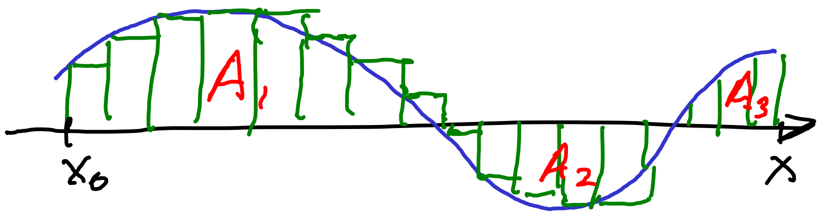

$$\int_{x_0}^{x} f(x)\cdot dx = A_1 - A_2 + A_3$$

Motivering av rekneregel (2):

$$\frac{d}{dx}\ln|x| = \frac{1}{x}$$

$$\frac{d}{dx}\left(\ln|f(x)| + C\right) = \frac{1}{f(x)} f'(x) + 0 = \frac{f'(x)}{f(x)}$$

$$\int \frac{\cos x}{\sin x}\,dx = \ln|\sin x| + C$$

---

(3)

$$\frac{d}{dx}\left(\frac{f^2(x)}{2} + C\right) = \frac{d}{dx}\left(\frac{(f(x))^2}{2} + C\right)$$

$$= \frac{1}{2}\, 2\, f(x)\cdot f'(x) + 0 = f(x)\cdot f'(x)$$

Motiverar (7)

$$\frac{d}{dx}\left(-\ln|\cos x| + C\right) = -\frac{1}{\cos x}(-\sin x) + 0$$

$$= \frac{\sin x}{\cos x} = \tan x$$

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

$\sqrt{a}\cdot\sqrt{b} = \sqrt{a\cdot b}$

s a° (a)

$$\frac{d}{dx}\left(\arcsin\frac{x}{a}+c\right) = \frac{1}{\sqrt{1-\left(\frac{x}{a}\right)^2}}\,\frac{1}{a}$$

$$= \frac{1}{\sqrt{a^2}\cdot\sqrt{1-\left(\frac{x}{a}\right)^2}} = \frac{1}{\sqrt{a^2\left(1-\frac{x^2}{a^2}\right)}}$$

$$= \frac{1}{\sqrt{a^2-x^2}}$$

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

$$\frac{d}{dx}\left(\frac{1}{a}\arctan\frac{x}{a}+c\right) = \frac{1}{a}\cdot\frac{1}{1+\left(\frac{x}{a}\right)^2}\cdot\frac{1}{a}+0$$

$$= \frac{1}{a^2\left(1+\frac{x^2}{a^2}\right)} = \frac{1}{a^2+x^2}$$

Ex:

- $\int(4x^3+\sin x)\,dx$

$$= 4\,x^4\cdot\frac{1}{4}-\cos x + C$$

$$= x^4-\cos x + C$$

$$\int \cos(k\cdot\pi\cdot x)\,dx = \sin(k\cdot\pi\cdot x)\cdot\frac{1}{k\cdot\pi} + C$$

$$= \frac{\sin(k\cdot\pi\cdot x)}{k\cdot\pi} + C$$

$$g(x) = \sin^2 x$$

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

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

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

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

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

$$G(x) = \int \sin^2 x\,dx$$

$$= \int \frac{1}{2}(1-\cos 2x)\,dx$$

$$= \int \left(\frac{1}{2} - \frac{1}{2}\cos 2x\right) dx$$

$$= \frac{1}{2}x - \frac{1}{2}\cdot\sin 2x\,\frac{1}{2} + C$$

$$= \frac{x}{2} - \frac{\sin 2x}{4} + C$$