ECONOMICS 207
EXAM 4
SPRING 2007

Problem 1 (30 Points)**.** Consider the following matrix and vector.

$$P = \begin{bmatrix} 2 & 6 \\ 3 & 10 \end{bmatrix}, \quad p = \begin{bmatrix} 2 \\ 4 \end{bmatrix},$$

a. Use elementary row operations to find the inverse of P and solve the equation Px=p in one set of operations.

Date: 27 March 2007.

b. Find the determinant of the matrix P.

$$P = \begin{bmatrix} 2 & 6 \\ 3 & 10 \end{bmatrix}, \quad p = \begin{bmatrix} 2 \\ 4 \end{bmatrix},$$

c. Find the inverse of the matrix P using the cofactor/adjoint method.

d. Solve the equation Px=p using the inverse you found in part 1c

e. Solve the equation Px=p using Cramer's rule.

$$P = \begin{bmatrix} 2 & 6 \\ 3 & 10 \end{bmatrix}, \quad p = \begin{bmatrix} 2 \\ 4 \end{bmatrix},$$

Problem 2 (45 Points)**.** Consider the following matrix and vector.

$$D = \begin{bmatrix} 1 & 3 & 0 \\ 3 & 8 & -1 \\ -4 & -7 & 6 \end{bmatrix}, \quad d = \begin{bmatrix} 5 \\ 13 \\ -9 \end{bmatrix}$$

a. Use elementary row operations to find the inverse of D and solve the equation Dx=d in one set of operations.

b. Find the determinant of the matrix D.

$$D = \begin{bmatrix} 1 & 3 & 0 \\ 3 & 8 & -1 \\ -4 & -7 & 6 \end{bmatrix}, \quad d = \begin{bmatrix} 5 \\ 13 \\ -9 \end{bmatrix}$$

c. Find the inverse of the matrix D using the cofactor/adjoint method.

$$D = \begin{bmatrix} 1 & 3 & 0 \\ 3 & 8 & -1 \\ -4 & -7 & 6 \end{bmatrix}, \quad d = \begin{bmatrix} 5 \\ 13 \\ -9 \end{bmatrix}$$

$$cof(D) = \begin{bmatrix} & -14 & \\ & 6 & -5 \\ -3 & & \end{bmatrix}$$

d. Solve the equation Dx=d using the inverse you found in part 2c

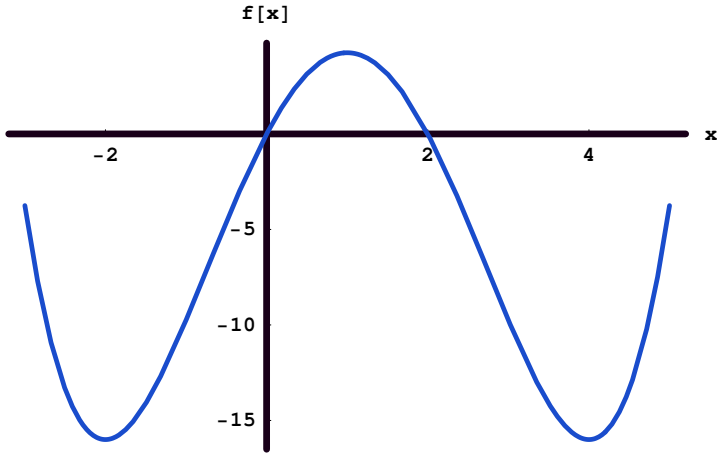
$$D = \begin{bmatrix} 1 & 3 & 0 \\ 3 & 8 & -1 \\ -4 & -7 & 6 \end{bmatrix}, \quad d = \begin{bmatrix} 5 \\ 13 \\ -9 \end{bmatrix}$$

e. Solve the equation Dx=d using Cramer's rule.

Problem 3 (25 Points)**.** For the following problem, 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 potential points of inflection **at points other than** critical points. **There is extra workspace on the next page if you need it.**

$$f(x) = \frac{1}{4}x^4 - x^3 - 3x^2 + 8x$$

FIGURE 1. $f(x) = \frac{1}{4}x^4 - x^3 - 3x^2 + 8x$



WORKSPACE