable on the vertical axis.