

Let $u = x^4$
then $du = 4x^3 dx$

$$\frac{du}{4x^3} = dx$$

and $u^{1/4} = x$

$$u = 2^4 = 16$$

$$u = (-2)^4 = 16$$

$$= \int_{16}^{16} \frac{1}{(u^2 - 1)} \cdot \frac{du}{4u^{3/4}}$$

but an integral $\int_a^a f(x) dx = 0$

$$\text{so } \int_{-2}^2 \frac{1}{x^8 - 1} dx = 0$$