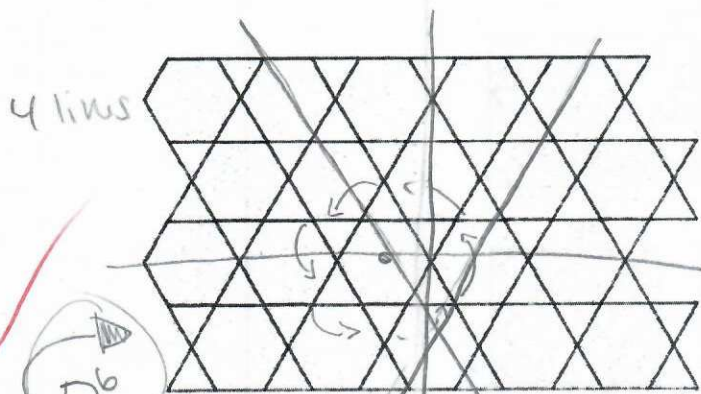


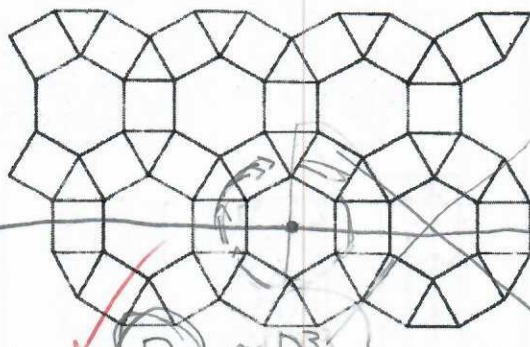
**Note:** half of your quiz grade will be assigned based on your spiral fractal. For five points of ten, attempt to classify the following wallpapers, based on the 17 Wallpaper groups (on the back of this quiz), noting the order of rotation and lines of distinctly different symmetry of each. (Recall that there will be an infinite number of lines, if they exist, because the paper will be translated.) You might write likely "candidates" next to each pattern, and circle your best guess.

You may skip one wallpaper: write "skip" on it.

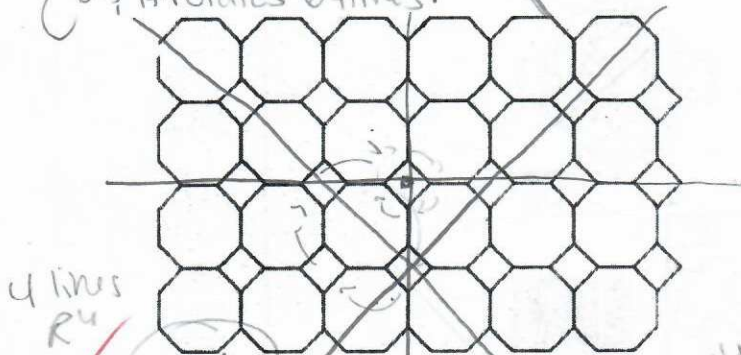
Nice work!



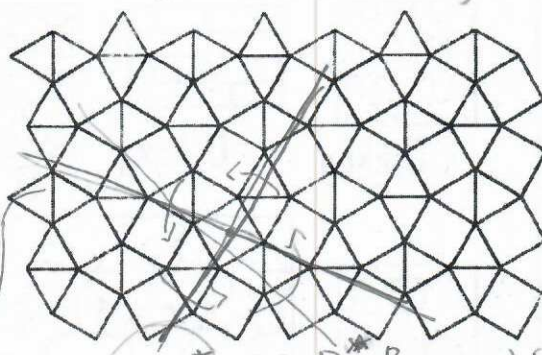
$D_6$  → because there is 6 lines of reflection/symmetry  
 $C_6$  → it rotates 6 times



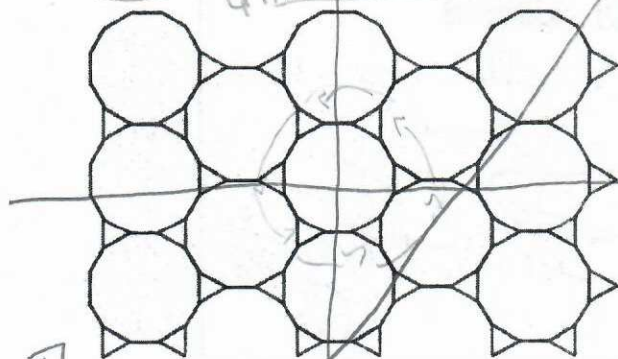
$D_6$  or  $D_3$   
 three lines of symmetry; 6 rotations



