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Math 501 Homework (§5.6 Inverse Functions)

Problem 1. *If* $m/n = k/l$, *where* $m, n, k, l \in \mathbb{N}$ *does* $(x^{1/n})^m = (x^{1/l})^k$?

Solution.

$$\begin{aligned}
(x^{1/n})^m &= x^{m/n} \\
&= ((x^{m/n})^l)^{1/l} \\
&= (x^{ml/n})^{1/l} && \text{using } (x^a)^b = x^{ab} \\
&= (x^k)^{1/l} && \text{hypothesis } k = ml/n \\
&= x^{k/l} \\
&= (x^{1/l})^k
\end{aligned}$$

□