

ANSWERS CHAPTER 1

THINK IT OVER



think it over

TIO 1.1: To a certain extent. You will soon come across discrete and random variables. Discrete variables are things like the number of students in your class, the number of items you buy, etc. In other words they are things that can be counted. Continuous variables are a bit more tricky to deal with. These variables are the result of taking measurements. Things like the time taken to answer the telephone, temperature, etc.

You can assign a scale where 0 could be interpreted to mean you hate something whereas 10 could mean you love something. A scale commonly used with questionnaires is the Likert scale where responses are scored along a range.

Yes it probably would. Make sure when you hand out questionnaires it is done at an appropriate time.

TIO 1.2: Experience is a big factor in decision making. When you get more experienced at statistical analysis, you will develop this sort of intuition.

TIO 1.3: Investment decisions tend to be made on what are known as trends. Trends rely upon historical data and cannot account for surprises! The normal distribution is the de-facto standard for much of statistical analysis. Unfortunately, many people who should know better, rely upon this curve to the exclusion of everything else; hence the banking crisis.

TIO 1.4: Data in statistics tends just to be numbers which are associated with a variable. Information tells you what the data means which is why units are very important; without them the numbers are meaningless. Ratios can only indicate the relationship between numbers.

TIO 1.5: Initially the data can just be numbers. In fact programmes like Excel and SPSS do not 'understand' units, only types of data. When the analysis is complete, the results have to be interpreted so informed decisions can be made.

TIO 1.6: Not necessarily in fact very unlikely.

TIO 1.7: It depends on what you are trying to find out. Longitudinal data is necessary if you are, say, investigating long-term effects of a certain drug on a specific group of patients. Cross-sectional data would be used if you are investigating how the same drug affects a group of patients at the same time.

TIO 1.8: One decision to be made is how accurate you would like your data when dealing with continuous variables. The quality of any measuring equipment is another factor.

TIO 1.9: You could, but you may get a different result than you expect. There is no such beast as the 'average person'; we're all different!

TIO 1.10: Exponentials enable very large or very small numbers to be written in 'short-hand'. They also make some mathematical calculations much simpler (laws of indices, etc.).

Using letters to represent numbers enables us to generalise calculations so that we don't have to recalculate a result every time we change one of the input values.

TIO 1.11: Quite simply, you will get the wrong answer.

TIO 1.12: They are not complicated. They are called complex because they are made up from two parts: a real part and an imaginary part (denoted by i or j). A rational number is just the real part of a complex number.

TIO 1.13: A model is designed to imitate the real thing. In statistics, models are used to gain an insight into how, say, people in general behave. They are also used for prediction purposes.

TIO 1.14: Once the value of one variable has been calculated, the other can be found by substituting this value back into the original equation. In this case if $x = -1.56$, y would equal 0.5. The graph of the equations would cross at these values.

TIO 1.15: This value would be known as the 'dependent' value since it depends on the value of x , which is known as the 'independent' value.

TIO 1.16: The dependent variable's value depends upon the value of the independent variable.

EXERCISES

1. There is no difference; they perform the same function. They appear different because in statistics it pays to give variables meaningful names.
2. Quantitative data is data that has been recorded as numbers. Qualitative data tends to be such things as opinions, feelings, etc.
3. The variable 'student or lecturer' is classed as nominal since they are distinct categories.
4. No. The results simply say that five students hated exams and three lecturers loved exams.
5. Imagine it to be a funny 'S' the initial letter of 'sum'.
6. A function states a rule which defines the relationship between the independent and dependent variables. For example, $f(x) = x^2$ states that the independent value (given by $f(x)$) is the result of multiplying x by itself.
7. It does not mean you are twice as clever. It means you did better in your class test. It could be classified as ordinal since a ranking is implied, i.e. 80 is much better than 40.