**Exercise 1.** If $A$ is a finite abelian group, show that $A \otimes_{\mathbb{Z}} \mathbb{Q} = 0$.

**Exercise 2.** Show that $\mathbb{Z}_m \otimes_{\mathbb{Z}} \mathbb{Z}_n \cong \mathbb{Z}_d$, where $d = (m, n)$. **Hint:** Write $d = am + bn$ for some integers $a, b$.

**Exercise 3.** Let $M$ be an $R$-module, and $I \subset R$ an ideal. Show that $R/I) \otimes_R M \cong M/IM$.

**Exercise 4.** Let $R$ be commutative, and $I, J \subset R$ ideals. Show that $R/I \otimes_R R/J \cong R/(I + J)$.

**Exercise 5.** Let $R$ be commutative. An $R$-module is called *flat* if tensoring with that module is left exact. Show that every projective $R$-module is flat.