A NMOS common-gate amplifier is shown. Assume the parameters of the transistor are $K_N = 1\text{mA/V}^2$, $V_{TN} = 1\text{V}$, and $\lambda = 0$. (a.) Find the small signal model parameter values for $g_m$ and $r_{ds}$. (b.) Find an algebraic expression for the small signal input resistance, $R_{in}$, the output resistance, $R_{out}$, and the voltage gain, $v_{out}/v_{in}$. (c.) Numerically evaluate the small signal input resistance, $R_{in}$, the output resistance, $R_{out}$, and the voltage gain, $v_{out}/v_{in}$. 

![Diagram of the circuit](image-url)