Premedical course
MINITAB practical 8

1. The vinca alkaloid vincristine arrests proliferating cells in metaphase (one of the 4 stages of mitosis, or cell division). Consequently, one way of estimating the cell birth rate in a tissue is to administer vincristine and count the number of metaphases as a proportion (x) of all cells at different times (t) after administration. Under plausible assumptions, the slope of the regression line of x against t estimates the cell birth rate, which is usually given in cells per 1000 cells per hour. Plot the following data and estimate the cell birth rate for it, giving 95% confidence limits for your estimate.

Time (minutes)	30	45	60	75	90	105	120	135	150
Metaphase index (%)	7.5	9.3	10.7	14.1	20.3	20.7	21.5	25.0	27.4

The assumptions on which this estimate is based are not necessarily correct, however. Possibly better ones lead to the birth rate being estimated from the slope of the line relating $\log_2(1+x)$ to t. Replot the data and recalculate the birth rate and its 95% confidence limits under these assumptions. Discuss your results.