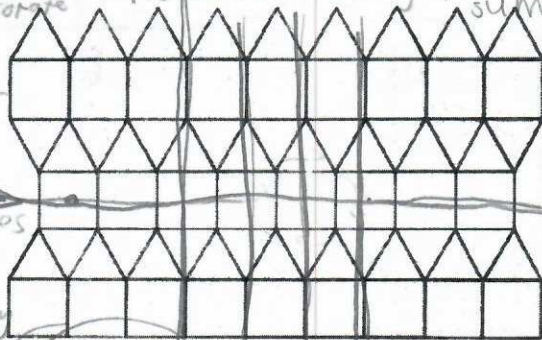
$D_4$   $R_4$   
 4 lines of symmetry; Rotates 4



$D_2$  or  $D_4$  → it's  $D_4$  because it rotates around its line of symmetry; has 4 lines of symmetry  
 it could only rotate twice



SKIP

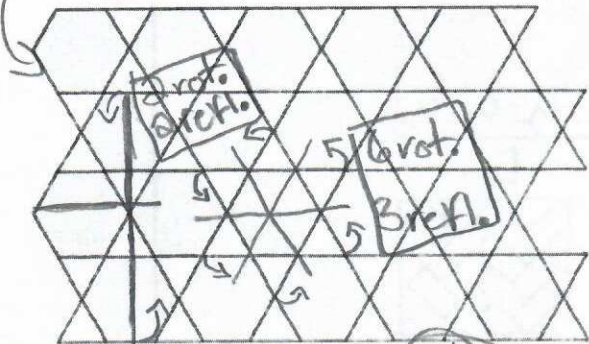


$D_2$   $R_2$   
 Because there are two line of symmetry for every group:  $\left\{ \begin{matrix} \text{line 1} \\ \text{line 2} \end{matrix} \right\}$  and one line reflecting in the middle. it also Rotates twice around its center axis

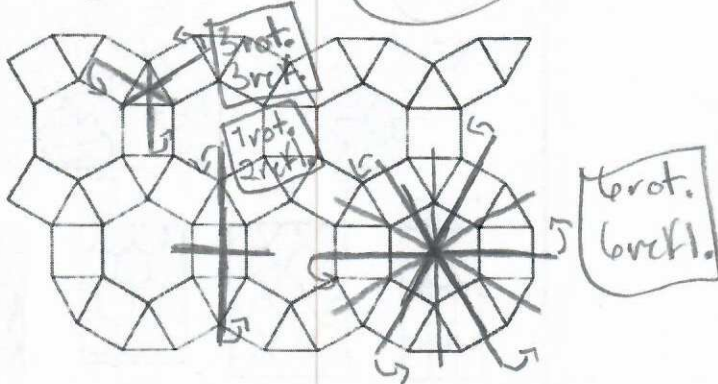
You might write likely "candidates" next to each pattern, and circle your best guess.

You may skip one wallpaper: write "skip" on it.

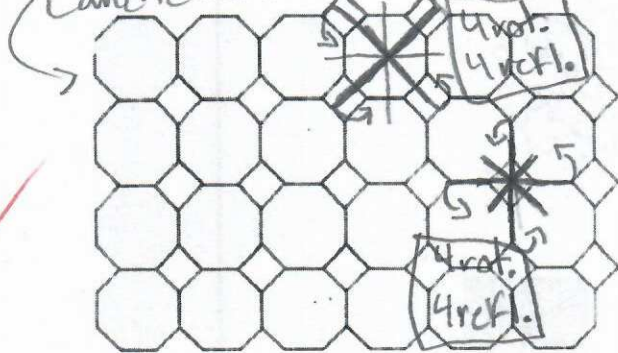
Candidates:  $D_3^*$   $D_4^*$   $D_6$



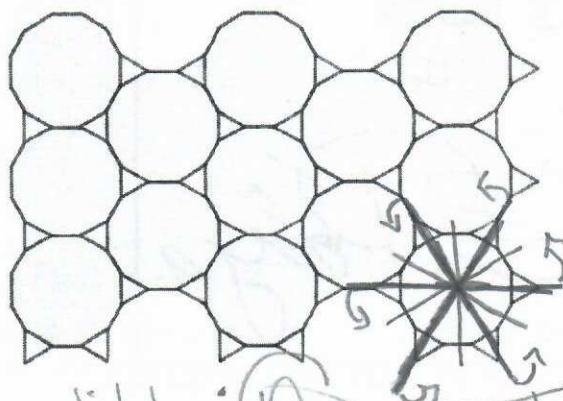
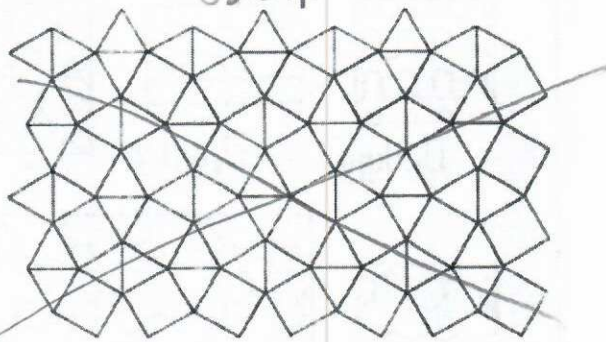
Candidates:  $D_6$   $C_6$



