

ECONOMICS 207
SPRING 2007
PROBLEM SET 10

Problem 1. For each of the following systems of equations, find the solution vector $\begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$ or $\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$ by appending the right-hand side vector to the coefficient matrix and performing row reduction.

a.

$$\begin{pmatrix} -1 & 1 \\ 2 & -3 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} -2 \\ 2 \end{pmatrix}$$

b.

$$\begin{pmatrix} 2 & -1 & 4 \\ 1 & 0 & 2 \\ 4 & -1 & 7 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 11 \\ 5 \\ 19 \end{pmatrix}$$

Problem 2. Consider the following matrices.

$$A = \begin{bmatrix} -1 & 1 \\ 2 & -3 \end{bmatrix}, \quad B = \begin{bmatrix} -1 & 1 \\ 2 & -3 \end{bmatrix}, \quad C = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$$

$$D = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 5 & 2 \\ -3 & -4 & -2 \end{bmatrix}, \quad E = \begin{bmatrix} 1 & -3 & 2 \\ -2 & 5 & -2 \\ 4 & -11 & 7 \end{bmatrix}, \quad F = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 5 \\ 3 & 5 & 7 \end{bmatrix}$$

a.

i Find the determinant of A.

ii Find the inverse of A using the adjoint method.

iii Find the inverse of A using row reduction.

b.

i Find the determinant of C.

ii Find the inverse of C using the adjoint method.

iii Find the inverse of C using row reduction.

c.

i Find the determinant of D .

ii Find the inverse of D using the adjoint method.

iii Find the inverse of D using row reduction.

d.

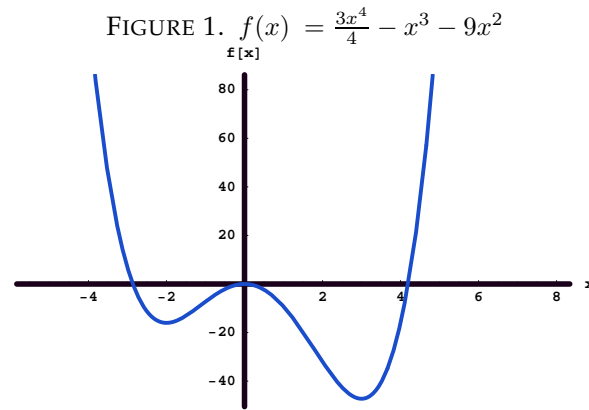
i Find the determinant of F.

ii Find the inverse of F using the adjoint method.

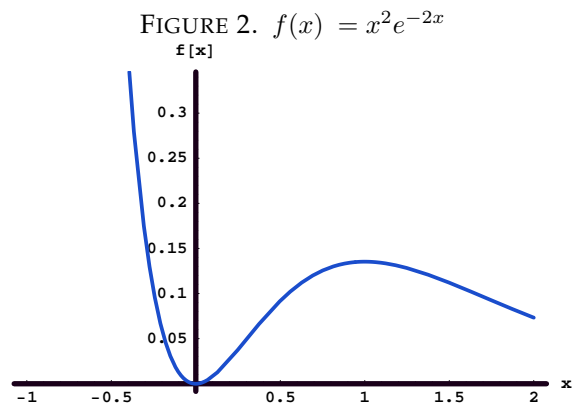
iii Find the inverse of F using row reduction.

Problem 3. For each of the following problems, find the critical points. For each critical point state whether the function is at a relative maximum, relative minimum, or otherwise. Check to see if there are points of inflection **at points other than** critical points.

a. $f(x) = \frac{3x^4}{4} - x^3 - 9x^2$



b. $f(x) = x^2 e^{-2x}$



c. $f(x) = \frac{3}{4}x^4 - 5x^3 - 3x^2 + 72x,$

