[Q5] Name:

Let $f : \alpha$-exp-concave on X. Choose $\mu \leq \frac{\alpha}{2}$ such that $|\mu \cdot \langle g, y - x \rangle| \leq \frac{1}{2}, \forall x, y \in X, \forall g \in \partial f(x)$.
Then,
$$f(y) \geq f(x) + \langle g, y - x \rangle + \frac{1}{2}\|y - x\|^2_{[\mu g.g^\top]}$$

(Hint: $\ln(1 + x) \leq x - \frac{x^2}{4}, \forall x \in [-1, 1]$).