Föreläsning 5, del b

## Deriveringsregler:

$$De^x = e^x$$

$$Da^x = D((e^{\ln a})^x) = D(e^{(\ln a)x}) =$$

$$= (\ln a)\, e^{(\ln a)x} = (\ln a)(e^{\ln a})^x = (\ln a)\, a^x$$

↑ inre derivata $\qquad (a>0)$

$$D \sin x = \cos x$$

$$D \cos x = -\sin x$$

$$D \tan x = D\frac{\sin x}{\cos x} = \frac{\cos^2 x + \sin^2 x}{\cos^2 x} =$$

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

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

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

## Motsvarande integreringregler:

$$\int e^x\, dx = e^x + C$$

$$\int a^x dx = \frac{a^x}{\ln a} + C \qquad (a>0,\ a \neq 1)$$

$$\int \cos x\, dx = \sin x + C$$

$$\int \sin x\, dx = -\cos x + C$$

$$\int (1 + \tan^2 x)\, dx = \tan x + C \iff \text{(linearitet!)}$$

$$\int dx + \int \tan^2 x\, dx = \tan x + C \iff$$

$$\int \tan^2 x\, dx = \tan x - x + C$$

$$\int (1 + \cot^2 x)\, dx = -\cot x + C \iff \cdots \iff$$

$$\int \cot^2 x\, dx = -\cot x - x + C$$