1. Use the Richardson’s improvement formula on

\[ \frac{d}{dt} \exp \left( at + \frac{bt^2}{2} \right) \]

at \( t = 0.1 \) with stepsizes of \( h = 0.1, 0.05, \) and \( 0.01, \) and with \( a = 1.0, b = 2.0. \) Use central difference approximations with second order truncation error. Note: this is the moment generating function for the normal distribution.

2. Derive the third order Newton Cotes integration formula and its associated error.