STAT120C Assignment 1

1. Calculate
\[ \int_{0}^{\infty} \frac{1}{\beta} e^{-x/\beta} \, dx, \]
where \( \beta > 0 \).

2. Calculate
\[ \sum_{k=0}^{\infty} 0.2^k. \]

3. Calculate
\[ \sum_{k=0}^{\infty} [0.3 \times 0.7^k]. \]

4. Consider the function
\[ \psi(t) = e^{2(e^t - 1)}, \]
(a) Find and expression for \( \frac{d}{dt} \psi(t) \)
(b) Evaluate the expression in part (a) when \( t = 0 \).

5. Evaluate the intergral
\[ \int_{0}^{2} \int_{1}^{3} (x + y) \, dy \, dx. \]

6. Let \( F(x) = \int_{-\infty}^{x} f(t) \, dt \). Find an expression for \( F'(x) = \frac{d}{dx} F(x) \) in terms of the function \( f \). Hint: Review the Fundamental Theorem of Calculus.

7. (R) Use R to generate 10 random numbers between 0 and 1. Show your code and result.