

Integrals

Exercise 1. Try out the following commands:

`integrate 2x^5+6x+10/x`

`integrate 2E^x(1-E^(-x)/x)`

`integrate 1/((Cos[x])^2(Sin[x])^2)`

`integrate Cot[x]`

`integrate 1/(x^2+x+1)` - notice, that instead of `Atan` we got `tan-1`. That's not a mistake, that's just notation you should get used to.

`integrate 1/(x(Log[x]+1))`

`integrate x*Atan[x]`

`integrate E^xCos[x]`

`integrate 1/((x-1)(x-5))`

`integrate 1/(x^3+1)`

`integrate (2-Sin[x])/(2+Cos[x])`

`integrate 1/(x^(1/3)+x^(1/2))`

Exercise 2a. Compute integrals:

$$\text{a) } \int \sqrt{2x+1} dx, \quad \text{b) } \int x\sqrt{x^2+7} dx, \quad \text{c) } \int \frac{x^2}{3\sqrt[3]{x+2}} dx,$$

Exercise 2b. Compute integrals:

$$\text{a) } \int \frac{1}{3\sin x+4\cos x} dx, \quad \text{b) } \int \frac{2-\sin x}{2+\cos x} dx, \quad \text{c) } \int \frac{dx}{3\sin x-4\cos x}.$$

To calculate a definite integral, you should input the interval behind the comma. As a result Wolfram Alpha also displays the visual representation (the area between the graph of the function and the OX axis).

Exercise 3. Try out the following commands:

`integrate x^2, x=2..4`

`integrate Sin[x], x=-Pi/2..Pi` – the area under the OX axis is marked with pink color – it was subtracted from the area over the OX axis (marked with the blue color).

`integrate E^x, x=-Infinity..0`

`integrate 1/x, x=0..Infinity` – this integral is not convergent

Exercise 4a. Compute integrals:

$$\text{a) } \int_2^e \frac{1}{x-1} dx, \quad \text{b) } \int_1^9 x\sqrt{x} dx, \quad \text{c) } \int_0^3 \frac{x}{x^2+1} dx, \quad \text{d) } \int_{\frac{\pi}{2}}^{\pi} \cos 2x dx,$$

Exercise 4b. Compute integrals:

$$\text{a) } \int_{-\infty}^{-1} \frac{dx}{\sqrt[3]{3x-5}}, \quad \text{b) } \int_{-\infty}^{\infty} e^{-2x} dx, \quad \text{c) } \int_0^{\infty} \operatorname{arccot} x dx,$$