MATH 1300 – D01 – Assignment 2

Due Monday 2009-10-16 at 23:59

Student number: ______________________________
Surname: ______________________________
First name: ______________________________

Answer the following questions **on separate sheets** and scan the result to produce a single PDF file. Please show your work. Unclear or not fully justified answers **will not** get full marks.

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1. Let

$$A = \begin{pmatrix} 2 & 3 \\ 0 & -2 \end{pmatrix}.$$

1.a. Compute $P(\lambda) = \det(A - \lambda\mathbb{I})$, where $\mathbb{I}$ is the appropriate identity matrix. [5]

1.b. Compute $P(A)$, where P is the polynomial obtained in **1.a.** in which constant terms have been replaced by "constant times identity" (e.g., if $P(\lambda) = a\lambda^2 + b\lambda + c$, then $P(A) = aA^2 + bA + c\mathbb{I}$). [5]

2. Assuming the matrices have sizes such that all operations are valid, simplify [5]

$$(AC^{-1})^{-1}(AC^{-1})(AC^{-1})^{-1}AD^{-1}.$$

3. Prove that if A is an invertible matrix and B is row equivalent to A, then B is also invertible. [5]

4. Let A be a 3×3 matrix with entries equal to 0 or 1. Find the range of $\det(A)$, i.e, the largest a and smallest b such that $\det(A) \in [a, b]$ for all matrices A of the prescribed form. [5]