

## MAT 313, Category Theory

Homework 4, Due Mon, Nov 23

To attempt: All exercises in van Oosten 5.1

To turn in: chap 4 #80, chap 5 # 92, 96, 101, and the following:

Let  $F, F'$  be functors from  $\mathcal{C}$  to  $\mathcal{D}$ , and let  $G, G'$  be functors from  $\mathcal{D}$  to  $\mathcal{E}$ . Let  $\alpha$  be a natural transformation from  $F$  to  $F'$ , and let  $\beta$  be a natural transformation from  $G$  to  $G'$ . Show that  $((\beta * \alpha)_C : C \in \mathcal{C}_0)$  is a natural transformation, where

$$(\beta * \alpha)_C = \beta_{F'C} \circ G(\alpha_C).$$