

ECON3120/4120 – Mathematics 2, spring term 08: **Problems for seminar 7, Apr. 3, 7, 9**

1 (From exam problem 28/5-03.)

(a) For which values of a does the matrix $\mathbf{A}_a = \begin{pmatrix} 1 & 2 & 3 \\ 0 & a-1 & 1 \\ 1 & 2 & a+1 \end{pmatrix}$ have an inverse? Find the inverse if $a = 3$

(b) Let $\mathbf{B} = \begin{pmatrix} 2 & 0 & -1 \\ 0 & 1 & 1 \\ 0 & 2 & 0 \end{pmatrix}$. Find all matrices \mathbf{X} such that $\mathbf{B}\mathbf{X} = \mathbf{B}^2 + 2\mathbf{B}$.

2 The following system defines u and v as C^1 functions of x and y around the point $P = (x, y, u, v) = (1, 2, 1, 1)$:

$$\begin{aligned} u^2 + v^2 &= xy \\ xu^2 + yv^2 &= x + y \end{aligned}$$

Differentiate the system. Then find the values of $\partial u/\partial x$, $\partial u/\partial y$, $\partial v/\partial x$ and $\partial v/\partial y$ at the point P .

3 Exam problem 92.

4 Exam problem 98.