

Differentiation formulas.

1. $(c)' = 0$

2. $(x^n)' = nx^{n-1}$

3. $(a^x)' = a^x \ln a$

4. $(e^x)' = e^x$

5. $(\log_a x)' = \frac{1}{x \ln a}$

6. $(\ln x)' = \frac{1}{x}$

7. $(\sin x)' = \cos x$

8. $(\cos x)' = -\sin x$

9. $(\operatorname{tg} x)' = \frac{1}{\cos^2 x}$

10. $(\operatorname{cotg} x)' = -\frac{1}{\sin^2 x}$

11. $(\arcsin x)' = \frac{1}{\sqrt{1-x^2}}$

12. $(\arccos x)' = -\frac{1}{\sqrt{1-x^2}}$

13. $(\operatorname{arctg} x)' = \frac{1}{1+x^2}$

14. $(\operatorname{arccotg} x)' = -\frac{1}{1+x^2}$

Rules for differentiation.

$u, v : \mathbb{R} \rightarrow \mathbb{R}, c \in \mathbb{R}$,

1. $(u(x) \pm v(x))' = u'(x) \pm v'(x)$

2. $(cu(x))' = cu'(x)$

3. $(u(x)v(x))' = u'(x)v(x) + u(x)v'(x)$

4. $\left(\frac{u(x)}{v(x)}\right)' = \frac{u'(x)v(x) - u(x)v'(x)}{v^2(x)}$

Integration formulas.

1. $\int dx = x + c$

2. $\int x^n dx = \frac{x^{n+1}}{n+1} + c$

3. $\int \frac{1}{x} dx = \ln|x| + c$

4. $\int a^x dx = \frac{a^x}{\ln a} + c$

5. $\int e^x dx = e^x + c$

6. $\int \sin x dx = -\cos x + c$

7. $\int \cos x dx = \sin x + c$

8. $\int \frac{1}{\cos^2 x} dx = \operatorname{tg} x + c$

9. $\int \frac{1}{\sin^2 x} dx = -\operatorname{cotg} x + c$

10. $\int \frac{1}{\sqrt{A^2 - x^2}} dx = \arcsin \frac{x}{A} + c$

11. $\int \frac{1}{\sqrt{x^2 \pm B}} dx = \ln|x + \sqrt{x^2 \pm B}| + c$

12. $\int \frac{1}{A^2 + x^2} dx = \frac{1}{A} \operatorname{arctg} \frac{x}{A} + c$

13. $\int \frac{1}{A^2 - x^2} dx = \frac{1}{2A} \ln \left| \frac{A+x}{A-x} \right| + c$

Basic methods of integration.

integration by parts, substitution, expansion into partial fractions