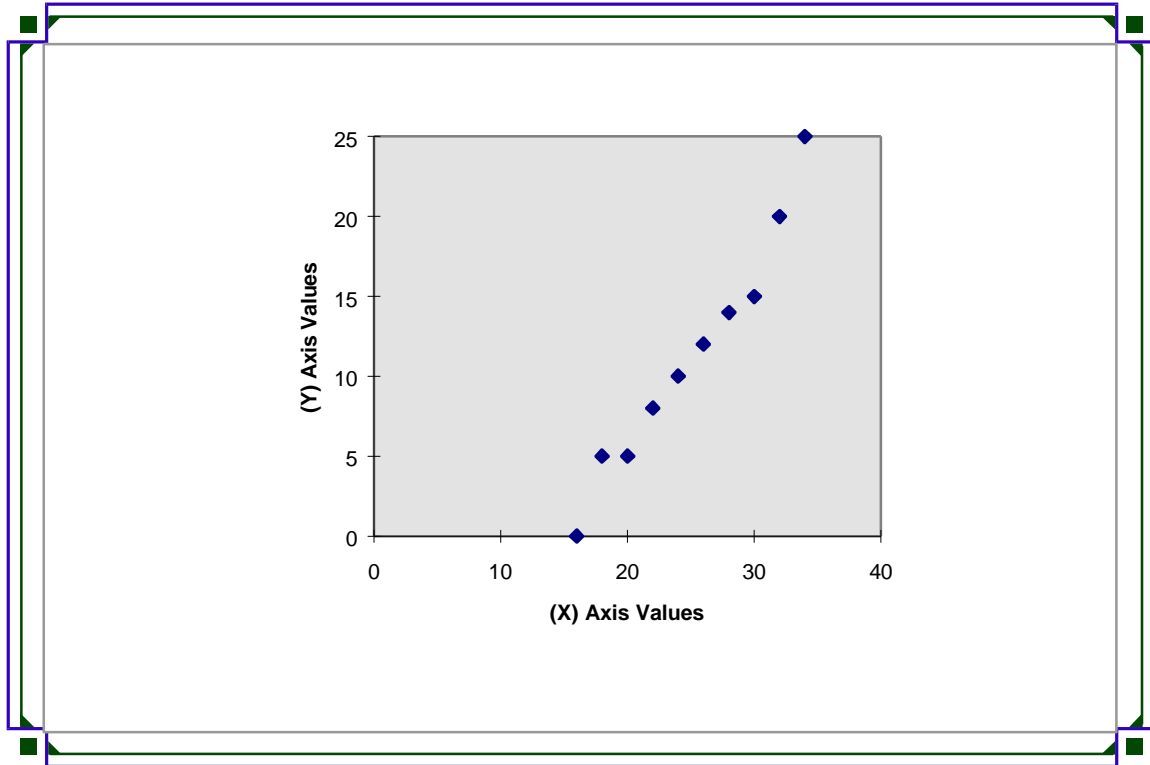
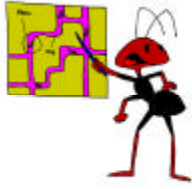


SCATTER DIAGRAM



Purpose

A **scatter diagram** is a graphic representation of the relationship between two variables. It is used to show if there is a relationship or correlation between those two variables. It can also be used to test cause and effect relationships between those two variables. It cannot be used to prove or disprove the relationship between the variables, but can validate the presence of a relationship and the strength of that relationship.



