

## 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}  $0 < a < 1$  için

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

\textcircled{10}  $a > 1$  için

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

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

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

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

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

### 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  $y = \arcsin x \rightarrow y' = \frac{1}{\sqrt{1-x^2}}$
- ⑫  $y = \arccos x \rightarrow y' = -\frac{1}{\sqrt{1-x^2}}$
- ⑬  $y = \arctan x \rightarrow y' = \frac{1}{1+x^2}$
- ⑭  $y = \text{Arccot} x \rightarrow y' = -\frac{1}{1+x^2}$

### 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 degillerdir, fakat tersin kümelerini bire-bir oldukları orneklerde kısıtlayabiliriz. Bu kısıtlamaların fonksiyonlar ortak bire-bir oldukları için tersleri verdik ve aşağıda setilde gösterilirler:

<u>Ters Trig. Fonksiyon</u>	<u>Tersin Kümesi</u>	<u>Görüntük.</u>
① $f(x) = \text{ArcSin}x$	$-1 \leq x \leq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
② $p(x) = \text{ArcCos}x$	$-1 \leq x \leq 1$	$0 \leq y \leq \pi$
③ $f(x) = \text{Arc Tan}x$	$-\infty < x < \infty$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$
④ $f(x) = \text{Arc Cot}x$	$-\infty < x < \infty$	$0 < y < \pi$
⑤ $f(x) = \text{Arc Sec}x$	$x \leq -1 \text{ veya } x \geq 1$	$0 \leq y \leq \pi, y \neq \frac{\pi}{2}$
⑥ $f(x) = \text{Arc Cosec}x$	$x \leq -1 \text{ veya } x \geq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}, y \neq 0$

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

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

$$\star y = \text{Arc Tan}x \Rightarrow x = \tan y$$

$$\star y = \text{Arc Cot}x \Rightarrow x = \cot y$$

$$\star y = \text{Arc Sec}x \Rightarrow x = \sec y$$

$$\star y = \text{Arc Cosec}x \Rightarrow x = \csc y$$

Örnek:

$x$	$y = \text{ArcSin}x$	$y = \text{ArcCos}x$
$\frac{\sqrt{3}}{2}$	$\frac{\pi}{6}$	$\frac{\pi}{3}$
$\frac{\sqrt{2}}{2}$	$\frac{\pi}{4}$	$\frac{\pi}{4}$
0	0	$\frac{\pi}{2}$
$-\frac{\sqrt{3}}{2}$	$\frac{7\pi}{6}$	$\frac{5\pi}{6}$

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

Örnek:

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

F4

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

Özdeşlikler

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

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

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

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

Türevleri

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

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

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

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

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

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

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

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

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

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

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

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