Further exercises

A. Differentiation

1.  2.  3. 

4.  5.  6. 

B. Integration

1.  2.  3. 

4.  5. 

C. The logarithmic function

1. The geometric mean is defined as follows: 

Suppose we have data, *y*1, y2, ..., *y*n*,* and we know that *yi* = ln(*xi*).

Show that: ; in other words, that the arithmetic mean of the log transformed data is the log of the geometric mean of the raw data.

2. Suppose we know that *y* = *α + β x*. Then it follows that *y|x+1*  - *y|x*  = *β*, where this terminology can be read as saying that the value of *y* at *x*+1 minus the value of *y* at x equals *β*: in other words, *β* is the change in y for a unit change in *x*.

What can we say about *β* when log *y* = *α + β x*?