You should be able to evaluate these integrals WITHOUT the aid of a calculator or math software package.

1. Evaluate: \( \int_0^\infty ye^{-y}dy \)

2. Evaluate: \( \int_0^\infty \int_0^y e^{-y}dxdy \)
   
   Do this in 2 different ways:
   
   (a) Without changing the order of integration
   
   (b) By changing the order of integration

3. Evaluate: \( \int_1^e \int_0^{\ln x} 1dydx \)
   
   Do this in 2 different ways:
   
   (a) Without changing the order of integration
   
   (b) By changing the order of integration