exercise 2. Draw a Cayley graph of the following groups.

a) $D_5$ with two generators.
   Note: Let $P_5 \subset \mathbb{R}^2$ be a regular pentagon. The dihedral group $D_5$ is the subgroup of isometries of $\mathbb{R}^2$ that maps $P_5$ onto itself. This group consists of 5 rotations and 5 reflections.

b) Draw the Cayley graph of $\mathbb{Z}/2\mathbb{Z} \times \mathbb{Z}$ with the generators $(1,0)$ and $(0,1)$.

exercise 3. Find two groups $G_1$, $G_2$ such that the corresponding undirected Cayley graphs $\Gamma_1$ and $\Gamma_2$ are isomorphic, but $G_1$ and $G_2$ are not isomorphic as groups.

exercise 4. Let $T = (V,E,\delta)$ be a tree with a finite number of edges and vertices. A vertex $v \in V$ is called leaf of $T$, if $\text{val}(v) = 1$.

a) Show that $\#V = \#E + 1$.

b) Let $\#V \geq 2$. Let furthermore $L = (v_i, \text{val}(v_i))_{i=1,\ldots,m}$ be a list of vertices $v_i$ of $T$ with valence $\text{val}(v_i) \geq 3$. Determine a formula that calculates the number of leaves of $T$ form the list $L$.

exercise 5. Show that any connected undirected graph with countably many vertices and edges contains a spanning tree. A spanning tree is a subgraph which is a tree that contains all vertices of the graph itself.