Bajo la transformación $y_i = Ax_i + b \quad i = 1, \dots, n$ mostrar que

i) $\bar{y} = A\bar{x} + b$

$$\sum_{i=1}^{n} y_i = \sum_{i=1}^{n} (Ax_i + b) = A\sum x_i + nb$$

$$\rightarrow \frac{1}{n}\sum_{i=1}^{n} y_i = \frac{1}{n} A\sum x_i + \frac{1}{n} nb = A\sum \frac{x_i}{n} + b$$

$$\therefore \bar{Y} = A\bar{X} + b \quad \blacksquare$$

ii) $S_y = AS_xA'$

$$S_y = var(Y) = var(AX + b)$$

donde $Y = Y_i$ con $i = 1, 2, \dots, n$

$X = X_i$

Y, X los vectores de y y x

$$= var(AX)$$

$$= A var(X) A'$$

$$= AS_xA'$$

$$\therefore S_y = AS_xA' \quad \blacksquare$$