## 0.1 Duality

Proposition 1. Formal Duality For any sentence  $\Sigma$  in the language of category theory, if  $\Sigma$  follows from the axioms for categories, then so does its dual  $\Sigma^*$ :

$$CT \Rightarrow \Sigma impliesCT \Rightarrow \Sigma^*$$

Taking a diagram to illustrate, if this is a statement  $\Sigma$ 



then this is the dual statement  $\Sigma^*$ 



Note how close this is to the idea of an opposite category  $C^{op}$ .

Proposition 2. Conceptual duality For any statement  $\Sigma$  about categories, if  $\Sigma$  holds for all categories, then so does the dual statement  $\Sigma^*$ .