

5. (4+6+3 points) Your uncle Harry absolutely LOVES eggnog around the holidays. The rate at which he drinks it at your family holiday party is given by the function $r(t)$ where t is measured in hours and $r(t)$ is in liters/hour. Suppose $t = 0$ corresponds to 6 pm when the party begins.

(a) Write a definite integral that represents the total amount of eggnog uncle Harry consumes between 8 pm and 2 am the next morning.

(b) If Uncle Harry's rate of eggnog drinking is given by $r(t) = e^{-t} + 1$, use a left hand sum with three (3) subdivisions to estimate the amount of nog Harry drinks in the first four hours of the party. Show all of your work.

(c) Should your estimate in part (b) be an underestimate or an overestimate? Explain.