وبلاگ علمی آموزشی «سرشاخ شدن با کنکور»

☑ فرمول های مشتق گیری ☑

در تمام فرمول های زیر r ،w و u بر حسب x فرض شده اند.

تابع	مشتق	مثال
$y=a$	$y'=0$	$y=3\Rightarrow y'=0$
$y=ax$	$y'=a$	$y=7x\Rightarrow y'=7$
$y=ax^n$	$y'=a.nx^{n-1}$	$y=2x^3\Rightarrow y'=2\times3\times x^2$
$y=u\pm v\pm\ldots$	$y'=u'\pm v'\pm\ldots$	$y=3x^2-5x+7\Rightarrow y'=6x-5$
$y=u.v$	$y'=u'.v+v'.u$	$y=(3x^4)(\sin x)\Rightarrow y'=(12x^3)\sin x+(\cos x).3x^4$
$y=au$	$y'=au'$	$y=5\cos\Rightarrow y'=-5\sin x$
$y=\frac{u}{v}$	$y'=\frac{u'.v-v'.u}{v^2}$	$y=\frac{3x^2}{\tan x}\Rightarrow y'=\frac{6x(\tan x)-(1+\tan^2 x)3x^2}{\tan^2 x}$
$y=\frac{u}{a}$	$y'=\frac{u'}{a}$	$y=\frac{\cot x}{5}\Rightarrow y'=\frac{-(1+\cot^2 x)}{5}$
$y=\frac{a}{u}$	$y'=\frac{-au'}{u^2}$	$y=\frac{3}{x^5}\Rightarrow y'=\frac{-3(5x^4)}{x^{10}}=\frac{-15}{x^6}$
$y=\frac{au+b}{cu+d}$	$y'=\frac{ad-bc}{(cu+d)^2}u'$	$y=\frac{3x+5}{2x-7}\Rightarrow y'=\frac{21-10}{(2x-7)^2}=\frac{-31}{(2x-7)^2}$
$y=au^m$	$y'=m.a.u'.u^{m-1}$	$y=5(\sin^2 x)\Rightarrow y'=4\times5\times\cos x\times\sin^3 x$
$y=\sqrt{u}$	$y'=\frac{u'}{2\sqrt{u}}$	$y=\sqrt{x}\Rightarrow y'=\frac{1}{2\sqrt{x}}$
$y=\sqrt[m]{n^n}$	$y'=\frac{nu'}{m\sqrt[m]{u^{m-n}}}$	$y=\sqrt[5]{x^3}\Rightarrow y'=\frac{3}{5\sqrt[5]{x^2}}$
$y=\|u\|$	$y'=\frac{u'.u}{\|u\|}$	$y=\|x^2+x\|\Rightarrow y'=\frac{(2x+1)(x^2+x)}{\|x^2+x\|}$
$y=a\sin u$	$y'=au'\cos u$	$y=-3\sin(2x^3+5)\Rightarrow y'=(-3)(6x^2)\cos(2y^3+5)=-18x^2\cos(2x^3+5)$
$y=a\cos u$	$y'=-au'\sin u$	$y=3\cos(\sqrt{x})\Rightarrow y'=-(3)(\frac{1}{2\sqrt{x}}).\sin\sqrt{x}$
$y=a\tan u$	$y'=au'(1+\tan^2 u)$	$y=3\tan(\cos)\Rightarrow y'=3(-\sin x)(1+\tan^2(\cos x))$
$y=a\cot u$	$y'=-au'(1+\cot^2 u)$	$y=5\cot x\Rightarrow y'=-5(1+\cot^2 x)$
$y=a\sin^m u$	$y'=mau'\cos u\sin^{m-1} u$	$y=2\sin^3(x^5)\Rightarrow y'=(2\times3)(5x^4)(\cos(x^5))\sin^2(x^5)$
$y=a\cos^m u$	$y'=-mau'\sin u\cos^{m-1} u$	$y=5\cos^4(\sqrt{x})\Rightarrow y'=-(4)(5)(\frac{1}{2\sqrt{x}})(\sin\sqrt{x})(\cos^3\sqrt{x})$

$y = a\tan^m u$	$y' = mau'(1+\tan^2 u)\tan^{m-1} u$	$y = 7\tan^5 x \Rightarrow y' = 7\times 5(1+\tan^2 x)\tan^4 x$
$y = a\cot^m u$	$y' = -mau'(1+\cot^2 u)\cot^{m-1} u$	$y = 2\cot^3 x \Rightarrow y' = -(3)(2)(1+\cot^2 x)\cot^2 u$
$y = a\sec u$	$y' = au'.\sin u.\sec^2 u$	$y = \sec x \Rightarrow y' = \sin.\sec^2 u$
$y = a\csc u$	$y' = -au'\cos u\csc^2 u$	$y = \csc(5x) \Rightarrow y' = -5\cos(5x)\csc^2(5x)$
$y = Arc\sin$	$y' = \frac{u'}{\sqrt{1-u^2}}$	$y = Arc\sin(3x) \Rightarrow y' = \frac{3}{\sqrt{1-9x^2}}$
$y = Arc\cos u$	$y' = \frac{-u'}{\sqrt{1-u^2}}$	$y = Arc\cos(3x^2-5x) \Rightarrow y' = \frac{-(6x-5)}{\sqrt{1-(3x^2-5x)^2}}$
$y = Arc\tan u$	$y' = \frac{u'}{1+u^2}$	$y = Arc\tan x \Rightarrow y' = \frac{1}{1+x^2}$
$y = Arc\cot u$	$y' = \frac{-u'}{1+u^2}$	$y = Arc\cot(\sin x) \Rightarrow y' = \frac{-\cos x}{1+\sin^2 x}$
$y = a^u$	$y' = u'a^u Lna$	
$y = \sqrt{x}$	$y' = \frac{1}{2\sqrt{x}}$	$y = \sqrt{2} \Rightarrow y' = \frac{1}{2\sqrt{2}}$
$y = Lnu$	$y' = \frac{u'}{u}$	$Lne = 1$ ✓
$y = \sin x$	$y' = \cos x$	
$y = \cos x$	$y' = -\sin x$	
$y = \tan x$	$y' = 1+\tan^2 x$	
$y = \cot x$	$y' = -(1+\cot^2 x)$	
$y = [u]$	$y' = \begin{cases} 0 & u \notin z \\ \phi & u \in z \end{cases}$	

تذکر: در نقطه ای که $u \in z$ و تابع u درآن نقطه مینیمم نسبی داشته باشد آنگاه :

$$y = [u] \Rightarrow y' = 0$$

$$y = \left[\sin\frac{3\pi}{2}\right] \xrightarrow{\sin\frac{3\pi}{2} = -1 \in z} y' = 0$$

$$y = \left[\sin\frac{\pi}{3}\right] \xrightarrow{\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2} \notin z} y' = 0$$

$$y = [\sin\pi] \xrightarrow{\sin\pi = 0 \in z} y' = \phi$$