## **Quadratic Forms**

If Q(x) is a function, then,

$$Q(ec{x}) = ec{x}^T A ec{x}$$

A is <u>symmetric</u>

## **Examples**

## $\mathbf{Find}\ Q$

$$Q(ec{x}) = ec{x}^T A ec{x}$$
 ,  $A = egin{bmatrix} 4 & 1 \ 1 & -3 \end{bmatrix}$ 

$$egin{bmatrix} [x & y] egin{bmatrix} 4 & 1 \ 1 & -3 \end{bmatrix} egin{bmatrix} x \ y \end{bmatrix} = 4x^2 + 2xy - 3y^2 \ \end{bmatrix}$$