KFUPM **Semester 121**

Dept. Math. &Stat. **A.Y:2012/2013**

Quiz N°2 Math 302

(October 03, 2012)

Name: .....

ID: .....

Exercise 1

Solve the following general system by inverting the coefficient matrix

$$\begin{aligned} x_1 + 3x_2 + x_3 &= 4 \\ 2x_1 + 2x_2 + x_3 &= -1 \\ 2x_1 + 3x_2 + x_3 &= 3 \end{aligned}$$

Exercise 2

Are there values of r and s for which

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & r-2 & 2 \\ 0 & s-1 & r+2 \\ 0 & 0 & 3 \end{bmatrix}$$

has rank 1 or 2? If so, find those values.

Exercise 3

Let

$$A = \begin{bmatrix} 5 & 2 & -2 \\ 2 & 5 & -2 \\ -2 & -2 & 5 \end{bmatrix}.$$

(a) Verify that $\det(\lambda I_3 - A)$, the characteristic polynomial of A, is given by

$$(\lambda - 3)^2(\lambda - 9).$$

(b) Find a non–singular matrix P such that $P^{-1}AP = \operatorname{diag}(3, 3, 9)$.