

Problem Set 7
Math modeling of the atmosphere

Problem 1: Optimal importance sampling density, $q(x)$

Suppose that our subgrid distribution is given by $P(x) = \mathcal{N}(0, \sigma^2)$ and our autoconversion parameterization is given by $f(x) = H(x) x^2$.

- i) Find the optimal importance sampling density, $q(x)$. Be sure that $q(x)$ is normalized.
- ii) Find the value of x where the optimal $q(x)$ reaches a maximum. Is it greater than or less than the mean, μ , for $P(x)$?