② Substitutiemethode

- veranderen de integratieveranderlijke
- doel: eenvoudige integraal bekomen

① $g(x) = u$

② $x = h(t)$

Opgelet: subst. volledig doorvoeren
→ integrandum aanpassen
→ dx aanpassen
→ (ev.) grenzen aanpassen

$$I = \int f(g(x)) \cdot g'(x)\,dx = \int f(u)\,du$$

$u = g(x) \Rightarrow du = g'(x)\,dx$

Oef 1 (42)

$$\int_0^2 (4x+1)^{1/2}\,dx$$

$u = 4x+1 \Rightarrow du = 4\,dx$
$\Rightarrow dx = \frac{du}{4}$

$x = 0 \Rightarrow u = 4.0+1 = 1$
$x = 2 \Rightarrow u = 4.2+1 = 9$

$$= \frac{1}{4}\int_1^9 u^{1/2}\,du = \frac{1}{4}\left[\frac{u^{3/2}}{3/2}\right]_1^9$$

$$= \frac{1}{4}\left(\frac{2.27}{3} - \frac{2}{3}\right) = \frac{2}{4.3}.26 = \frac{13}{3}$$

Oef 1(45)

$$\int \sin(3x)\cos^2(3x)\,dx = \frac{-1}{3}\int u^2\,du$$

$u = \cos(3x) \Rightarrow du = -\sin(3x).3\,dx$
$\Rightarrow \sin(3x)\,dx = -\frac{du}{3}$

$$= -\frac{1}{3}\frac{u^3}{3} + C = -\frac{1}{9}\cos^3(3x) + C$$