

- Exercise 1** (1).      a. Find a way to hang a picture from a wire using 2 nails such that removing either nail will cause the picture to fall down. Draw your answer and explain how it can be interpreted in terms of fundamental groups.
- b. Is it possible to hang a picture from three nails such that removing any of the three nails will cause the picture to fall down? Justify your answer.

a. **Do this.**

- b. Yes, it is possible. Consider the wire arrangement corresponding to the following element of the free group on three generators  $\langle x_1, x_2, x_3 \rangle$ :

$$[x_1, x_3]^{-1}[x_1x_2, x_3][x_2, x_3]^{-1} =$$

**finish**