

3. (12 pts.) Some distance upriver from a small reservoir, there has been a chemical spill. The authorities are concerned with levels of the chemical in the reservoir. Consequently, they take samples at half hour intervals of the rate $r(t)$, in gallons per hour, that the chemical is entering the reservoir t hours after the chemical spill. Their data is recorded in the following table.

t	0	.5	1	1.5	2	2.5	3	3.5	4	4.5	5
$r(t)$	0	0	0	0	0	0.175	.4	.675	1	1.375	1.8

(a) Write an integral that represents the total amount of chemical that has entered the reservoir during the first five hours after the spill.

(b) Based on the data given, find the left and right hand sum approximations to your integral. (Show how you computed the sums.)

LHS = _____

RHS = _____

(c) Is it reasonable to expect that LHS is a lower bound for the integral? Explain why or why not.

(d) What is your best estimate of the integral based on the given data? Do you think it would be an under- or over-estimate of the actual value of the integral? Explain the reason for your answer.