

Önemli Limitler

$$\textcircled{1} \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$\textcircled{2} \lim_{x \rightarrow 0} \frac{1 - \cos x}{x} = 0$$

$$\textcircled{3} \lim_{x \rightarrow 0} (1 + ax)^{1/x} = e^a$$

$$\textcircled{4} \lim_{x \rightarrow \infty} \left(1 + \frac{a}{x}\right)^x = e^a$$

$$\textcircled{5} \lim_{x \rightarrow \infty} \ln x = \infty$$

$$\textcircled{6} \lim_{x \rightarrow 0^+} \ln x = -\infty$$

$$\textcircled{7} \lim_{x \rightarrow \infty} e^x = \infty$$

$$\textcircled{8} \lim_{x \rightarrow -\infty} e^x = 0$$

$$\textcircled{9} 0 < a < 1 \text{ için}$$

$$\lim_{x \rightarrow \infty} a^x = 0$$

$$\lim_{x \rightarrow -\infty} a^x = \infty$$

$$\textcircled{10} a > 1 \text{ için}$$

$$\lim_{x \rightarrow \infty} a^x = \infty$$

$$\lim_{x \rightarrow -\infty} a^x = 0$$

$$\textcircled{11} \lim_{n \rightarrow \infty} \sqrt[n]{n} = 1$$

$$\textcircled{12} \lim_{n \rightarrow \infty} x^{1/n} = 1 \quad (x > 0)$$

$$\textcircled{13} \lim_{n \rightarrow \infty} x^n = 0 \quad (|x| < 1)$$

$$\textcircled{14} \lim_{n \rightarrow \infty} \frac{x^n}{n!} = 0 \quad (\forall x \in \mathbb{R})$$

Türev Tablosu

- ① $y = x^n \rightarrow y' = nx^{n-1}$
- ② $y = \cos x \rightarrow y' = -\sin x$
- ③ $y = \sin x \rightarrow y' = \cos x$
- ④ $y = \tan x \rightarrow y' = 1 + \tan^2 x = \sec^2 x$
- ⑤ $y = \cot x \rightarrow y' = -(1 + \cot^2 x) = -\operatorname{cosec}^2 x$
- ⑥ $y = \sec x \rightarrow y' = \sec x \cdot \tan x$
- ⑦ $y = \operatorname{cosec} x \rightarrow y' = -\operatorname{cosec} x \cdot \cot x$
- ⑧ $y = \ln x \rightarrow y' = \frac{1}{x}$
- ⑨ $y = e^x \rightarrow y' = e^x$
- ⑩ $y = a^x \rightarrow y' = a^x \cdot \ln a$
- ⑪ $y = \operatorname{Arcsin} x \rightarrow y' = \frac{1}{\sqrt{1-x^2}}$
- ⑫ $y = \operatorname{Arccos} x \rightarrow y' = -\frac{1}{\sqrt{1-x^2}}$
- ⑬ $y = \operatorname{Arctan} x \rightarrow y' = \frac{1}{1+x^2}$
- ⑭ $y = \operatorname{Arccot} x \rightarrow y' = -\frac{1}{1+x^2}$

Integral Tablosu

- ① $\int x^n dx = \frac{x^{n+1}}{n+1} + C \quad (n \neq -1)$
- ② $\int \cos x dx = \sin x + C$
- ③ $\int \sin x dx = -\cos x + C$
- ④ $\int \sec^2 x dx = \tan x + C$
- ⑤ $\int \operatorname{cosec}^2 x dx = -\cot x + C$
- ⑥ $\int \tan x dx = -\ln |\cos x| + C$
- ⑦ $\int \cot x dx = \ln |\sin x| + C$
- ⑧ $\int \sec x dx = \ln |\sec x + \tan x| + C$
- ⑨ $\int \operatorname{cosec} x dx = -\ln |\operatorname{cosec} x + \cot x| + C$
- ⑩ $\int \frac{dx}{x} = \ln |x| + C$
- ⑪ $\int e^x dx = e^x + C$
- ⑫ $\int a^x dx = \frac{a^x}{\ln a} + C$
- ⑬ $\int \cos^2 x dx = \int \frac{1 + \cos 2x}{2} dx = \frac{x}{2} + \frac{\sin 2x}{4} + C$
- ⑭ $\int \sin^2 x dx = \int \frac{1 - \cos 2x}{2} dx = \frac{x}{2} - \frac{\sin 2x}{4} + C$

Ters Trigonometrik Fonksiyonlar

Altı temel trigonometrik fonksiyon bire-bir değildir, fakat tanım kümelerini bire-bir oldukları aralıklara kısıtlayabiliriz. Bu kısıtlanmış fonksiyonlar artık bire-bir oldukları için tersleri vardır ve aşağıdaki şekilde gösterilmiştir:

