TÜREV KURALLARI

Genel Formüller

u ve v, x'in türevlenebilen fonksiyonları olsun.

Sabit: $\frac{d}{dx}(c) = 0$

Toplam: $\frac{d}{dx}(u + v) = \frac{du}{dx} + \frac{dv}{dx}$

Fark: $\frac{d}{dx}(u + v) = \frac{du}{dx} - \frac{dv}{dx}$

Sabit ile Çarpım: $\frac{d}{dx}(cu) = c\frac{du}{dx}$

Çarpım: $\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$

Bölüm: $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$

Kuvvet: $\frac{d}{dx}x^n = nx^{n-1}$

Zincir Kuralı: $\frac{d}{dx}(f(g(x)) = f'(g(x)) \cdot g'(x)$

Trigonometrik Fonksiyonlar

$\frac{d}{dx}(\sin x) = \cos x$ $\quad$ $\frac{d}{dx}(\cos x) = -\sec x$

$\frac{d}{dx}(\tan x) = \sec^2 x$ $\quad$ $\frac{d}{dx}(\sec x) = \sec x \tan x$

$\frac{d}{dx}(\cot x) = -\csc^2 x$ $\quad$ $\frac{d}{dx}(\csc x) = -\csc x \cot x$

Üstel ve Logaritmik Fonksiyonlar

$\frac{d}{dx}e^x = e^x$ $\quad$ $\frac{d}{dx}\ln x = \frac{1}{x}$

$\frac{d}{dx}a^x = a^x \ln a$ $\quad$ $\frac{d}{dx}(\log_a x) = \frac{1}{x \ln a}$

Ters Trigonometrik Fonksiyonlar

$\frac{d}{dx}(\sin^{-1} x) = \frac{1}{\sqrt{1 - x^2}}$ $\quad$ $\frac{d}{dx}(\cos^{-1} x) = -\frac{1}{\sqrt{1 - x^2}}$

$\frac{d}{dx}(\tan^{-1} x) = \frac{1}{\sqrt{1 + x^2}}$ $\quad$ $\frac{d}{dx}(\sec^{-1} x) = \frac{1}{|x|\sqrt{x^2 - 1}}$

$\frac{d}{dx}(\cot^{-1} x) = -\frac{1}{1 + x^2}$ $\quad$ $\frac{d}{dx}(\csc^{-1} x) = -\frac{1}{|x|\sqrt{x^2 - 1}}$

Hiperbolik Fonksiyonlar

$\frac{d}{dx}(\sinh x) = \cosh x$ $\quad$ $\frac{d}{dx}(\cosh x) = \sinh x$

$\frac{d}{dx}(\tanh x) = \operatorname{sech}^2 x$ $\quad$ $\frac{d}{dx}(\operatorname{sech} x) = -\operatorname{sech} x \tanh x$

$\frac{d}{dx}(\coth x) = -\operatorname{csch}^2 x$ $\quad$ $\frac{d}{dx}(\operatorname{csch} x) = -\operatorname{csch} x \coth x$

Ters Hiperbolik Fonksiyonlar

$\frac{d}{dx}(\sinh^{-1} x) = \frac{1}{\sqrt{1 - x^2}}$ $\quad$ $\frac{d}{dx}(\cosh^{-1} x) = \frac{1}{\sqrt{x^2 - 1}}$

$\frac{d}{dx}(\tanh^{-1} x) = \frac{1}{1 - x^2}$ $\quad$ $\frac{d}{dx}(\operatorname{sech}^{-1} x) = \frac{1}{x\sqrt{1 - x^2}}$

$\frac{d}{dx}(\coth^{-1} x) = \frac{1}{1 - x^2}$ $\quad$ $\frac{d}{dx}(\operatorname{csch}^{-1} x) = -\frac{1}{|x|\sqrt{1 + x^2}}$

Parametrik Denklemler

Eğer $x = f(t)$ ve $y = g(t)$ türevlenebilirse, bu durumda:

$$y' = \frac{dy}{dx} = \frac{dy/dt}{dx/dt} \quad \text{veya} \quad \frac{d^2y}{dx^2} = \frac{dy'/dt}{dx/dt}.$$

TÜREV ALMA KURALLARI

$$\frac{d}{dx}\Big(f(x)+g(x)\Big) = f'(x)+g'(x)$$

$$\frac{d}{dx}\Big(cf(x)\Big) = cf'(x)$$

$$\frac{d}{dx}\Big(f(x)g(x)\Big) = f'(x)g(x)+f(x)g'(x)$$

$$\frac{d}{dx}\left(\frac{1}{f(x)}\right) = -\frac{f'(x)}{\Big(f(x)\Big)^2}$$

$$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{g(x)f'(x)-f(x)g'(x)}{\Big(g(x)\Big)^2}$$

