Math Formulas: Common Integrals

Indefinite Integral

Method of substitution

1. $$\int f\left(g(x)\right) \cdot g'(x)dx = \int f(u)du$$

Integration by parts

2. $$\int f(x) \cdot g'(x)dx = f(x) \cdot g(x) - \int g(x) \cdot f'(x)dx$$

Integrals of Rational and Irrational Functions

3. $$\int x^n dx = \frac{x^{n+1}}{n+1} + C, n \neq 1$$
4. $$\int \frac{1}{x} dx = \ln|x| + C$$
5. $$\int c\, dx = c \cdot x + C$$
6. $$\int x\, dx = \frac{x^2}{2} + C$$
7. $$\int x^2\, dx = \frac{x^3}{3} + C$$
8. $$\int \frac{1}{x^2} dx = -\frac{1}{x} + C$$
9. $$\int \sqrt{x}\, dx = \frac{2 \cdot x \cdot \sqrt{x}}{3} + C$$
10. $$\int \frac{1}{1+x^2} dx = \arctan x + C$$
11. $$\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x + C$$

Integrals of Trigonometric Functions

12. $$\int \sin x\, dx = -\cos x + C$$
13. $$\int \cos x\, dx = \sin x + C$$
14. $$\int \tan x\, dx = \ln|\sec x| + C$$
15. $$\int \sec x\, dx = \ln|\tan x + \sec x| + C$$
16. $$\int \sin^2 x\, dx = \frac{1}{2}(x - \sin x \cdot \cos x) + C$$
17. $$\int \cos^2 x\, dx = \frac{1}{2}(x + \sin x \cdot \cos x) + C$$

18. $$\int \tan^2 x\,dx = \tan x - x + C$$

19. $$\int \sec^2 x\,dx = \tan x + C$$

Integrals of Exponential and Logarithmic Functions

20. $$\int \ln x\,dx = x \cdot \ln x - x + C$$

21. $$\int x^n \cdot \ln x\,dx = \frac{x^{n+1}}{n+1}\ln x - \frac{x^{n+1}}{(n+1)^2} + C$$

22. $$\int e^x\,dx = e^x + C$$

23. $$\int a^x\,dx = \frac{a^x}{\ln a} + C$$