Mathematisches Institut
der Universität München
Prof. Dr. B. Pareigis

WS 2001/02
Set 10

Problem set for Advanced Algebra

(37) Let $f, g : X \longrightarrow Y$ be two maps. Show that the set $\{x \in X | f(x) = g(x)\}$ with the inclusion map into X is an equalizer of $f, g : X \longrightarrow Y$.

(38) (a) Let the commutative diagram

$$\begin{array}{ccc} P & \xrightarrow{p} & A \\ {\scriptstyle q}\downarrow & & \downarrow{\scriptstyle f} \\ B & \xrightarrow[g]{} & C \end{array}$$

be a pullback (a limit) of the morphisms $f : A \longrightarrow C$ and $g : B \longrightarrow C$. Assume that g is a monomorphism. Show that p is also a monomorphism.

(b) Show that the category of sets has pullbacks.

(39) Let X and Y be two sets. Show that the disjoint union $X \dot{\cup} Y$ is a coproduct of X and Y in the category of sets.

(40) Show that the category of sets has coequalizers.

Due date: Tuesday, 8.1.2002, 16:15 in Lecture Hall 138