

Definite Integral (Newton-Leibniz formula)

1. $\int_{-1}^2 (3x^2 + 7) dx$

2. $\int_1^2 (x^3 + 3x^2 - 5) dx$

3. $\int_1^3 (x^2 - \frac{1}{x^4}) dx$

4. $\int_2^7 \frac{1}{x} dx$

5. $\int_0^\pi \cos x dx$

6. $\int_0^8 (\sqrt{2x} + \sqrt[3]{x}) dx$

7. $\int_0^a (a^2x - x^3) dx$

where $a \in \mathbb{R}$ is a parameter.

8. $\int_1^2 x \ln x dx$

9. $\int_2^6 \sqrt{x-2} dx$

10. $\int_2^3 \frac{x}{x^2+1} dx$

11. $\int_1^2 \frac{1}{x^2+x} dx$

12. $\int_1^e \frac{\ln^2 x}{x} dx$

13. $\int_0^{\pi/2} \sin^3 x dx$

14. $\int_0^{2\pi} \sin^2 x dx$

15. $\int_0^\pi \cos^4 x \sin^3 x dx$

Applications of definite integral

Mean Value

1. Compute a mean value of function $f(x) = x \cos x$ on the interval $x \in \langle 0; \frac{\pi}{2} \rangle$.
2. Compute a mean value of function $f(x) = \sin^2 x$ on the interval $x \in \langle 0; \pi \rangle$.