

# Math 504 HW3

Due: 18.03.2019

March 10, 2019

1. Page 190: 12,13
2. (a) Page 180: 17  
(b) Suppose  $R$  is a ring with identity and  $P$  a unitary  $R$ -module. Show that  $P$  is projective if and only if for every **unitary**  $R$ -modules  $A, B$ , for every epimorphism  $g : A \rightarrow B$  and for every homomorphism  $f : P \rightarrow B$ , there is a homomorphism  $h : P \rightarrow A$  such that  $gh = f$ .  
( A sketch is provided on page 191)
3. Let  $R$  be a ring. Show that  $\prod_{i \in I} J_i$  is injective if and only if each  $J_i$  is injective.
4. Page 198: 1,2,3,5,14