For the problem:

$$\begin{array}{lrl} Min & -x_1 - x_2 & \\ & x_1 + 2x_2 - 3 & \leq 0 \\ & 0 \leq x_i \leq 3 & ,\ x_i \in Z \end{array}$$

1. Find the duality gap if it exists; find the dual-lagrangian function and its maximum
2. Reproduce, in the corresponding dominium, the result:

$$\varphi^c(s,t) = \psi(s,t) = Max_{\substack{\lambda \\ \mu \geq 0}} \left[\begin{array}{ll} Min_x & f(x) - \lambda^t h(x) - \mu^t g(x) \\ & x \in X \end{array} \right]$$