11. minitest M1, 16.12.2025

$$\int \frac{x^2}{x^2-1}\,dx = \int \left(1 + \frac{1}{x^2-1}\right) dx =$$

$$x^2 : (x^2-1) = 1 + \frac{1}{x^2-1}$$
$$\underline{-(x^2-1)}$$
$$1$$

$$= \int \left(1 + \frac{\frac{1}{2}}{x-1} + \frac{\left(-\frac{1}{2}\right)}{x+1}\right) dx = x + \frac{1}{2}\ln|x-1| - \frac{1}{2}\ln|x+1|$$

$$= x + \frac{1}{2}\ln\left|\frac{x-1}{x+1}\right| + c$$

LOR

Rozklad na parciální zlomky:

$$\frac{1}{x^2-1} = \frac{1}{(x-1)(x+1)} = \frac{A}{x-1} + \frac{B}{x+1} \stackrel{?}{=} \frac{Ax+A+Bx-B}{(x-1)(x+1)}$$

$$\Rightarrow \begin{array}{ll} \text{I.} & A - B = 1 \\ \text{II.} & A + B = 0 \end{array} \quad \oplus$$

$$2A = 1$$

$$A = \frac{1}{2}$$

$$B = -\frac{1}{2}$$