Universal coefficient theorem

Theorem 1. *Let P be a flat complex with each $d(P_n)$ flat. Then for all R-modules M we have a short exact sequence*

$$0 \to H_n(P) \otimes M \to H_n(P \otimes M) \to Tor_1(H_{n-1}(P), M) \to 0$$

... ■

Theorem 2. *Let P be a flat complex with each $d(P_n)$ flat and let Q be any chain complex. Then we have a short exact sequence*

$$0 \to (H_*(P) \otimes H_*(Q))_n \to H_n(P \otimes Q) \to \bigoplus_{p+q=n-1} Tor_1(H_p(P), H_q(Q)) \to 0$$

Proof Same idea as above. ■