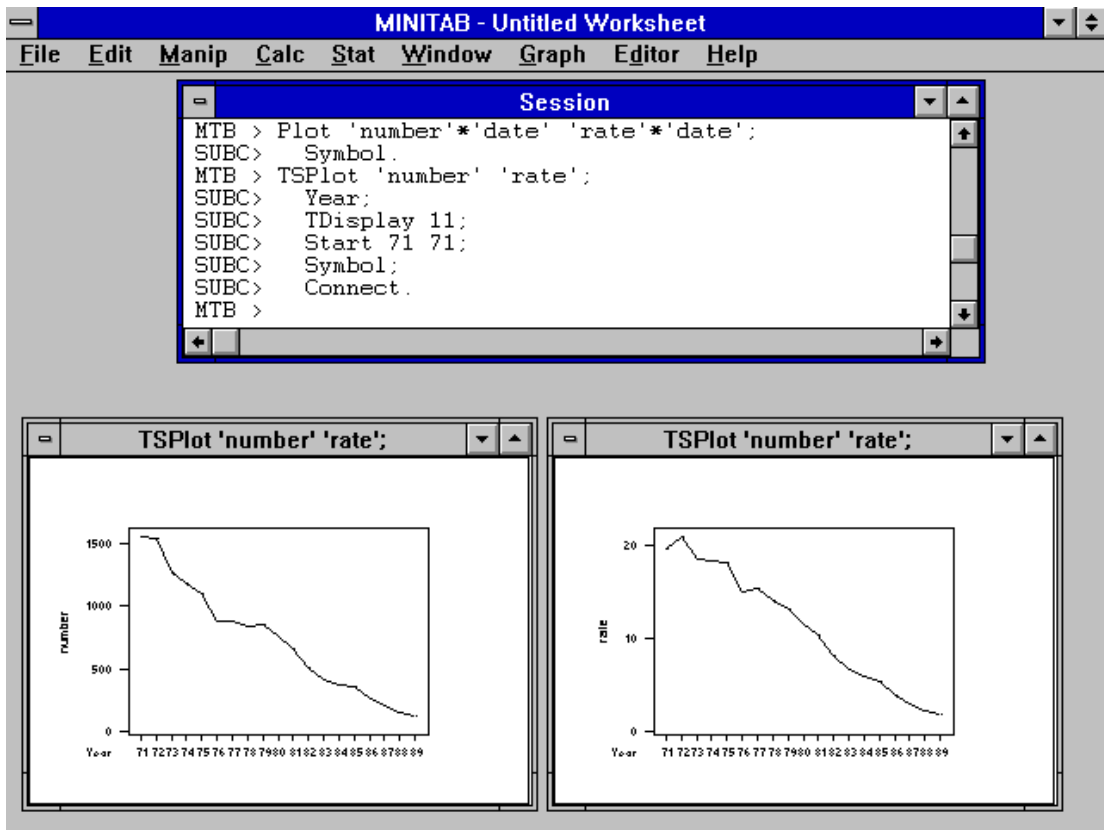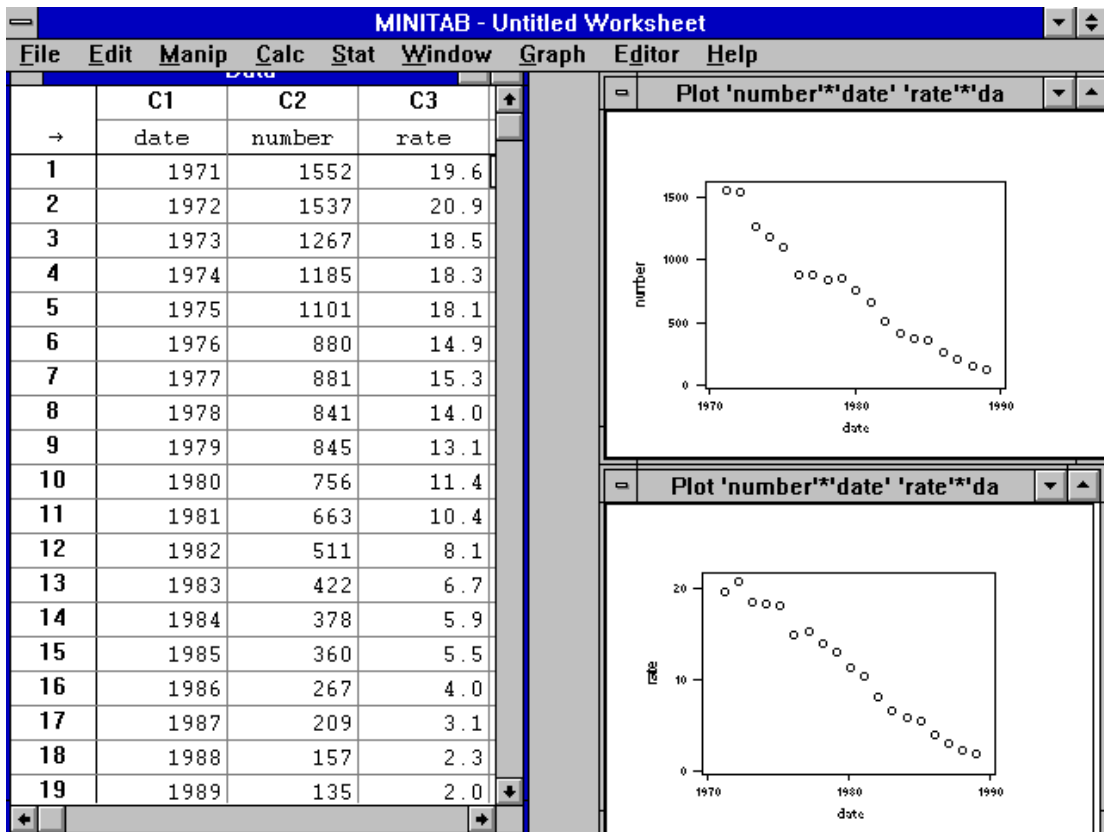# Premedical course
Solution to MINITAB practical 3

