

Definite integral example

Calculate definite integral of function for border values

$$\int_{\ln 2}^{\ln 3} \frac{1}{e^x + e^{-x}} \cdot dx$$

We will use substitution method. We have to remember that in substitution method values of border values also are changing.

$$\int_{\ln 2}^{\ln 3} \frac{1}{e^x + e^{-x}} \cdot dx = \frac{1}{e^x + \frac{1}{e^x}} \cdot dx = \left[\begin{array}{l} e^x = t \\ e^x \cdot dx = dt \\ dx = \frac{dt}{e^x} \end{array} \right]$$

Border values change in following way

$$e^{\ln 3} = p$$

$$\ln 3 = \ln p$$

$$p = 3$$

$$\log_a b = c; a^c = b; \ln p = \log_e p$$

$$\int_2^3 \frac{1}{t + \frac{1}{t}} \cdot \frac{dt}{t}$$

$$\int_2^3 \frac{1}{\left(t + \frac{1}{t}\right) \cdot t} \cdot dt =$$

$$\int_2^3 \frac{1}{t^2 + 1} \cdot dt$$

$$[\arctan t]_2^3 = \arctan 3 - \arctan 2$$