$$\frac{d}{dx}f\Big(g(x)\Big) = f'\Big(g(x)\Big)g'(x)$$

TEMEL TÜREVLER

$$\frac{d}{dx}\frac{1}{x} = -\frac{1}{x^2}$$

$$\frac{d}{dx}\sqrt{x} = \frac{1}{2\sqrt{x}}$$

$$\frac{d}{dx}x^r = rx^{r-1}$$

$$\frac{d}{dx}e^x = e^x$$

$$\frac{d}{dx}a^x = a^x \ln a \quad (a>0)$$

$$\frac{d}{dx}\ln x = \frac{1}{x} \quad (x>0)$$

$$\frac{d}{dx}\sin x = \cos x$$

$$\frac{d}{dx}\cos x = -\sin x$$

$$\frac{d}{dx}\tan x = \sec^2 x$$

$$\frac{d}{dx}\sec x = \sec x\tan x$$

$$\frac{d}{dx}\csc x = -\csc x\cot x$$

$$\frac{d}{dx}\cot x = -\csc^2 x$$

$$\frac{d}{dx}\sin^{-1}x = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}\tan^{-1}x = \frac{1}{1+x^2}$$

$$\frac{d}{dx}|x| = \operatorname{sgn}x = \frac{x}{|x|}$$

TRİGONOMETRİK ÖZDEŞLİKLER

$$\sin^2 x+\cos^2 x = 1$$

$$\sin(-x) = -\sin x$$

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

$$\sec^2 x = 1+\tan^2 x$$

$$\sin(\pi-x) = \sin x$$

$$\cos(\pi-x) = -\cos x$$

$$\csc^2 x = 1+\cot^2 x$$

$$\sin\left(\frac{\pi}{2}-x\right) = \cos x$$

$$\cos\left(\frac{\pi}{2}-x\right) = \sin x$$

$$\sin(x\pm y) = \sin x\cos y \pm \cos x\sin y$$

$$\cos(x\pm y) = \cos x\cos y \mp \sin x\sin y$$

$$\tan(x\pm y) = \frac{\tan x\pm\tan y}{1\mp\tan x\tan y}$$

$$\sin 2x = 2\sin x\cos x$$

$$\sin^2 x = \frac{1-\cos 2x}{2}$$

$$\cos^2 x = \frac{1+\cos 2x}{2}$$

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

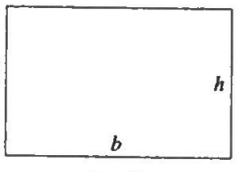
KUADRATİK FORMÜL

$Ax^2+Bx+C=0$, ise o zaman $x = \dfrac{-B\pm\sqrt{B^2-4AC}}{2A}$ dir.

GEOMETRİK FORMÜLLER

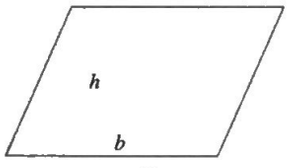
A = alan,
b = taban,
h = yükseklik,
C = çevre,
V = hacım,
S = yüzey alanı

Dikdörtgen



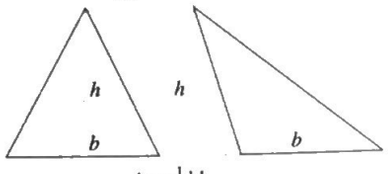
$A = bh$

Paralelkenar



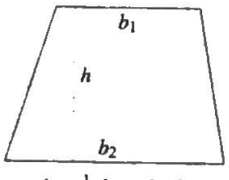
$A = bh$

Üçgenler



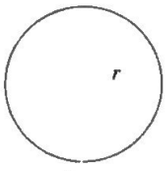
$A = \frac{1}{2}bh$

Yamuk



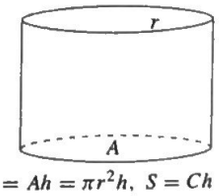
$A = \frac{1}{2}(b_1+b_2)h$

Çember



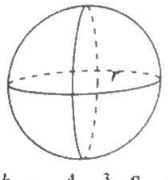
$A = \pi r^2,\ C = 2\pi r$

Dairesel Silindir



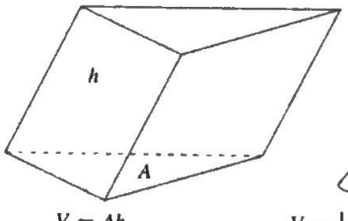
$V = Ah = \pi r^2 h,\ S = Ch = 2\pi rh$
(silindirik çeper)

Küre



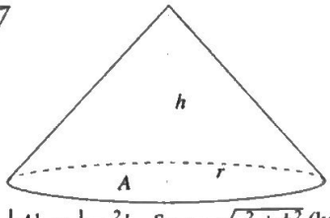
$V = \frac{4}{3}\pi r^3,\ S = 4\pi r^2$

Prizma



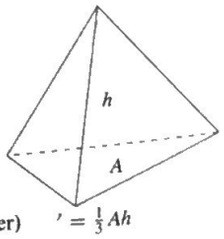
$V = Ah$

Dairesel Koni



$V = \frac{1}{3}Ah = \frac{1}{3}\pi r^2 h,\ S = \pi r\sqrt{r^2+h^2}$ (konik çeper)

Piramit



$' = \frac{1}{3}Ah$