Business Mathematics (BK/IBA) – Quantitative Research Methods I (EBE)
Tutorial 2 – Answers

Functions and equations

A1 $(-\infty, -1) \cup (1, \infty)$

A2 $1\frac{1}{2}$

A3 $x = 0 \vee x = 2$

A5 (a) $A_2 = \left(1 + \frac{1}{n}\right)^n A_1$ (b) 2.61 (c) 2.71

A6 $x = 2$

A7 $x = 0 \vee x = -2$

A8 $-\frac{\ln 2}{\ln 12}$

A9 $\frac{1}{27}$

A10 $\frac{x^2}{y^2}$

A11 $x = \ln 3 - 2$

A12 $p = 0 \vee p = 23$

A13 $z = -1$

A14 $\alpha \in (-5, -3)$

A15 $a = 1 \wedge b = 1$

A16 $x = 0 \vee x = 7 \vee x = -3$

A17 $x = 0$

A18 There is no solution x.

A19 There is no solution x.

A20 $b = -\frac{1}{2}$

A21 $n = 9$

Extreme values

A4 $f(x)$ has a minimum at $x = \frac{1}{2}\ln 2$ and no maximum.
The minimum is $f\left(\frac{1}{2}\ln 2\right) = -4\sqrt{2}$

A5 $p'(x) = +\mathrm{c}ke^{-cx} > 0$
$p''(x) = -\mathrm{c}^2 ke^{-cx}$
there exists no maximum!
See figure A8.3.4 in the book, p.684

A6 there is global minimum at $x = -3$ and no maximum

Vectors

A1 $\begin{pmatrix}-1\\-5\end{pmatrix}$ and $\begin{pmatrix}13\\10\end{pmatrix}$

A2 $x = 3 \wedge y = -3 \wedge z = -4$

A3 $\mathbf{x} = 3\mathbf{a} + 4\mathbf{b}$

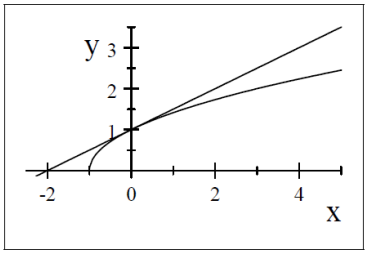
A4 5 and 7

A5 $x = 0 \vee x = -4$

A6 $\begin{pmatrix}0\\1\end{pmatrix}, \begin{pmatrix}2\\0\end{pmatrix}$, 3, 2, -1

Elasticities and approximations

A1



A2 -3

A3 $-\frac{3}{2}$

A4 $\mathrm{El}_x\big(Af(x)\big) = \frac{x}{Af(x)}\frac{d\big(Af(x)\big)}{dx} = \frac{x}{Af(x)}\frac{Adf(x)}{dx} = \frac{x}{f(x)}\frac{df(x)}{dx} = \mathrm{El}_x f(x)$