**Topic 4 Worksheet**

is the symmetry group of the 4-gon, or the square.

Since = with = **,**  = with

= = 90.

**Problem 1:** Label the corners of the square undergoing the given symmetry transformations of

|  |  |
| --- | --- |
|  | The symmetry transformations of are:  e: no transformation  r: clockwise rotation of 90  : clockwise rotation of 180  : clockwise rotation of 270  f: reflection about symmetry axis  rf: clockwise rotation of 90 and  then reflection about the  symmetry axis  : clockwise rotation of 180  and then reflection about  the symmetry axis  : clockwise rotation of 270  and then reflection about  the symmetry axis |

**Problem 2:** Complete the Cayley table for . Use the Cayley table for and the given transformation to show that is equivalent to

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table**  =   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **\*** | **e** | **r** |  |  | **f** | **rf** |  |  | | e |  |  |  |  |  |  |  |  | | r |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  | | f |  |  |  |  |  |  |  |  | | rf |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  | | e e  r a  b  c  d  rf | **Table**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **\*** | e | a | b | c | d | f | g | h | | e |  |  |  |  |  |  |  |  | | a |  |  |  |  |  |  |  |  | | b |  |  |  |  |  |  |  |  | | c |  |  |  |  |  |  |  |  | | d |  |  |  |  |  |  |  |  | | f |  |  |  |  |  |  |  |  | | g |  |  |  |  |  |  |  |  | | h |  |  |  |  |  |  |  |  | |

Is abelian?

\* See Topic 3 Homework Problems for