

Übungen in Analysis ◇ Exercices en Analyse ◇ T. B2 ◇ II / 12

Probl. 1 Studiere: • *Etudier*:

$$\int_{z=a}^{z=b} f(z) dz = \int_{x=z^{-1}(a)}^{x=z^{-1}(b)} f(z(x)) \cdot \frac{dz}{dx} dx \quad (\Delta z = \frac{\Delta z}{\Delta x} \Delta x \Rightarrow dz = \frac{dz}{dx} dx)$$

Sei • *Soit*: $f_1(x) = 4x \cdot \ln(x^2)$

$$\leadsto \int_1^{10} f_1(x) dx = 2 \cdot \int_1^{10} 2x \cdot \ln(x^2) dx = ? \quad (\text{Subst. } z = x^2)$$

Probl. 2 $\int_0^5 (x^5 - 6x^4 + 2x^3 + 11x^2 - x + 1) \cdot (5x^4 - 24x^3 + 6x^2 + 22x - 1) dx = ?$

Probl. 3 (a) $\int_1^{\infty} \frac{1}{x^2} dx = \lim_{z \rightarrow \infty} \int_1^z x^{-2} dx = ?$

(b) $\int_1^{\infty} \frac{1}{x} dx = ?$

(c) $\int_1^{\infty} \frac{1}{x^3} dx = ?$