

$\cos x = \frac{e^{ix} + e^{-ix}}{2}$ $\sin x = \frac{e^{ix} - e^{-ix}}{2i}$ $\sin^2 x + \cos^2 x = 1$ $\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y$ $\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$ $\sin 2x = 2 \sin x \cos x$ $\cos 2x = \cos^2 x - \sin^2 x$ $\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}$ $\sin x + \sin y = 2 \sin \frac{x+y}{2} \cos \frac{x-y}{2}$ $\cos x + \cos y = 2 \cos \frac{x+y}{2} \cos \frac{x-y}{2}$ $\sin x \sin y = -\frac{1}{2} [\cos(x+y) - \cos(x-y)]$ $\sin x \cos y = \frac{1}{2} [\sin(x+y) + \sin(x-y)]$ $\cos x \cos y = \frac{1}{2} [\cos(x+y) + \cos(x-y)]$	$(cf)' = cf'$ $(f \pm g)' = f' \pm g'$ $(fg)' = f'g + fg'$ $\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$ $(f \circ g)' = (f' \circ g)g'$	$\int cf(x)dx = c \int f(x)dx$ $\int f(x) \pm g(x)dx = \int f(x)dx \pm \int g(x)dx$ $\int f'(ax+b)dx = \frac{1}{a}f(ax+b) + C$ $\int f^\alpha(x)f'(x)dx = \begin{cases} \frac{f^{\alpha+1}}{\alpha+1} + C & (\alpha \neq -1) \\ \ln f(x) + C & (\alpha = -1) \end{cases}$ $\int f(x)g'(x)dx = f(x)g(x) - \int f'(x)g(x)dx$
$\cosh x = \frac{e^x + e^{-x}}{2}$ $\sinh x = \frac{e^x - e^{-x}}{2}$ $\cosh^2 x - \sinh^2 x = 1$ $\sinh 2x = 2 \sinh x \cosh x$ $\cosh 2x = \cosh^2 x + \sinh^2 x$ $\operatorname{arsinh} x = \ln(x + \sqrt{x^2 + 1})$ $\operatorname{arcosh} x = \ln(x + \sqrt{x^2 - 1})$ $\operatorname{artanh} x = \frac{1}{2} \ln \frac{1+x}{1-x}$ $\operatorname{arcoth} x = \frac{1}{2} \ln \frac{x+1}{x-1}$	$(x^\alpha)' = \alpha x^{\alpha-1}$ $(a^x)' = (\ln a)a^x$ $(\log_a x)' = \frac{1}{\ln a} \frac{1}{x}$ $(\sin x)' = \cos x$ $(\cos x)' = -\sin x$ $(\tan x)' = \frac{1}{\cos^2 x} = 1 + \tan^2 x$ $(\cot x)' = -\frac{1}{\sin^2 x} = -1 - \cot^2 x$ $(\arcsin x)' = -(\arccos x)' = \frac{1}{\sqrt{1-x^2}}$ $(\arctan x)' = -(\operatorname{arccot} x)' = \frac{1}{1+x^2}$ $(\sinh x)' = \cosh x$ $(\cosh x)' = \sinh x$ $(\tanh x)' = \frac{1}{\cosh^2 x} = 1 - \tanh^2 x$ $(\operatorname{coth} x)' = -\frac{1}{\sinh^2 x} = 1 - \operatorname{coth}^2 x$ $(\operatorname{arsinh} x)' = \frac{1}{\sqrt{x^2+1}}$ $(\operatorname{arcosh} x)' = \frac{1}{\sqrt{x^2-1}}$ $(\operatorname{artanh} x)' = \frac{1}{1-x^2}$ $(\operatorname{arcoth} x)' = \frac{1}{1-x^2}$	$t = \tan \frac{x}{2} \quad \sin x = \frac{2t}{1+t^2}$ $\frac{dx}{dt} = \frac{2}{1+t^2} \quad \cos x = \frac{1-t^2}{1+t^2}$ $u = \tanh \frac{x}{2} \quad \sinh x = \frac{2u}{1-u^2}$ $\frac{dx}{du} = \frac{2}{1-u^2} \quad \cosh x = \frac{1+u^2}{1-u^2}$
		$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots + \frac{x^n}{n!} + \dots$ $\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots + (-1)^n \frac{x^{2n}}{(2n)!} + \dots$ $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots + (-1)^{n-1} \frac{x^{2n-1}}{(2n-1)!} + \dots$ $\cosh x = 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \dots + \frac{x^{2n}}{(2n)!} + \dots$ $\sinh x = x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} + \dots + \frac{x^{2n-1}}{(2n-1)!} + \dots$ $\frac{1}{1-x} = 1 + x + x^2 + x^3 + \dots + x^n + \dots$ $(1+x)^\alpha = 1 + \alpha x + \frac{\alpha(\alpha-1)}{2}x^2 + \dots + \binom{\alpha}{n}x^n + \dots$

