

Practice Assessment

Definite Integral

These **practice problems** are designed to help you **prepare for our course exams** and **assess your understanding** of the course material at the expected level. Aim to complete them **in class, during tutoring, office hours, or on your own**, and try to solve them **without notes or a calculator**, just like on the **actual exams**. Remember, **practice makes perfect**, so don't hesitate to **ask for help** if you get stuck.

Useful Properties of Definite Integrals:

1. $\int_a^a f(x) dx = 0$
2. $\int_a^b f(x) dx = - \int_b^a f(x) dx$
3. $\int_a^b cf(x) dx = c \int_a^b f(x) dx$
4. $\int_a^b (f(x) + g(x)) dx = \int_a^b f(x) dx + \int_a^b g(x) dx$
5. $\int_a^b f(x) dx = \int_a^c f(x) dx + \int_c^b f(x) dx$

1. Suppose

$$\int_1^2 f(x) dx = -4, \quad \int_1^5 f(x) dx = 3, \quad \int_1^5 g(x) dx = 6.$$

Compute the following.

(a) $\int_2^2 (5g(x) + \pi) dx$

(b) $\int_5^1 (4f(x) - 2g(x)) dx$

(c) $\int_2^5 3f(x) dx$

2. Use geometry to evaluate the integrals below.

(a) $\int_{-1}^2 (2 - x) \, dx$

(b) $\int_{-1}^3 |x - 4| \, dx$

(c) $\int_{-5}^0 \sqrt{25 - x^2} \, dx$

(d) $\int_{-4}^4 2 + \sqrt{16 - x^2} \, dx$