一、$\lim\limits_{x\to\infty}\dfrac{a_0x^n+a_1x^{n-1}+\quad+a_n}{b_0x^m+b_1x^{m-1}+\quad+b_m}=\begin{cases}\dfrac{a_0}{b_0} & n=m\\ 0 & n<m\\ \infty & n>m\end{cases}$

$\sin x\sim x \qquad \tan x\sim x$

$\arcsin x\sim x \qquad \arctan x\sim x$

$1-\cos x\sim\dfrac{1}{2}x^2 \qquad \ln(1+x)\sim x$

$e^x-1\sim x \qquad a^x-1\sim x\ln a$

$(1+x)^{\partial}-1\sim\partial x$

(1) $(c)'=0$ (2) $x^{\mu}=\mu x^{\mu-1}$

(3) $(\sin x)'=\cos x$ (4) $(\cos x)'=-\sin x$

(5) $(\tan x)'=\sec^2 x$ (6) $(\cot x)'=-\csc^2 x$

(7) $(\sec x)'=\sec x\cdot\tan x$ (8) $(\csc x)'=-\csc x\cdot\cot x$

(9) $(e^x)'=e^x$ (10) $(a^x)'=a^x\ln a$

(11) $(\ln x)'=\dfrac{1}{x}$ (12) $(\log_a{}^x)'=\dfrac{1}{x\ln a}$

(13) $(\arcsin x)'=\dfrac{1}{\sqrt{1-x^2}}$ (14) $(\arccos x)'=-\dfrac{1}{\sqrt{1-x^2}}$

(15) $(\arctan x)'=\dfrac{1}{1+x^2}$ (16) $(\operatorname{arc}\cot x)'=-\dfrac{1}{1+x^2}$

(17) $(x)'=1$ (18) $(\sqrt{x})'=\dfrac{1}{2\sqrt{x}}$

（1） $\left[u(x)\pm v(x)\right]^{(n)}=u(x)^{(n)}\pm v(x)^{(n)}$

（2） $\left[cu(x)\right]^{(n)}=cu^{(n)}(x)$

（3） $\left[u(ax+b)\right]^{(n)}=a^{n}u^{(n)}(ax+b)$

（4） $\left[u(x)\cdot v(x)\right]^{(n)}=\sum_{k=0}^{n}c_{n}^{k}u^{(n-k)}(x)v^{(k)}(x)$

（1） $\left(x^{n}\right)^{(n)}=n!$

（2） $\left(e^{ax+b}\right)^{(n)}=a^{n}\cdot e^{ax+b}$

（3） $\left(a^{x}\right)^{(n)}=a^{x}\ln^{n}a$

(4) $\left[\sin(ax+b)\right]^{(n)}=a^{n}\sin\left(ax+b+n\cdot\frac{\pi}{2}\right)$

(5) $\left[\cos(ax+b)\right]^{(n)}=a^{n}\cos\left(ax+b+n\cdot\frac{\pi}{2}\right)$

(6) $\left(\frac{1}{ax+b}\right)^{(n)}=(-1)^{n}\frac{a^{n}\cdot n!}{(ax+b)^{n+1}}$

(7) $\left[\ln(ax+b)\right]^{(n)}=(-1)^{n-1}\frac{a^{n}\cdot(n-1)!}{(ax+b)^{n}}$

(1) $\int kdx=kx+c$

(2) $\int x^{\mu}dx=\frac{x^{\mu+1}}{\mu+1}+c$

(3) $\int\frac{dx}{x}=\ln|x|+c$

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

(5) $\int e^{x}dx=e^{x}+c$

(6) $\int\cos xdx=\sin x+c$

(7) $\int\sin xdx=-\cos x+c$

(8) $\int\frac{1}{\cos^{2}x}dx=\int\sec^{2}xdx=\tan x+c$

(9) $\int\frac{1}{\sin^{2}x}=\int\csc^{2}xdx=-\cot x+c$

(10) $\int\frac{1}{1+x^{2}}dx=\arctan x+c$

(11) $\int\frac{1}{\sqrt{1-x^{2}}}dx=\arcsin x+c$

积分型	换元公式
$\int f(ax+b)dx = \frac{1}{a}\int f(ax+b)d(ax+b)$	$u = ax+b$
$\int f(x^\mu)x^{\mu-1}dx = \frac{1}{\mu}\int f(x^\mu)d(x^\mu)$	$u = x^\mu$
$\int f(\ln x)\cdot\frac{1}{x}dx = \int f(\ln x)d(\ln x)$	$u = \ln x$
$\int f(e^x)\cdot e^x dx = \int f(e^x)d(e^x)$	$u = e^x$
$\int f(a^x)\cdot a^x dx = \frac{1}{\ln a}\int f(a^x)d(a^x)$	$u = a^x$
$\int f(\sin x)\cdot\cos x dx = \int f(\sin x)d(\sin x)$	$u = \sin x$
$\int f(\cos x)\cdot\sin x dx = -\int f(\cos x)d(\cos x)$	$u = \cos x$
$\int f(\tan x)\cdot\sec^2 x dx = \int f(\tan x)d(\tan x)$	$u = \tan x$
$\int f(\cot x)\cdot\csc^2 x dx = \int f(\cot x)d(\cot x)$	$u = \cot x$

1.两角和公式

$$\sin(A+B) = \sin A\cos B + \cos A\sin B$$

$$\sin(A-B) = \sin A\cos B - \cos A\sin B$$

$$\cos(A+B) = \cos A\cos B - \sin A\sin B$$

$$\cos(A-B) = \cos A\cos B + \sin A\sin B$$

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A\tan B}$$

$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A\tan B}$$

$$\cot(A+B) = \frac{\cot A\cdot\cot B - 1}{\cot B + \cot A}$$

$$\cot(A-B) = \frac{\cot A\cdot\cot B + 1}{\cot B - \cot A}$$

2.二倍角公式

$$\sin 2A = 2\sin A\cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A = 1 - 2\sin^2 A = 2\cos^2 A - 1$$

$$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$$