Solution to HW #1, Question 8

Symmetries of the Square: D_4, the Dihedral Group of Degree 4

The eight possible symmetries of the square form a group with $* =$ composition.

$*$	e	R_{90}	R_{180}	R_{270}	H	V	D_{13}	D_{24}
e	e	R_{90}	R_{180}	R_{270}	H	V	D_{13}	D_{24}
R_{90}	R_{90}	R_{180}	R_{270}	e	D_{24}	D_{13}	H	V
R_{180}	R_{180}	R_{270}	e	R_{90}	V	H	D_{24}	D_{13}
R_{270}	R_{270}	e	R_{90}	R_{180}	D_{13}	D_{24}	V	H
H	H	D_{13}	V	D_{24}	e	R_{180}	R_{90}	R_{270}
V	V	D_{24}	H	D_{13}	R_{180}	e	R_{270}	R_{90}
D_{13}	D_{13}	V	D_{24}	H	R_{270}	R_{90}	e	R_{180}
D_{24}	D_{24}	H	D_{13}	V	R_{90}	R_{270}	R_{180}	e

Table 1: Complete multiplication table for the 8 symmetries of the square.