$\binom{\alpha}{n} = \frac{\alpha(\alpha-1)\cdots(\alpha-n+1)}{n!}$ $(1+x)^n \geq 1+nx \quad (x > -1, n \in \mathbb{N})$ $\frac{n}{\frac{1}{a_1} + \frac{1}{a_2} + \cdots + \frac{1}{a_n}} \leq \sqrt[n]{a_1 a_2 \cdots a_n} \leq \frac{a_1 + a_2 + \cdots + a_n}{n} \leq \sqrt{\frac{a_1^2 + a_2^2 + \cdots + a_n^2}{n}}$		$\text{grad } f = \left(\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial f}{\partial z} \right)$ $\text{div } \mathbf{u} = \frac{\partial u_x}{\partial x} + \frac{\partial u_y}{\partial y} + \frac{\partial u_z}{\partial z}$ $\text{rot } \mathbf{u} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ u_x & u_y & u_z \end{vmatrix} = \left(\frac{\partial u_z}{\partial y} - \frac{\partial u_y}{\partial z} \right) \mathbf{i} + \left(\frac{\partial u_x}{\partial z} - \frac{\partial u_z}{\partial x} \right) \mathbf{j} + \left(\frac{\partial u_y}{\partial x} - \frac{\partial u_x}{\partial y} \right) \mathbf{k}$ $D\mathbf{u} = \begin{bmatrix} \frac{\partial u_x}{\partial x} & \frac{\partial u_x}{\partial y} & \frac{\partial u_x}{\partial z} \\ \frac{\partial u_y}{\partial x} & \frac{\partial u_y}{\partial y} & \frac{\partial u_y}{\partial z} \\ \frac{\partial u_z}{\partial x} & \frac{\partial u_z}{\partial y} & \frac{\partial u_z}{\partial z} \end{bmatrix}$																			
$a_0 + \sum_{n=1}^{\infty} \left(a_n \cos \frac{2\pi n x}{T} + b_n \sin \frac{2\pi n x}{T} \right)$ $a_0 = \frac{1}{T} \int_0^T f(x) dx$ $a_n = \frac{2}{T} \int_0^T f(x) \cos \frac{2\pi n x}{T} dx$ $b_n = \frac{2}{T} \int_0^T f(x) \sin \frac{2\pi n x}{T} dx$		$\int_C f ds = \int_a^b f(\mathbf{r}(t)) \dot{\mathbf{r}}(t) dt$ $\int_C \mathbf{u} \cdot d\mathbf{r} = \int_a^b \mathbf{u}(\mathbf{r}(t)) \cdot \dot{\mathbf{r}}(t) dt$ $\iint_S f dA = \iint_D f(\mathbf{r}(u, v)) \left \frac{\partial \mathbf{r}}{\partial u} \times \frac{\partial \mathbf{r}}{\partial v} \right du dv$ $\iint_S \mathbf{u} \cdot d\mathbf{A} = \iint_D \mathbf{u}(\mathbf{r}(u, v)) \cdot \left(\frac{\partial \mathbf{r}}{\partial u} \times \frac{\partial \mathbf{r}}{\partial v} \right) du dv$ $\iiint_V f dV = \iiint_D f(\mathbf{r}(u, v, w)) \left \frac{\partial \mathbf{r}}{\partial u} \frac{\partial \mathbf{r}}{\partial v} \frac{\partial \mathbf{r}}{\partial w} \right du dv dw$ $\int_C \text{grad } f \cdot d\mathbf{r} = f(b) - f(a)$ $\iint_S \text{rot } \mathbf{u} \cdot d\mathbf{A} = \int_{\partial S} \mathbf{u} \cdot d\mathbf{r}$ $\iiint_V \text{div } \mathbf{u} dV = \iint_{\partial V} \mathbf{u} \cdot d\mathbf{A}$		$\text{rot grad } f = 0$ $\text{div rot } \mathbf{u} = 0$ $\text{grad } cf = c \text{ grad } f$ $\text{div } c\mathbf{u} = c \text{ div } \mathbf{u}$ $\text{rot } c\mathbf{u} = c \text{ rot } \mathbf{u}$ $\text{grad}(f \pm g) = \text{grad } f \pm \text{grad } g$ $\text{div}(\mathbf{u} \pm \mathbf{v}) = \text{div } \mathbf{u} \pm \text{div } \mathbf{v}$ $\text{rot}(\mathbf{u} \pm \mathbf{v}) = \text{rot } \mathbf{u} \pm \text{rot } \mathbf{v}$ $\text{grad}(fg) = (\text{grad } f)g + f \text{ grad } g$ $\text{div}(f\mathbf{u}) = (\text{grad } f) \cdot \mathbf{u} + f \text{ div } \mathbf{u}$ $\text{rot}(f\mathbf{u}) = (\text{grad } f) \times \mathbf{u} + f \text{ rot } \mathbf{u}$ $\text{grad}(\mathbf{u} \cdot \mathbf{v}) = D\mathbf{u}(\mathbf{v}) + D\mathbf{v}(\mathbf{u}) + \mathbf{u} \times \text{rot } \mathbf{v} + \mathbf{v} \times \text{rot } \mathbf{u}$ $\text{rot}(\mathbf{u} \times \mathbf{v}) = D\mathbf{u}(\mathbf{v}) - D\mathbf{v}(\mathbf{u}) + (\text{div } \mathbf{v}) \cdot \mathbf{u} - (\text{div } \mathbf{u}) \cdot \mathbf{v}$ $\text{div}(\mathbf{u} \times \mathbf{v}) = (\text{rot } \mathbf{u}) \cdot \mathbf{v} - \mathbf{u} \cdot (\text{rot } \mathbf{v})$																	
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