<u>Ters Trig. Fonksiyon</u>	<u>Tanım Kümesi</u>	<u>Görüntü K.</u>
① $f(x) = \text{ArcSin } x$	$-1 \leq x \leq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
② $f(x) = \text{ArcCos } x$	$-1 \leq x \leq 1$	$0 \leq y \leq \pi$
③ $f(x) = \text{ArcTan } x$	$-\infty < x < \infty$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$
④ $f(x) = \text{ArcCot } x$	$-\infty < x < \infty$	$0 < y < \pi$
⑤ $f(x) = \text{ArcSec } x$	$x \leq -1$ veya $x \geq 1$	$0 \leq y \leq \pi, y \neq \frac{\pi}{2}$
⑥ $f(x) = \text{ArcCosec } x$	$x \leq -1$ veya $x \geq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}, y \neq 0$

$$\star y = \text{ArcSin } x \Rightarrow x = \text{Sin } y$$

$$\star y = \text{ArcCos } x \Rightarrow x = \text{Cos } y$$

$$\star y = \text{ArcTan } x \Rightarrow x = \text{Tan } y$$

$$\star y = \text{ArcCot } x \Rightarrow x = \text{Cot } y$$

$$\star y = \text{ArcSec } x \Rightarrow x = \text{Sec } y$$

$$\star y = \text{ArcCosec } x \Rightarrow x = \text{Cosec } y$$

Örnek:

x	$y = \text{ArcSin } x$	$y = \text{ArcCos } x$
$\frac{1}{2}$	$\frac{\pi}{6}$	$\frac{\pi}{3}$
$\frac{\sqrt{2}}{2}$	$\frac{\pi}{4}$	$\frac{\pi}{4}$
0	0	$\frac{\pi}{2}$
$\frac{\sqrt{3}}{2}$	$\frac{\pi}{3}$	$\frac{\pi}{6}$

x	$y = \text{ArcSin } x$	$y = \text{ArcCos } x$
$-\frac{1}{2}$	$-\frac{\pi}{6}$	$\frac{2\pi}{3}$
$-\frac{\sqrt{2}}{2}$	$-\frac{\pi}{4}$	$\frac{3\pi}{4}$
$-\frac{\sqrt{3}}{2}$	$-\frac{\pi}{3}$	$\frac{5\pi}{6}$

Örnek:

x	y = Arc Tan x
$\sqrt{3}$	$\pi/3$
1	$\pi/4$
0	0
$\frac{\sqrt{3}}{3}$	$\pi/6$

x	y = Arc Tan x
$-\sqrt{3}$	$-\pi/3$
-1	$-\pi/4$
$-\frac{\sqrt{3}}{3}$	$-\pi/6$

(F4)

Özellikler

① $\text{Arc Cos } x + \text{Arc Cos } (-x) = \pi$

② $\text{Arc Sin } x + \text{Arc Cos } x = \frac{\pi}{2}$

③ $\text{Arc Tan } x + \text{Arc Cot } x = \frac{\pi}{2}$

④ $\text{Arc Cosec } x + \text{Arc Sec } x = \frac{\pi}{2}$

Türevleri

① $y = \text{Arc Sin } x \Rightarrow y' = \frac{1}{\sqrt{1-x^2}}$

$y = \text{Arc Sin } f(x) \Rightarrow y' = \frac{f'(x)}{\sqrt{1-(f(x))^2}}$

② $y = \text{Arc Cos } x \Rightarrow y' = \frac{-1}{\sqrt{1-x^2}}$

$y = \text{Arc Cos } f(x) \Rightarrow y' = \frac{-f'(x)}{\sqrt{1-(f(x))^2}}$

③ $y = \text{Arc Tan } x \Rightarrow y' = \frac{1}{1+x^2}$

$y = \text{Arc Tan } f(x) \Rightarrow y' = \frac{f'(x)}{1+(f(x))^2}$

④ $y = \text{Arc Cot } x \Rightarrow y' = \frac{-1}{1+x^2}$

$y = \text{Arc Cot } f(x) \Rightarrow y' = \frac{-f'(x)}{1+(f(x))^2}$

⑤ $y = \text{Arc Sec } x \Rightarrow y' = \frac{1}{|x| \sqrt{x^2-1}}$

$y = \text{Arc Sec } f(x) \Rightarrow y' = \frac{f'(x)}{|f(x)| \sqrt{(f(x))^2-1}}$

⑥ $y = \text{Arc Cosec } x \Rightarrow y' = \frac{-1}{|x| \sqrt{x^2-1}}$

$y = \text{Arc Cosec } f(x) \Rightarrow y' = \frac{-f'(x)}{|f(x)| \sqrt{f^2-1}}$