

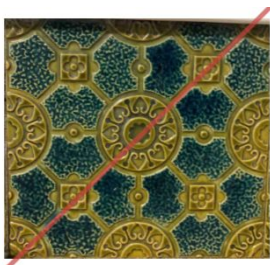
Tiles for Miles

In the main building of the Desmond estate there are 6 fireplaces; all are unique and beautiful. Most of the fireplaces are tiled. These tiles are distinct and seem to have symmetry.

Let's look at the symmetry in two different ways, reflection and rotation.

A *line of symmetry* is an imaginary line where you could fold the image and have both halves match exactly.

Ex. If you were able to fold the tile on the red line, it would produce the same image.

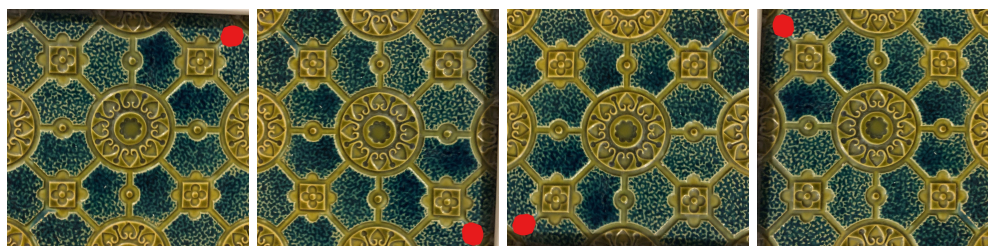


What other lines of symmetry can you discover? How many lines of symmetry does this tile have? _____

A *rotation* is an action of rotating around an axis or center.

If we were to rotate a tile, it should look the same before and after rotation. In how many ways can we rotate the tile so that it looks the same as before?

For example, the following tile can be rotated 90 degrees, 180 degrees, 270 degrees and 360 degrees (0 degrees) and the tile would look the same! A red dot has been added to indicate the start position. See below.



Rotation of 0/ 360 Rotation of 90 Rotation of 180 Rotation of 270

Except for the red dot, all four tiles are identical after a rotation.

The symmetries we have observed are examples of *rigid motions*, a way of moving all the points in the plane so that (a) the relative distance between points stays the same and (b) the relative position of the points stays the same. There are four types of rigid motions: *reflection*, *rotation*, *translation*, and *glide reflection*. We only observed reflections and rotations.