MAS 4106 Linear Algebra 2   **Quiz 6**   12 Apr 2006   <u>Name:</u>
Show **ALL** work for credit; Give exact answers when possible.

1. True or False.

    (a) Every convex set is affine.

    (b) Every hexagon in the plane is convex.

    (c) Every compact convex set in $\mathbb{R}^n$ is a polytope.

    (d) Each corner of the convex filled regular polygon P is an extreme point of P

    (e) There are closed unbounded convex sets with exactly one extreme point.

    (f) The hyperplane $\left[\begin{bmatrix} 1 & 1 & 1 & 0 \end{bmatrix} : 3\right]$ intersects the hypercube C^4 (which is the convex hull of the 16 point set $\{(\pm 1, \pm 1, \pm 1 \pm 1)\}$) in a 2-dimensional face.

    (g) The number of edges of the 4-dimensional Simplex S^4 is 6.

    (h) A pure strategy is a mixed strategy with 0's in all but one component.

    (i) In the matrix game A (below), row 3 dominates row 1

    $$A = \begin{bmatrix} 1 & 2 & -3 & 4 \\ 2 & 2 & 3 & 2 \\ 2 & 2 & -2 & 5 \\ 2 & 2 & -3 & 2 \end{bmatrix}$$

    (j) The entry $a_{4,2}$ is a saddle point of the matrix game A (above).

2. Find the optimal strategy $\hat{x}$ for the row player R and the value v_R in this $2 \times n$ matrix game

$$B = \begin{bmatrix} 5 & 2 & 3 \\ 3 & 5 & 4 \end{bmatrix}$$