Math 7120 – Homework 5 – Due: March 4, 2022

Practice problems:

Problem 1. In 17.1, read the statements and proofs of the following results:

(1) Theorem 2 (the hard part of the proof is relegated to a well-guided exercise, which I highly recommend working through)
(2) Proposition 4
(3) Proposition 5
(4) Theorem 6 (this says that the Ext functor does not depend on your choice of projective resolution)

Test prep:

Type solutions to the following problems in LaTeX, and email the tex and PDF files to me at `dbernstein1@tulane.edu` by 10am on the indicated date. Please title them as [lastname].tex and [lastname].pdf. When preparing your solutions, you must follow the rules as laid out in the course syllabus.

Graded Problems:

Problem 2. Prove that a finitely generated abelian group A is free if and only if $\mathrm{Ext}^1(A, \mathbb{Z}) = 0$

Problem 3. Prove that a direct sum $\bigoplus_\alpha A_\alpha$ of R-modules if flat if and only if each A_α is flat (use the fact that tensor product commutes with direct sum).