Extra homework problems on bijective functions, compositions and symmetry.

Think of the set $X = \{1, 2, 3, 4\}$ as the set of vertices of the square in the figure below. Write down all the symmetries of the square explicitly as elements of the set $\mathrm{Perm}(X)$. How many symmetries are there? Describe them geometrically (as rigid motions of the plane), and write down the composition table for these symmetries.
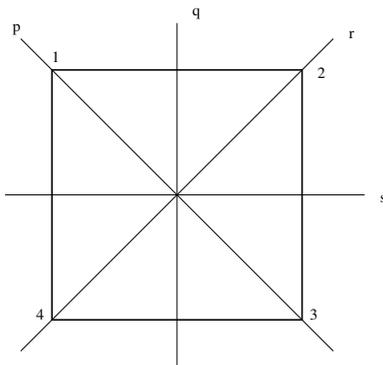
Think of the set $Y = \{1, 2, 3, 4, 5\}$ as the set of vertices of the pentagon in the figure below. Write down all the symmetries of the pentagon explicitly as elements of the set $\mathrm{Perm}(Y)$. How many symmetries are there? Describe them geometrically, and write down the composition table for these symmetries.
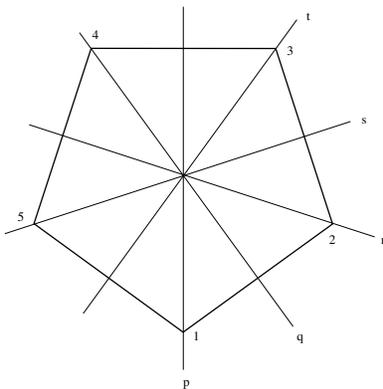
How many symmetres does the figure in the picture below have? Describe them geometrically, and identify them among the set of permutations in your previous answer.