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طبعاً نعم

انتگرال

فصل چهارم

انتگرال تابع $f(x)$ به صورت زیر است

$$\int f(x) dx = F(x)$$

$$F'(x) = f(x)$$

فرمول انتگرال

①

$$\int 1 dx = x$$

$$\int 1 dv = v$$

$$(v)' = 1$$

②

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

$$(x)' = 1$$

$$\int x^\mu dx = \frac{x^{\mu+1}}{\mu+1}$$

$$\int x dx = \frac{x^2}{2}$$

③

$$\int \sin x dx = -\cos x$$

$$\int \cos x dx = \sin x$$

$$\textcircled{f} \int \sin ax \, dx = \frac{-\cos ax}{a}$$

$$\int \cos ax \, dx = \frac{\sin ax}{a}$$

$$\int \cos kx \, dx = \frac{\sin kx}{k}$$

$$\int \sin ax \, dx = \frac{-\cos ax}{a}$$

$$\textcircled{g} \int e^x \, dx = e^x$$

$$\textcircled{h} \int e^{kx} \, dx = \frac{e^{kx}}{k}$$

$$\int e^{kx} \, dx = \frac{e^{kx}}{k}$$

$$\int e^{ax} \, dx = \frac{e^{ax}}{a}$$

$$\textcircled{i} \int \frac{1}{x} \, dx = \ln|x|$$

$$\textcircled{j} \int \frac{u'}{u} \, dx = \ln|u|$$

$$(\ln 0)' = \frac{0'}{0}$$

$$\int \frac{1}{x+1} dx = \ln(x+1)$$

① $\int f(x) \pm g(x) dx = \int f(x) dx \pm \int g(x) dx$ g ali

$$\int x^k + \cos x dx = \int x^k dx + \int \cos x dx$$
$$= \frac{x^{k+1}}{k+1} + \sin x$$

② $\int k f(x) dx = k \int f(x) dx$

$$\int \omega \cos x dx = \omega \int \cos x dx = \omega \sin x$$

$$\int v x^k dx = v \int x^k dx = v \frac{x^{k+1}}{k+1}$$

③ $\int u dv = uv - \int v du$

$$\int \underbrace{x}_u \underbrace{e^x}_{dv} dx = x e^x - \int e^x dx = x e^x - e^x$$

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$\int e^{ax} dx = \int e^u du \Rightarrow \frac{1}{a} e^{ax} = \frac{1}{a} e^u \Rightarrow dx = \frac{1}{a} du \Rightarrow du = a dx$

+	a	e^x
-	1	e^x
+	0	e^x

$\int a e^x dx = a e^x - e^x$

+	a^2	$\sin ax$
-	$2a$	$-\cos ax$
+	1	$-\sin ax$
-	0	$\cos ax$

$\int a^2 \sin ax dx = -a^2 \cos ax + 2a \sin ax + \cos ax$

$\int (V a^2 - \frac{1}{a} + K) dx$

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$$= \int v a^x dx - \int a^x dx + \int E dx$$

$$= \int a^x dx - a \int a^x dx + k \int 1 dx$$

$$= \frac{v a^x}{k} - a \frac{a^x}{k} + k x$$

$$\int 10 \sin x - 4 dx$$

$$= \int 10 \sin x dx - \int 4 dx$$

$$= 10 \int \sin x dx - 4 \int 1 dx$$

$$= 10(-\cos x) - 4x = -10 \cos x - 4x$$

$$\int \frac{v}{a-x} dx = v \int \frac{1}{a-x} dx$$

$$= v \ln(a-x)$$

$$\int e^{kx} - e^{-kx} dx =$$

$$= \int e^{\mu x} dx - \int e^{-x} dx$$

$$= \frac{e^{\mu x}}{\mu} - \frac{e^{-x}}{-1}$$

$$\int \frac{x^{\mu} + x^{\mu} + 1}{x^{\mu}} dx =$$

از هر دو جمله اول

از مجموع شش

تکامل

$$\int \frac{x^{\mu}}{x^{\mu}} dx + \int \frac{x^{\mu}}{x^{\mu}} dx + \int \frac{1}{x^{\mu}} dx$$

$$= \int x dx + \int \frac{1}{x} dx + \int x^{-\mu} dx$$

سه جمله شش

$$= \frac{x^{\mu}}{\mu} + \ln x + \frac{x^{-\mu+1}}{-\mu+1}$$