

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