

# Övningsblad

## Standardgränsvärden

$\lim_{x \rightarrow \infty} \frac{a^x}{x^\alpha} =$		$\lim_{x \rightarrow \infty} \frac{a^x}{x^\alpha} =$	
$\lim_{x \rightarrow \infty} \frac{x^a}{{}^a \log x} =$		$\lim_{x \rightarrow \infty} \frac{x^a}{{}^a \log x} =$	
$\lim_{x \rightarrow \pm\infty} \left(1 + \frac{1}{x}\right)^x =$		$\lim_{x \rightarrow \pm\infty} \left(1 + \frac{1}{x}\right)^x =$	
$\lim_{x \rightarrow 0} \frac{\sin x}{x} =$		$\lim_{x \rightarrow 0} \frac{\sin x}{x} =$	
$\lim_{x \rightarrow 0} \frac{\ln(1+x)}{x} =$		$\lim_{x \rightarrow 0} \frac{\ln(1+x)}{x} =$	
$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} =$		$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} =$	

## Derivata av elementära funktioner

$D e^x =$		$D e^x =$	
$D \ln x =$		$D \ln x =$	
$D a^x =$		$D a^x =$	
$D {}^a \log x =$		$D {}^a \log x =$	
$D x^\alpha =$		$D x^\alpha =$	
$D \sin x =$		$D \sin x =$	
$D \cos x =$		$D \cos x =$	
$D \tan x =$		$D \tan x =$	
$D \cot x =$		$D \cot x =$	
$D \arcsin x =$		$D \arcsin x =$	

$D \arccos x =$		$D \arccos x =$	
$D \arctan x =$		$D \arctan x =$	
$D \operatorname{arccot} x = i$		$D \operatorname{arccot} x =$	
Elementära primitiva funktioner			
$\int e^x dx =$		$\int e^x dx =$	
$\int \frac{1}{x} dx =$		$\int \frac{1}{x} dx =$	
$\int x^\alpha dx =$		$\int x^\alpha dx =$	
$\int \cos x dx =$		$\int \cos x dx =$	
$\int \sin x dx =$		$\int \sin x dx =$	
$\int \frac{1}{\cos^2 x} dx =$		$\int \frac{1}{\cos^2 x} dx =$	
$\int \frac{1}{\sin^2 x} dx =$		$\int \frac{1}{\sin^2 x} dx =$	
$\int \frac{1}{\sqrt{1-x^2}} dx =$		$\int \frac{1}{\sqrt{1-x^2}} dx =$	
$\int \frac{1}{1-x^2} dx =$		$\int \frac{1}{1-x^2} dx =$	
$\int \frac{1}{\sqrt{x^2+\alpha}} dx =$		$\int \frac{1}{\sqrt{x^2+\alpha}} dx =$	

<b>Facit</b>
Standardgränsvärden
$\lim_{x \rightarrow \infty} \frac{a^x}{x^\alpha} = \infty$
$\lim_{x \rightarrow \infty} \frac{x^a}{a \log x} = \infty$
$\lim_{x \rightarrow \pm\infty} \left(1 + \frac{1}{x}\right)^x = e$
$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$
$\lim_{x \rightarrow 0} \frac{\ln(1+x)}{x} = 1$
$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$
Derivata av elementära funktioner
$D e^x = e^x$
$D \ln x = 1/x$
$D a^x = a^x \ln a, \quad a > 0$ och är konstant
$D^a \log x = \frac{1}{x \ln a}, \quad a > 0, a \neq 1, \text{ är konstant}$
$D x^\alpha = \alpha x^{\alpha-1}, \quad \alpha \text{ är konstant}$
$D \sin x = \cos x$
$D \cos x = -\sin x$
$D \tan x = \frac{1}{\cos^2 x}$
$D \cot x = \frac{1}{\sin^2 x}$
$D \arcsin x = \frac{1}{\sqrt{1-x^2}}$

$D \arccos x = -\frac{1}{\sqrt{1-x^2}}$
$D \arctan x = \frac{1}{1+x^2}$
$D \operatorname{arccot} x = -\frac{1}{1+x^2}$
Elementära primitiva funktioner
$\int e^x dx = e^x + C$
$\int \frac{1}{x} dx = \ln x  + C$
$\int x^\alpha dx = \frac{x^{\alpha+1}}{\alpha+1} + C$
$\int \cos x dx = \sin x + C$
$\int \sin x dx = -\cos x + C$
$\int \frac{1}{\cos^2 x} dx = \tan x + C$
$\int \frac{1}{\sin^2 x} dx = -\cot x + C$
$\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x + C$
$\int \frac{1}{1-x^2} dx = \arctan x + C$
$\int \frac{1}{\sqrt{x^2+\alpha}} dx = \ln x+\sqrt{x^2+\alpha}  + C$