Tutorial ...

Name:_____

ID:_____

Mathematics 1E2 2006–07

HW 9 Due 15/1/07

This homework is due IN CLASS on MONDAY. *Pay close attention to the regulations about homeworks and attendance, which will be in force for the next two terms.*

(1) (18 marks). Let e_1, e_2, e_3 be the following EROs on matrices of height 3:
e_1: scale row 3 by 3; e_2: swap rows 1 and 3; e_3: Subtract 2×row 3 from row 2.
Give the elementary matrices E_1, E_2, E_3, for these operations, and their inverses.

(2) (10 marks) Calculate $P = E_3E_2E_1$. Hint: direct multiplication is not the easiest way.

(3) (10 marks) Calculate $E_1^{-1}E_2^{-1}E_3^{-1}$. Again, there are easier ways of doing it.

(4) (12 marks) Let $A = [a_{ij}]_{\ell\times m}$, $B = [b_{jk}]_{m\times n}$, $AB = [c_{ik}]$. Note that B^TA^T is well-defined. Let $A^T = [e_{ji}]$, $B^T = [d_{kj}]$, and $B^TA^T = [f_{ki}]$. With this notation, show that $B^TA^T = (AB)^T$.