Assignment 2

Suggested Exercises from Course Notes: 31, 32, 33, 35, 37, 42, 43.

Exercises to hand-in from Course Notes: 36.

Additional Exercises to hand-in:

1. Consider the functor $G : \mathbf{Set} \longrightarrow \mathbf{Rel}$ which acts as the identity on objects and is defined on arrows by

$$G(f) = \{\langle a, b \rangle \in A \times B \mid b = f(a)\},$$

for an arrow $f : A \longrightarrow B$ in **Set**. That is, a function between sets is mapped to its graph as a relation between elements in the domain and elements in the codomain.

   (a) Show that $G : \mathbf{Set} \longrightarrow \mathbf{Rel}$ does *not* preserve products

   (b) Show that **Rel** has a finite products (Use Ex. 43 from Course Notes)

2. Let $F : \mathsf{E} \longrightarrow \mathsf{D}$ be a pullback preserving functor. Show that F preserves monomorphisms. (Hint: Use Ex. 37 from Course Notes).