Process

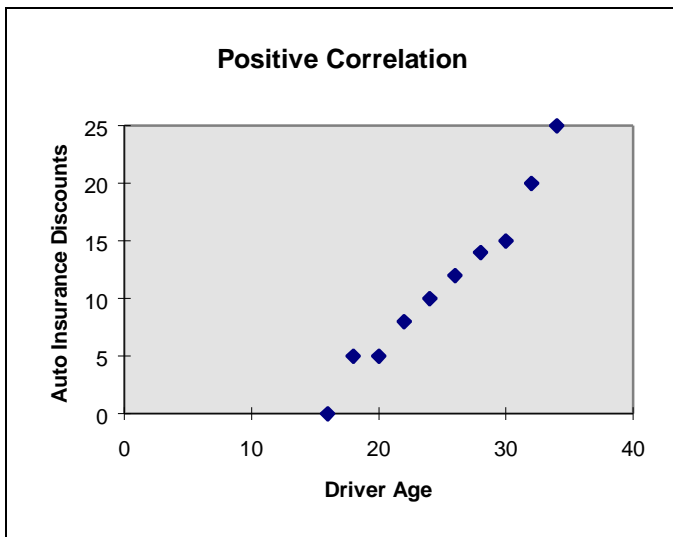
A **scatter diagram** is set up with the horizontal (X) axis representing the value of one variable and the vertical (Y) axis representing the other variable.

1. Determine which two variables are to be plotted on the diagram. These two variables are the ones to be tested for their relationship.
2. Obtain raw data for the variables in question. Each sample will contain one of each variable and will become the data points to be plotted. The larger the number of data points collected the more confidence in the **scatter diagram**.
3. Determine the high and low values of each group of variables. This will help determine the scale of both the horizontal (X) axis and the vertical (Y) axis.
4. Draw an (X) and (Y) axis of equal lengths and label them from left to right and bottom to top with values that will include all data points. Be sure to label both the (X) and (Y) axis.
5. Plot all data points on the diagram. Where data points are the same draw a circle around that data point each time it is repeated.
6. Identify and classify the pattern of correlation found. (See correlation examples next.)

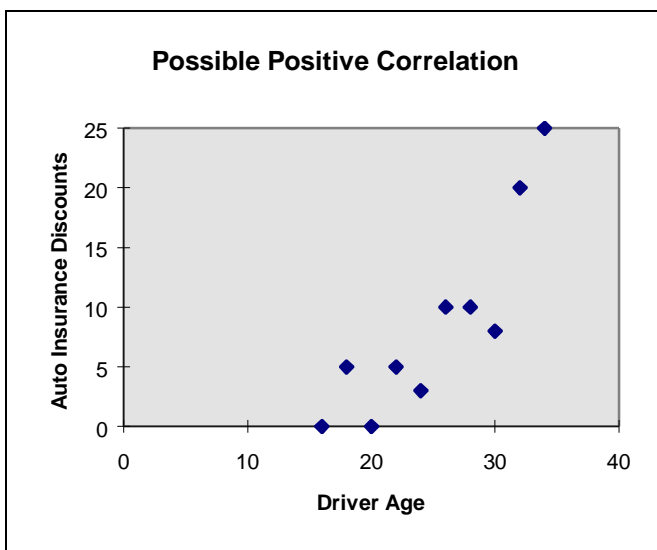


Examples

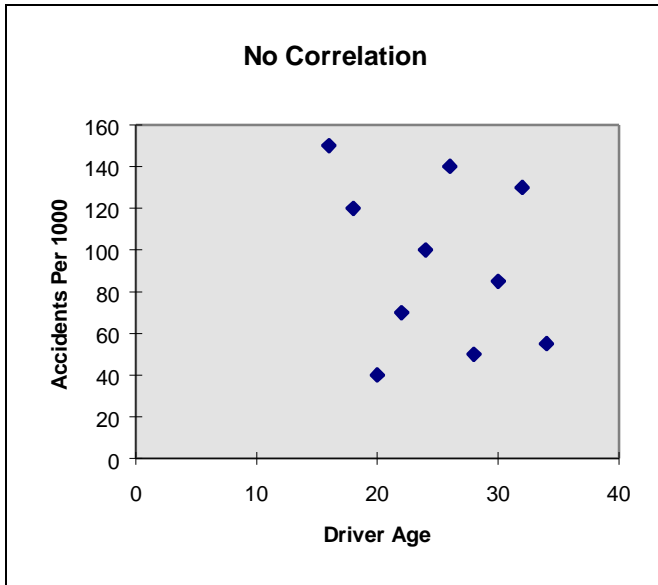
E1. *Positive Correlation*- As the (X) axis variable increases, so does the (Y) axis variable. A cause and effect relationship probably exists.