For all of these graphs there is a choice of whether to use **Plot** or **Time Series Plot** in the **Graph** menu. Both will be shown here. Although the latter makes it unnecessary to put the years in the **Data** window, it is just as easy to obtain satisfactory results with the former.

a. The first illustration shows how to generate the years using **Set Patterned Data** from the **Calc** menu preparatory to using **Plot**. Both graphs in the second illustration clearly show a decrease. Since, in principle, a decrease in total numbers could merely be a reflection of a decreasing number of pregnancies being at risk because of a falling birth rate, it is important to look at the rate in terms either of live births or total pregnancies. Since the number of cases of spina bifida is small it makes little difference in this instance which is used.

The interpretation of why the rate is decreasing so sharply needs some care. It is not necessarily because there are fewer foetal defects, but because earlier detection makes termination of pregnancy possible.

The third illustration shows similar graphs produced using **Time Series Plot**, and the commands necessary to produce them using each method.

File   Edit   Manip   Calc   Stat   Window   Graph   Editor   Help

Data

	C1	C2	C3
→	date	number	rate
1	1971	1552	19.6
2	1972	1537	20.9
3	1973	1267	18.5
4	1974	1185	18.3
5	1975	1101	18.1
6	1976	880	14.9
7	1977	881	15.3
8	1978	841	14.0
9	1979	845	13.1
10	1980	756	11.4
11	1981	663	10.4
12	1982	511	8.1
13	1983	422	6.7
14	1984	378	5.9
15	1985	360	5.5
16	1986	267	4.0
17	1987	209	3.1
18	1988	157	2.3
19	1989	135	2.0

Plot 'number'*'date' 'rate'*'da

Plot 'number'*'date' 'rate'*'da

File   Edit   Manip   Calc   Stat   Window   Graph   Editor   Help

Session

```
MTB > Plot 'number'*'date' 'rate'*'date';
SUBC>    Symbol.
MTB > TSPlot 'number' 'rate';
SUBC>    Year;
SUBC>    TDisplay 11;
SUBC>    Start 71 71;
SUBC>    Symbol;
SUBC>    Connect.
MTB >
```

TSPlot 'number' 'rate';

