presentations

definition

Let A be a ring and M a module over A. A presentation of M is an exact sequence

$$R \to P \to M \to 0 \tag{1}$$

where R and P are free modules over A.

A presentation

$$R \to P \to M \to 0 \tag{2}$$

corresponds to sets of generators and relations. The image in M of a basis

$$x_i \in P$$

for P as a free module over A is a generating set for M as an A-module.

The image in P of a basis

$$r_i \in R$$

for R as an A-module corresponds to relations among the generators.

Question

Let $A = \mathbb{Z}[t]$. Let $I = (p, t)$, where p is a prime. Find a presentation of I.