

MAVZU: INTEGRAL

$$\int e^x = f(\underline{u}^n)$$

The diagram illustrates the integration of $\int \ln x + 1 \, dx$ using the MAVZU method. It shows the following steps:

- Initial expression: $\int \ln x + 1 \, dx$
- Identification of u and v : $u = \ln x$ and $v = 1$. These are highlighted in blue and green boxes respectively.
- Integration of v : $\int v \, dx = \int 1 \, dx = x$. This is shown in a green box.
- Final result: $\ln x + x - \int \frac{1}{x} (x) \, dx$. The term $\int \frac{1}{x} (x) \, dx$ is shown in a green box.

Arrows indicate the flow from the initial expression to the identification of u and v , and then to the final result.

Reja:

- 1. Boshlang'ich funksiya. Aniqmas integral.**

- 2. Integrallash jadvali.**
- 3. O'zgaruvchini almashtirish usuli bilan integrallash.**
- 4. Trigonometrik funksiyalarni integrallash.**
- 5. Aniq integral, xossalari. Nyuton-Leybnits formulasi.**

$$\int e^x = f(u)^n$$

e.g.

$$\int x^5 dx = \frac{x^6}{6} + c$$
$$\int 2x^7 dx = \frac{2x^8}{8} + c$$
$$\int 2x^{-3} dx = \frac{2x^{-2}}{-2} + c = -x^{-2} + c$$
$$\int (x^4 - 4x^3) dx = \frac{x^5}{5} - \frac{4x^4}{4} + c = \frac{x^5}{5} - x^4 + c$$
$$\int \sqrt{x} dx = \int x^{\frac{1}{2}} = 2x^{\frac{3}{2}} + c$$

Tayanch iboralar: Boshlang'ich funksiya.
Aniqmas integral. Integrallash jadvali.
Bo'laklab integrallash. Trigonometrik
funksiyalarni integrallash. Aniq integral.
Aniq integralning geometrik ma'nosi.
Nyuton-Leybnits formulasi.

Aniqmas integral. Integralning sodda xossalari va integrallash sullari

Aniqmas integralning soda qoidalari. Integrallash usullari

Boshlang'ich funksiya va aniqmas integral tushunchalari. Aniqmas integralning sodda xossalari. $f(x)$ funksiya (a,b) da berilgan bo'lib, shu intervalda differensiallanuvchi $F(x)$ funksiya uchun

$$F'(x) = f(x)$$

bo'lsa, $F(x)$ funksiya (a,b) da $f(x)$ funksiyaning boshlang'ich funksiyasi deyiladi.
 $f(x)$ funksiya boshlang'ich funksiyalarning umumiy ko'rinishi

$$F(x) + C, \quad C = \text{const}$$

berilgan $f(x)$ funksiyaning aniqmas integrali deyiladi va $\int f(x)dx$ kabi belgilanadi:

$$\int f(x)dx = F(x) + C$$

$f(x)$ funksiya (a,b) da uzluksiz bo'lsa, uning aniqmas integrali mavjud bo'ladi. Funktsiyaning aniqmas integralini topish amali funksiyaning integrallash deyiladi. U differensiyallash amaliga teskari amal bo'ladi. Integrallashning sodda xossalari:

$$1) \left(\int f(x) dx \right)' = f(x), \quad d\left(\int f(x) dx \right) = f(x) dx, \quad \int dF(x) = F(x) + C. \quad (C = \text{const})$$

$$2) \int k f(x) dx = k \int f(x) dx \quad (k = \text{const}, \quad k \neq 0).$$

$$3) \int (f(x) + g(x)) dx = \int f(x) dx + \int g(x) dx.$$