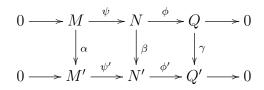
MATH 101: GRADUATE LINEAR ALGEBRA DAILY HOMEWORK #17

Problem 17.1. Let R be a ring and let



be a homomorphism of short exact sequences. Suppose that α and γ are surjective. Show that β is surjective.

Problem 17.2. Let R be a ring and let

 $0 \longrightarrow M \stackrel{\psi}{\longrightarrow} N \stackrel{\phi}{\longrightarrow} Q \longrightarrow 0$

be a short exact sequence. Let D be an R-module. Show that the map

 $\operatorname{Hom}_R(D, M) \to \operatorname{Hom}_R(D, N) \to \operatorname{Hom}_R(D, Q)$

is exact. [Hint: This is Theorem 28 on page 387 in Dummit and Foote.]

Date: Assigned Wednesday, 18 October 2017; due Friday, 20 October 2017.