

Integration by substitution.

$$\int_5^7 \frac{x^4}{x^5 - 6} dx = 0.337 \quad \text{if we set } u(x) := x^5 - 6 \quad \text{then } \frac{d}{dx}u(x) = 5 \cdot x^4 \Rightarrow x^4 \cdot dx = \frac{du}{5}$$

We will now replace  $\frac{1}{x^5 - 6}$  with  $\frac{1}{u}$  and  $x^4 \cdot dx$  with  $\frac{du}{5}$

$$\text{so... } \int_5^7 \frac{x^4}{x^5 - 6} dx = \frac{1}{5} \cdot \int_{u(5)}^{u(7)} \left(\frac{1}{u}\right) du = 0.337$$

$$\text{or... } = \frac{\ln(u)}{5} \Big|_{u(5)}^{u(7)} = \frac{\ln(x^5 - 6)}{5} \Big|_5^7 = \frac{\ln(7^5 - 6) - \ln(5^5 - 6)}{5} = 0.337$$