Matroid theory: exercise sheet 11

1. Let M_1 and M_2 be regular matroids with ground sets E_1 and E_2 such that $E_1 \cap E_2$ is a triangle in both M_1 and M_2. Show that $M_1 \oplus_{\mathbb{F}_2} M_2$ is regular.

2.* Let M be a regular matroid and k a field. Show that any presentation of M over k is equivalent to a regular one.

3. Find a grip presenting a connected matroid with 8 elements which is not a wheel.

4. Let G be a connected graph and let x, y, z and t be distinct vertices of G such that z and t lie in different components of $G - \{x, y\}$. Show that $M(G, \{x, y, z, t\})$ is graphic.