۲۹ فرمول طلایی مهم در مشتق

	تابع	مشتق	مثال	
۱	$Y = c$	$Y' = 0$	$Y = 5$	$y' = 0$
۲	$Y = ax$	$Y' = a$	$Y = 2x$	$y' = 2$
۳	$Y = ax + b$	$Y' = a$	$Y = 3x + 1$	$Y' = 3$
۴	$Y = x^n$	$Y' = nx^{n-1}$	$Y = x^3$	$Y' = 3x^2$
۵	$Y = ax^n$	$Y' = nax^{n-1}$	$Y = 2x^5$	$Y' = 5(2x^4) = 10x^4$
۶	$Y = U^n$	$Y' = nu'u^{n-1}$	$Y = (2x^2)^3$	$Y' = 3(4x)(2x^2)^2 = 12x(2x^2)^2 = 48x^5$
۷	$Y = au^n$	$Y' = nau'u^{n-1}$	$Y = 5(2x+1)^3$	$Y' = 3 \times 5(2)(2x+1)^2 = 30(2x+1)^2$
۸	$y = u + v + \cdots$	$y' = u' + v' + \cdots$	$y = 5x^2 + 3x$	$y' = 10x + 3$
۹	$y = u.v$	$y' = u'v + uv'$	$y = (x^2+1)(2x^3+3x)$	$y' = (2x)(2x^3+3x) + (6x^2+3)(x^2+1) = 4x^2 + 6x^2 + 6x^4 + 6x^2 + 3x^2 + 3 = 10x^4 + 15x^2 + 3$
۱۰	$y = \frac{u}{v}$	$y' = \frac{u'v - uv'}{v^2}$	$y = \frac{3x}{5x+1}$	$y' = \frac{3(5x-1) - 5(3x)}{(5x-1)^2} = \frac{3}{(5x-1)^2}$
۱۱	$y = \lvert u \rvert$	$y' = \frac{u'u}{\lvert u \rvert}$	$y = \lvert 4x \rvert$	$y' = \frac{4 \times 4x}{\lvert 4x \rvert} = \frac{16x}{\lvert 4x \rvert}$
۱۲	$y = \sqrt{x}$	$y' = \frac{1}{2\sqrt{x}}$	$y = \sqrt{x}$	$y' = \frac{1}{2\sqrt{x}}$
۱۳	$y = \sqrt{u}$	$y' = \frac{u'}{2\sqrt{u}}$	$y = \sqrt{2x^2+1}$	$y' = \frac{4x}{2\sqrt{2x^2+1}} = \frac{2x}{\sqrt{2x^2+1}}$
۱۴	$y = \sqrt[m]{u^n}$	$y' = \frac{nu'}{m\sqrt[m]{u^{m-n}}}$	$y = \sqrt[5]{(2x+3)^2}$	$y' = \frac{2(2)}{5\sqrt[5]{(2x+3)^3}}$
۱۵	$y = a^x$	$y' = a^x Lna$	$y = 3^x$	$y' = 3^x Ln3$
۱۶	$F(x,y) = 0$ تابع ضمنی	$F' = -\frac{f'x}{f'y}$ از تابع نسبت به x مشتق میگیریم / از تابع نسبت به y مشتق میگیریم	$3x + y^2 - 4xy + 1 = 0$	$f'(x,y) = -\frac{3-4y}{2y-4x}$
۱۷	$y = e^u$	$Y' = u'e^u$	$y = e^{5x+1}$	$y = 5e^{5x+1}$
۱۸	$y = Lnu$	$y' = \frac{u'}{u}$	$y = Lnx$	$y' = \frac{1}{x}$
۱۹	$y = Sinax$	$y' = \text{aCos}\, ax$	$y = sin2x$	$y' = 2cos2x$
۲۰	$y = \sin^n u$	$y' = nu'CosuSin^{n-1}u$	$y = Sin^5 3x$	$y' = -3 \times 5 \times sin5xCos^2 5x = -15Sin5xCos^2 5x$
۲۱	$y = Cosax$	$y' = -aSinax$	$y = cos2x$	$y' = -2sin2x$
۲۲	$y = Cos^n u$	$y' = -nu'SinuCos^{n-1}u$	$y = \cos^3 5x$	$y' = -3 \times 5 \times \sin 5x \text{Cos}^2 5x = -15Sin5xCos^2 5x$
۲۳	$y = tanax$	$y' = a(1 + \tan^2 a\, x)$	$y = \tan 2x$	$y' = 2(1 + \tan^2 2x)$
۲۴	$y = \tan^n u$	$y' = nu'(1 + \tan^2 u)\tan^{n-1} u$	$y = \tan^2 3x$	$y' = 2 \times 3(1 + \tan^2 3x)\tan 3x$
۲۵	$y = Cot\, ax$	$y' = -a(1 + \cot^2 ax)$	$y = \cot 7x$	$y' = -7(1 + \cot^2 7x)$
۲۶	$y = arc\sin u$	$y' = \frac{u'}{\sqrt{1-u^2}}$	$y = arc\sin(x^3 - 2)$	$y' = \frac{3x^2}{\sqrt{1-(x^3-2)^2}}$
۲۷	$y = arc\cos u$	$y' = \frac{-u'}{\sqrt{1-u^2}}$	$y = -arc\, cosx^2$	$y' = \frac{2x}{\sqrt{1-x^2}}$
۲۸	$y = arc\tan u$	$y' = \frac{u'}{1+u^2}$	$y = arc\tan(sinx)$	$y' = \frac{cos}{1+\sin^3 x}$
۲۹	$y = arc\cot u$	$y' = \frac{-u'}{1+u^2}$	$y = arc\cot(e^x)$	$y' = \frac{-e^x}{1+e^{2x}}$