

#5 using graphical method

$$* 1 - x_1^2 - x_2^2 \geq 0$$

$$x_1^2 + x_2^2 \leq 1$$

$$* \sqrt{2} x_1 - x_2 \geq 0$$

$$x_1 + x_2 \leq 0$$

$$* x_2 \geq 0$$

$$x_a = \begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix} \text{ inside feasible region}$$

$$x_b = \begin{bmatrix} 1 \\ 0 \end{bmatrix} \text{ on the boundary of 2nd and 3rd constraint}$$

$$x_c = \begin{bmatrix} -1 \\ 0 \end{bmatrix} \text{ on the boundary of 2nd and 3rd constraint}$$

$$x_d = \begin{bmatrix} -1/2 \\ 0 \end{bmatrix} \text{ on the boundary of 3rd constraint}$$

$$x_e = \begin{bmatrix} 1/\sqrt{2} \\ 1/\sqrt{2} \end{bmatrix} \approx \begin{bmatrix} 0.7 \\ 0.7 \end{bmatrix} \text{ inside feasible region}$$