Candidates:  $D_2$   $D_4$   $D_6$

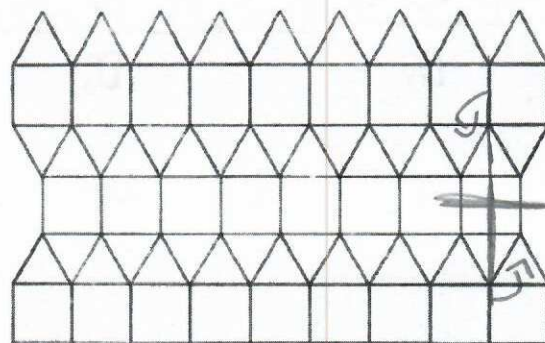


skip



Candidates:  $D_6$

6 rot.  
2 refl.

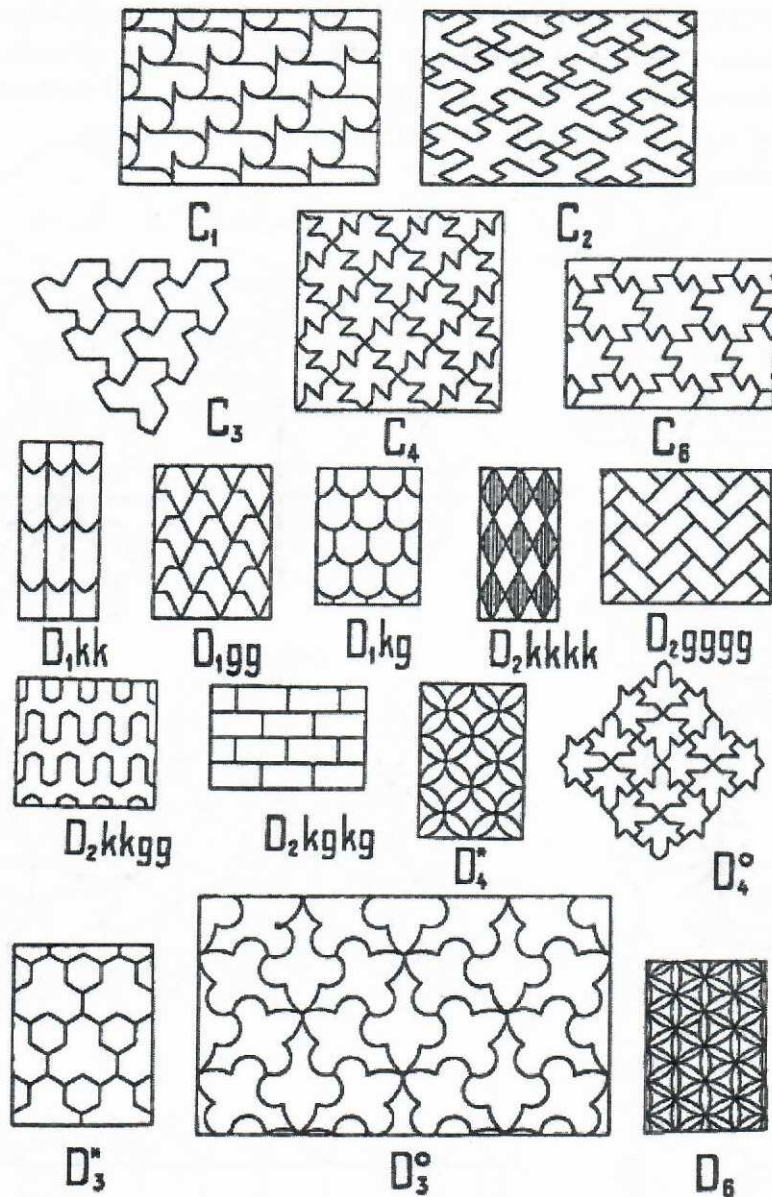


Candidates:  $D_2$   $D_4$   $D_6$

$D_2$   $D_4$   $D_6$

$D_2$

~✓



*E. Polya*