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ECON3120/4120 Mathematics 2, spring 2009

Problems for Seminar 8, 23–27 March

1 EMEA, 16.4.6(b) = LA, 5.4.4(b).

2 EMEA, 16.4.10 = LA, 5.4.8.

3 Exam problem 5

4 Exam problem 95

5 Exam problem 121

6 Given the matrix

$$\mathbf{A}_t = \begin{pmatrix} 1 & t & 0 \\ -2 & -2 & -1 \\ 0 & 1 & t \end{pmatrix}$$

(a) Calculate $|\mathbf{A}_t|$ and show that $(\mathbf{A}_t)^{-1}$ exists for all t.

(b) Show that for a certain value of t we have $(\mathbf{A}_t)^3 = \mathbf{I}_3$, where $\mathbf{I}_3$ is the identity matrix of order 3.

(c) Find the inverse of $\mathbf{A}_1$.

(d) Suppose that $\mathbf{A}$ and $\mathbf{B}$ are invertible $n \times n$ matrices. Show that if $\mathbf{A}'\mathbf{A} = \mathbf{I}_n$, then $(\mathbf{A}'\mathbf{B}\mathbf{A})^{-1} = \mathbf{A}'\mathbf{B}^{-1}\mathbf{A}$.