general formulas for integration

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Related topic	IntegralTables
Related topic	IntegrationByParts
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1. $$\int f'(x)\,dx = f(x) + C$$

2. $$\int \lambda\,dx = \lambda x + C$$

3. $$\int \lambda f(x)\,dx = \lambda \int f(x)\,dx$$

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

5. $$\int f(x)g'(x)\,dx = f(x)g(x) - \int g(x)f'(x)\,dx$$

6. $$\int g(f(x))f'(x)\,dx = G(f(x)) + C \quad \text{if} \quad G'(t) = g(t)$$

7. $$\int [f(x)]^r f'(x)\,dx = \frac{1}{r+1}[f(x)]^{r+1} + C \quad \text{for} \quad r \neq -1$$

8. $$\int \frac{f'(x)}{f(x)}\,dx = \ln|f(x)| + C$$

9. $$\int e^{f(x)} f'(x)\,dx = e^{f(x)} + C$$

10. $$\int \frac{f(x)}{(f(x)+a)(f(x)+b)}\,dx = \frac{a}{a-b}\int \frac{dx}{f(x)+a} - \frac{b}{a-b}\int \frac{dx}{f(x)+b}$$

11. $$\int \sin(\omega x + \varphi)\,dx = -\frac{\cos(\omega x + \varphi)}{\omega} + C$$

12. $$\int \cos(\omega x + \varphi)\,dx = \frac{\sin(\omega x + \varphi)}{\omega} + C$$

13. $$\int \sinh(\omega x + \varphi)\,dx = \frac{\cosh(\omega x + \varphi)}{\omega} + C$$

14. $$\int \cosh(\omega x + \varphi)\,dx = \frac{\sinh(\omega x + \varphi)}{\omega} + C$$

15. $$\int \sqrt{ax+b}\,dx = \frac{2}{3a}(ax+b)\sqrt{ax+b} + C$$

16. $$\int \sqrt{ax^2+b}\, dx = \frac{x}{2}\sqrt{ax^2+b} + \frac{b}{2\sqrt{a}} \ln(x\sqrt{a} + \sqrt{ax^2+b}) + C$$

17. $$\int \sin^n x \cos^m x\, dx = -\frac{\sin^{n-1} x \cos^{m+1} x}{m+n} + \frac{n-1}{m+n} \int \sin^{n-2} x \cos^m x\, dx$$

18. $$\int \sin^n x \cos^m x\, dx = \frac{\sin^{n+1} x \cos^{m-1} x}{m+n} + \frac{m-1}{m+n} \int \sin^n x \cos^{m-2} x\, dx$$

Some series-formed antiderivatives:

$$\int f(x)\, dx = C + f(0)x + \frac{f'(0)}{2!}x^2 + \frac{f''(0)}{3!}x^3 + \ldots$$

$$\int f(x)\, dx = C + xf(x) - \frac{x^2}{2!}f'(x) + \frac{x^3}{3!}f''(x) - + \ldots$$

$$\int UV\, dx = UV^{(-1)} - U'V^{(-2)} + U''V^{(-3)} - + \ldots\ = \sum_{n=0}^{\infty}(-1)^n U^{(n)} V^{(-n-1)}$$

The derivatives with negative `http://planetmath.org/HigherOrderDerivatives`order that V has been integrated repeatedly.