Assignment 10

1. Find the conjugate function of the following f:
(a) $f(x) = -\log x$;
(b) $f(x) = \frac{1}{2}x^T Q x$, where $Q \in \mathbb{R}^{n\times n}$ is a symmetric positive definite matrix and $x \in \mathbb{R}^n$.

2. Find the conjugate function of the following functinons in terms of g^*, the conjugate function of g.
(a) $f_1(x) = g(x) + a^T x + b$;
(b) $f_2(x) = g(x - b)$.

3. Consider the following problem

$$\min\langle c, x\rangle, \text{ subject to } f(x) \leq 0$$

with $c \neq 0$.
Express the dual problem in terms of the conjugate function of f.