ALGEBRAIC TOPOLOGY IV ∥ EPIPHANY 2020
PROBLEM SHEET 3

Please hand in Problems 1 and 2 from this sheet and Problems 2 and 3 (complete proof of (a) not required) from the previous sheet on Monday 10th February, in the lecture or at my office by 5pm that day.

Problem 1. Calculate $\mathrm{Ext}^1(\mathbb{Z}/n, \mathbb{Z}/m)$ for every $n, m \geq 2$.

Problem 2. Consider the abelian group
$$G := \left\{ \frac{m}{2^n} \in \mathbb{Q} \,|\, m, n \in \mathbb{Z} \right\}.$$

(i) Calculate $\mathrm{Hom}(G, G)$.

(ii) Show that the homomorphism $p_*\colon \mathrm{Hom}(G, G) \to \mathrm{Hom}(G, G/\mathbb{Z})$ induced by the projection $p\colon G \to G/\mathbb{Z}$ is not surjective.