P3. Let R and S be regular expressions, then consider the statement: If $R^* \equiv S^*$, then $R \equiv S$.

We prove this is false. Consider the counterexample:

Let $R = 0$ and $S = 0^*$. We obtain the result that $R^* \equiv S^*$ by the property of *idempotence* of the Kleene star. However, it is not true that $R \equiv S$ since the empty string would be in the language generated by S but not in the language generated by R.