

Homework 9
(due Wednesday, November 26)

1. Suppose $f(x)$ is a continuous function. Write the formula which gives the estimate of $\int_0^{12} f(x) dx$ using a

(a) Left-hand Riemann sum with $\Delta x = 2$

(b) Right-hand sum with $\Delta x = 3$

2. Give an example of an integral of the form $\int_a^b g(t) dt$ that the sum $2((1)^2 + (3)^2 + (5)^2 + (7)^2)$ is approximating (you may assume that this sum corresponds to a Left-hand Riemann sum). In this problem I want you to find $a, b, g(t), \Delta t$ and n .

3. Give an example of a function $h(x)$ and numbers a, b so that $\int_a^b h(x) dx = 0$. You don't need to write the expression of $h(x)$. Just a graph is sufficient.

4. If $f(x)$ is an even function and $\int_0^{100} f(x) dx = \pi$, then what is the exact value of $\int_{-100}^{100} Af(x) dx$, where A is some non-zero constant ?

5. Write down the fundamental theorem of calculus.

6. (a) Differentiate the function $x^3 + x$

(b) Compute the exact value of $\int_0^2 (3x^2 + 1) dx$

7. Compute the following integrals exactly:

(a) $\int_0^3 4y^5 dy$

(a) $\int_2^9 \frac{1}{t} dt$

(a) $\int_2^0 (3s^2 + 1) ds$

(a) $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin(x) \cos(x) dx$ (Hint: Differentiate the function $\sin^2(x)$)

8. Do 20 from section 5.3

9. Do 24 from section 5.3

10. Do 34 from section 5.3

11. Do 39 from section 5.3