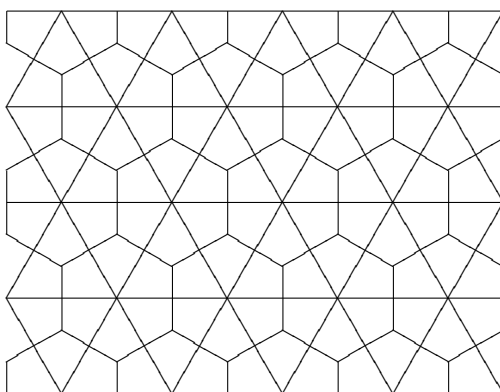


The following are wallpaper patterns. On each one, indicate the following with colored ink:

- Shortest translations, τ_v and τ_w , in two different directions, that preserve the pattern and form the boundary of a fundamental region T for \mathcal{T} .
- All n -centers for each possible n .
- All lines of symmetry.
- A fundamental region, T , for \mathcal{T} . If \mathcal{W} is a W_3 -group that contains lines of symmetry, base it at a 3-center on a line of symmetry. Otherwise base it at an n -center for the largest possible n .
- A fundamental region, S for \mathcal{W} .

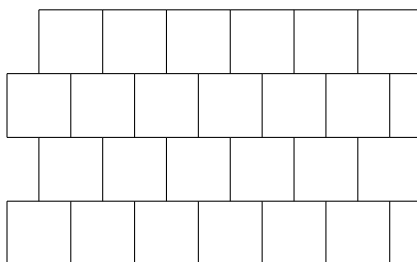
1.



a) How many \mathcal{T} -orbits are there of n -centers for each possible n and what are their isotropy subgroups?

b) Which wallpaper group is \mathcal{W} ?

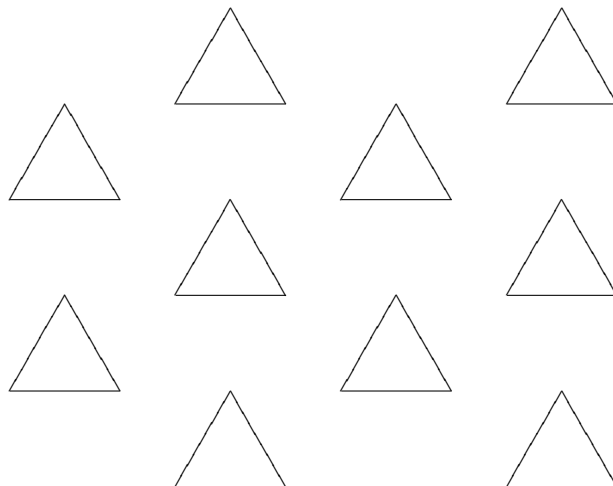
2.



a) How many \mathcal{T} -orbits are there of n -centers for each possible n and what are their isotropy subgroups?

b) Which wallpaper group is \mathcal{W} ?

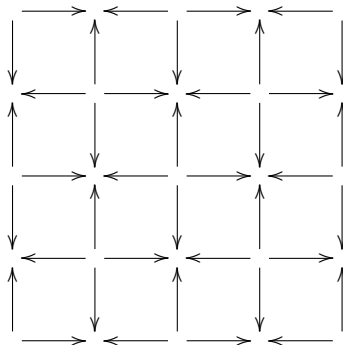
3.



a) How many \mathcal{T} -orbits are there of n -centers for each possible n and what are their isotropy subgroups?

b) Which wallpaper group is \mathcal{W} ?

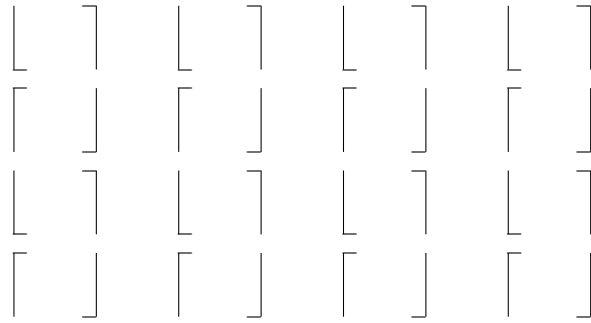
4.



a) How many \mathcal{T} -orbits are there of n -centers for each possible n and what are their isotropy subgroups?

b) Which wallpaper group is \mathcal{W} ?

5.



- a) How many \mathcal{T} -orbits are there of n -centers for each possible n and what are their isotropy subgroups?
- b) Which wallpaper group is \mathcal{W} ?