1. Using `R`, obtain a Monte Carlo estimate of the following integrals and show that the approximation goes to 0 as n increases:

   (a) $\int_0^{10} x^{15} e^{-5x} dx$

   (b) $\int_0^1 \sin(50x) \log(x^2 + 10) dx$

2. Using `R` and only 1000 draws from $\text{Unif}(0, 1)$, obtain a Monte Carlo estimate of the following integrals:

   (a)
   $$\int_0^1 \exp(-x^2/200) dx + \int_0^1 \sin(50x) \log(x^2 + 10) dx$$

   (b)
   $$\int_0^1 \frac{\log(x + 1)}{x + 1} dx$$