

Oef 4 (k)

$$\int_0^1 \frac{dx}{x-x^{4/3}}$$

1) oneigenl?

$$x=1 \quad \lim_{x \rightarrow 1^-} \frac{1}{x-x^{4/3}} = \frac{1}{0} = \infty \Rightarrow \text{oneigenl in bovengrens}$$

$$x=0 \quad \lim_{x \rightarrow 0^+} \frac{1}{x-x^{4/3}} = \frac{1}{0} = \infty \Rightarrow \text{oneigenl in ondergrens}$$

$$N = x(1-x^{1/3}) = 0 \Leftrightarrow x=0 \vee x^{1/3} = 1 \quad \downarrow \quad x=1$$

$$I = \lim_{S \rightarrow 1} \left( \lim_{\substack{t \rightarrow 0 \\ >}} \int_t^S \frac{dx}{x-x^{4/3}} \right)$$

$$\text{onbep. int: } \int \frac{dx}{x-x^{4/3}}$$

$$\text{Stel: } x = t^3 \\ \Rightarrow dx = 3t^2 dt$$

$$= \int \frac{3t^2 dt}{t^3 - t^4} = 3 \int \frac{dt}{t(1-t)}$$

$$= 3 \int \left( \frac{1}{t} + \frac{1}{1-t} \right) dt$$

$$= 3 \ln|t| - 3 \ln|1-t|$$

$$= 3 \ln \sqrt[3]{x} - 3 \ln |1 - \sqrt[3]{x}|$$

$$\begin{aligned} I &= \lim_{\substack{S \rightarrow 1 \\ <}} \lim_{\substack{t \rightarrow 0 \\ >}} \left[ 3 \ln \sqrt[3]{x} - 3 \ln |1 - \sqrt[3]{x}| \right]_t^S \\ &= \lim_{\substack{S \rightarrow 1 \\ <}} \lim_{\substack{t \rightarrow 0 \\ >}} \left[ 3 \ln \sqrt[3]{S} - 3 \ln |1 - \sqrt[3]{S}| \right. \\ &\quad \left. - \left( 3 \ln \sqrt[3]{t} - 3 \ln |1 - \sqrt[3]{t}| \right) \right] \\ &= 3 \ln 1 - 3(-\infty) - 3(-\infty) + 3 \ln 1 \\ &= +\infty \Rightarrow \text{divergent!} \end{aligned}$$