

**Business Mathematics (BK/IBA) – Quantitative Research Methods I (EBE)**  
**Digital test 2 (07/10/2015 08:45-10:15)**

**Question 1**

- a) Open the file “answersheet\_digitaltest\_2.docx” on the desktop. **Do not change the location** of the file, and **do not rename** the file.
- b) Type your name, student number, programme (IBA), etc. at the appropriate places. **(1 point)**
- c) Leave the document open for inserting the answers to questions 2 and 3 in the indicated places. We recommend you to save your document regularly while doing the next questions.

**Question 2**

- a) Type a formula that expresses the following fact. Ice cream sales in countries with a temperature above 10 degrees depend linearly on temperature, while no ice creams are sold in colder countries. Define symbols wherever you needed. **(1 point)**
- b) Type a formula that corresponds to the following Excel syntax. **(1 point)**  
“=SUM(C1:C23)\*1/(1-SQRT(A1^2-B1^2))”

**Question 3**

- a) Use Excel’s matrix functions to solve the following system of linear equations:

$$\begin{cases} 2y - 3z = x \\ w = -4x - 5z \\ 0 = 3x - 4w + 2z \\ 4x - 2 = 2y + 5 \end{cases}$$

Make a screenshot<sup>1</sup> of the result. Take care to make the screenshot in such a way that all information (matrices/vectors, intermediate matrice/vectors) is visible, but no more. Paste it in the Word file. **(2 points)**

- b) Define a matrix  $\mathbf{A} = \begin{pmatrix} -20.3 & 12.5 & 5.6 \\ 65.2 & -14.6 & 4.3 \end{pmatrix}$  and a vector  $\mathbf{b} = \begin{pmatrix} 2.3 \\ -27.5 \\ 43.7 \end{pmatrix}$ . Use Excel’s matrix functions to calculate  $\mathbf{A}'\mathbf{A}\mathbf{b} - \mathbf{b}$ . Make a screenshot<sup>1</sup> of the result. Take care to make the screenshot in such a way that all information (matrices/vectors, intermediate matrice/vectors) is visible, but no more. Paste it in the Word file. **(2 points)**
- c) Use Excel’s Solver to solve the following problem:  
$$\begin{cases} \text{maximize} & g(p, q) = 4p^2 - 12pq + 8q^3 + 15 \\ \text{subject to} & 2p + 3q = 34 \\ \text{and} & p \leq q \leq 25 \end{cases}$$
Make a screenshot<sup>1</sup> of the Solver’s settings. Paste it in the Word file. **(2 points)**
- d) We want to fill a rectangular array with function values. The function depends on  $x \in [3,15]$  and on  $y \in [-4,0]$ , and is given by:

<sup>1</sup> Use [alt][PrintScreen] to send a screenshot of the active window to the clipboard.

$$f(x, y) = e^x + 2y$$

See the grid below. We will type the formula for  $f$  in cell B2 and then copy it to the rest of the cells in the grid. What formula do we type in cell B2? Give your answer in the Word file. (1 point)

	A	B	C	D	E	F	G
1		3	3.1	3.2	3.3	3.4	3.
2	-4						
3	-3.9						
4	-3.8						
5	-3.7						
6	-3.6						
7	-3.5						
8	-3.4						
9	-3.3						
10	-3.2						

**Ready?**

**Save** your Word file, and **check location** (desktop) **and name** (answersheet\_digitaltest\_2.docx). Then **do not log off** and **do not turn off the computer**. Make sure you have signed the attendance list.