

Seminar 3: introduction to integral calculus

Exercise 1

Evaluate each indefinite integral.

1. $\int x^7 dx.$

5. $\int \sqrt[3]{x^4} dx.$

2. $\int x^{3/2} dx.$

6. $\int x\sqrt{x} dx.$

3. $\int 6x^5 dx.$

4. $\int 8x^3 - 4x^2 + 5 dx.$

7. $\int \sqrt{\sqrt{x}} dx.$

Exercise 2

A company's marginal revenue function is $MR = 12\sqrt[3]{x} + 3\sqrt{x}$, where x is the number of units sold. Find the revenue function.

Exercise 3

The value of an apartment in the center of Riga increases at the rate of $600\sqrt{t}$ euros per year after t years. Its value now is 200000 euros. What will be the price of this flat in 25 years?

Exercise 4

Evaluate each definite integral.

1. $\int_0^2 x^3 dx.$

3. $\int_4^9 \frac{1}{\sqrt{x}} dx.$

2. $\int_{-1}^1 1 - x^2 dx.$

4. $\int_1^2 6x^2 + 4x - 1 dx.$

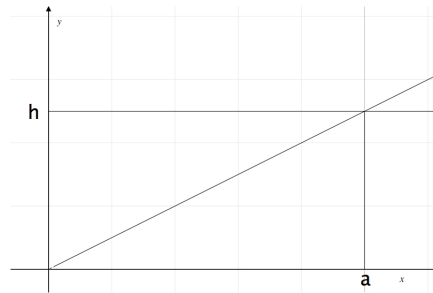
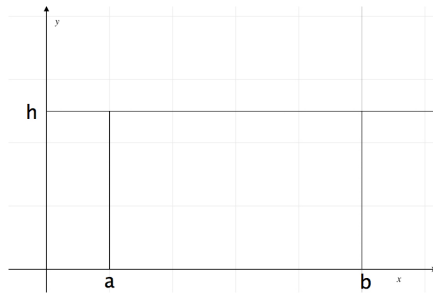
Exercise 5

- Evaluate the indefinite integral $\int x^2 dx.$
- Evaluate the definite integral $\int_0^3 x^2 dx$ by including the constant $C.$

- Explain why the constant does not matter when we evaluate a definite integral.

Exercise 6

1. Show that the area of a rectangle of length $(b - a)$ and height h is $h(b - a)$ using integral calculus.
2. Show that the area of a triangle of base a and height h is $\frac{ha}{2}$ using integral calculus.



Exercise 7

A guitar dealer estimates that the newest model will sell at the rate of $\frac{30}{t^2}$ guitars per month, where t is measured in months and $t = 1$ corresponds to the beginning of January. Find the number of guitars that will be sold from the beginning of January to the beginning of May.

Exercise 8

Find the area bounded by the two curves $y_1 = \sqrt{x}$ and $y_2 = x^2$.