

Review Problems 2

1. The rates of escape of pollutant are given in the following table:

Day	1	2	3	4	5	6	7
Rate (gal./day)	15	13	12	11	9	7	2

- (a) Estimate the total amount of pollutant escaped using the right hand Riemann sum.
 - (b) It is known that the rate is decreasing. Is your estimate in (a) an overestimate or an underestimate? Explain.
 - (c) Estimate the error in (a).
2. #18, Ch. 5 Review.
3. #19, Ch. 5 Review.
4. The velocity of a particle moving along x -axis at the time t (in *sec.*) is $v(t) = t^2 + t - 2$ (in *meter/sec.*).
- (a) If at time $t = 0$, the particle is at the origin, determine the position of the particle at time $t = 2$. (You should be able to do this both by using calculator and by using the fundamental theorem of calculus.)
 - (b) What is the total distance traveled by the particle from $t = 0$ to $t = 2$?
5. Compute $\int_{-3}^2 |x - 1| dx$.
- (a) Interpreting it as area.
 - (b) Using the fundamental theorem of calculus.
6. Let $F(x)$ be an antiderivative of $f(x)$.
- (a) If the units x and $f(x)$ are *gallons* and *pounds* respectively, what are the units of $F(x)$.
 - (b) Suppose that you know that $F(0) = 1$, $\int_{-1}^1 f(x) dx = 1$, and f is an even function. Determine $F(1)$.
7. Using the fundamental theorem of calculus, find the area of region bounded by $y = x^2 - 2$ from below and by $y = 6 - x^2$ from above.
8. Using the fundamental theorem of calculus, find the average value of $f(x) = \cos x$ for x in $[0, \pi]$.
9. #47, Ch. 6 Review.
10. #49, Ch. 6 Review.