

$$\begin{aligned}
 b. \text{ left-right} &= \lambda^2 x^T A x + (1-\lambda)^2 y^T A y + 2\lambda(1-\lambda)x^T A y \\
 &\quad - (\lambda x^T A x + (1-\lambda)y^T A y) \\
 &= \lambda(1-\lambda) (x-y)^T A (x-y)
 \end{aligned}$$

since, $A \geq 0$, so, $(x-y)^T A (x-y) \geq 0$

When $A \geq 0$, $f(x) = x^T A x$ is convex for $x \in \mathbb{R}^n$.