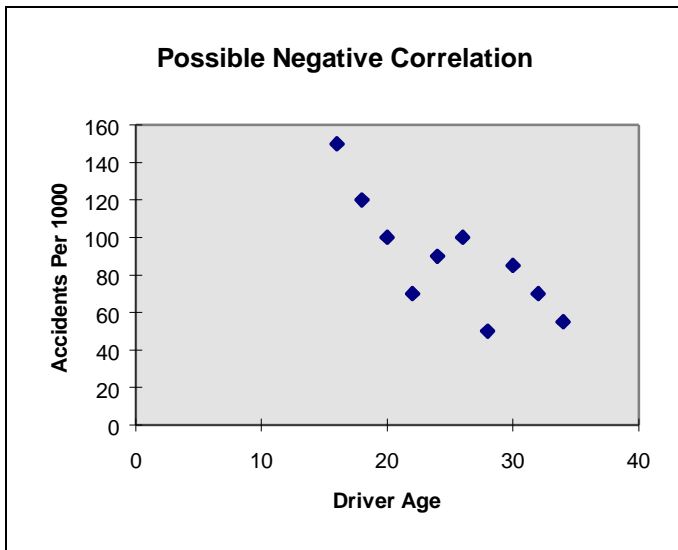
E2. *Possible Positive Correlation*- As the (X) axis variable increases, usually the (Y) axis variable also increases. A cause and effect relationship may exist.



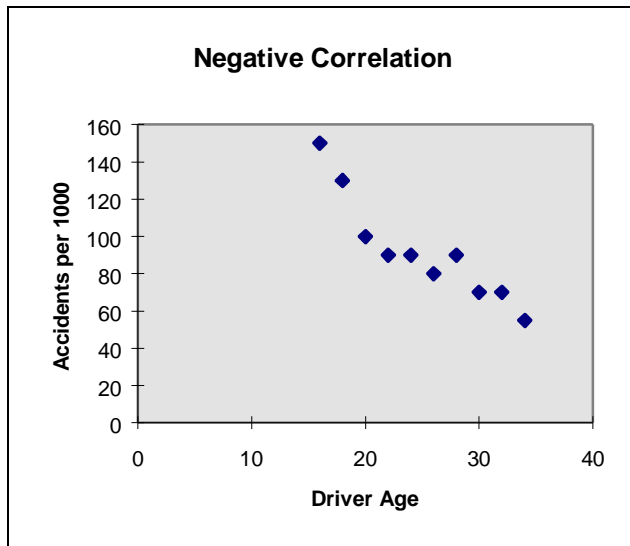
E3. *No Correlation*- There is no systematic change between the (X) axis variables and the (Y) axis variables. There is probably no cause and effect relationship.



E4. *Possible Negative Correlation*- As the (X) axis variable increases there is usually a decrease in the (Y) axis variable. A negative cause and effect relationship may exist.



E5. *Negative Correlation*- As the (X) axis increases there is a decrease in the (Y) axis variable. A negative cause and effect relationship probably exists.



Key Points

- The use of spreadsheet software will greatly simplify the use of these diagrams. Scaling is automatic and most software will systematically carry the user through development of the chart.
- A **scatter diagram** may tell you that the (X) and (Y) values may be related, but it cannot prove or disprove a cause and effect relationship.
- For a **scatter diagram** to be effective collection of at least 30 data pairs [one (X) value and one (Y) value] must be displayed on the diagram.
- Applied statistical techniques (Correlation and Regression Analysis) can be used to test the strength of relationships and develop predictive models. Seek assistance with these techniques if you feel the analysis will be helpful to your investigation.

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