TSPlot 'number' 'rate';

b. It is best if the two sets of data are superimposed on a single graph. This can be done using the **Mu_ltiple Graphs** option under **Frame**. The footnote then becomes essential, and a title is always helpful. Below the graph are shown the commands required if the menu system is not used.
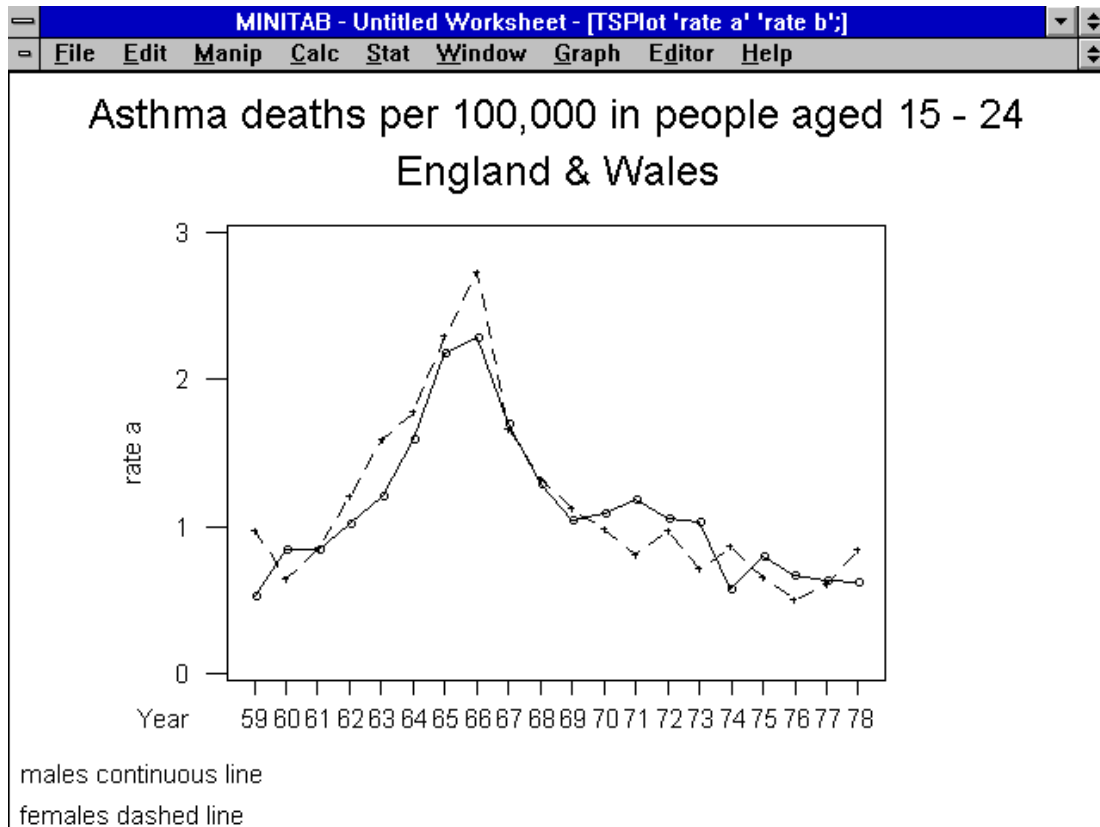

```
MTB > TSPlot 'rate a' 'rate b';
SUBC>   Year;
SUBC>   TDisplay 11;
SUBC>   Start 59 59;
SUBC>   Symbol;
SUBC>   Connect;
SUBC>   Title "Asthma deaths per 100,000 in people aged 15 - 24";
SUBC>   Title "England & Wales";
SUBC>   Footnote "males continuous line";
SUBC>   Footnote "females dashed line";
SUBC>   Overlay;
SUBC>   Minimum 2 0;
SUBC>   Maximum 2 3;
SUBC>   Axis 11;
SUBC>   Axis 2.
```

The reason for this pattern is not clear. There could have been changes in environmental factors, in diagnostic ability or fashions, and in what appeared on death certificates as the underlying cause of death. Some clues could possibly be found by looking at similar series for people of different ages. Regional differences could also shed some light. There may be a connection with dust-mite populations.

c. Having drawn the other two graphs, this one should now be easy. Its interpretation involves noticing two aspects, namely the overall decline in reported cases and the oscillating pattern with maxima roughly every second or third year. One has to be careful not to see patterns where they do not exist, and the oscillations are now much less marked than they used to be. Measles vaccine has reduced the infection rate and has also damped out the cyclic pattern whereby there was an epidemic every second year.