46

9. (6 points) This problem has TWO parts.

(a) LIST the right cosets of $<\sigma>$ in D_4.

$<\sigma> i_0 = \{i_0, \sigma\}$

$<\sigma> \rho = \{\rho, \sigma\rho\}$

$<\sigma> \rho^2 = \{\rho^2, \sigma\rho^2\}$

$<\sigma> \rho^3 = \{\rho^3, \sigma\rho^3\}$

(b) Let S equal the set of right cosets of $<\sigma>$ in D_4. Is

$$(<\sigma>x, <\sigma>y) \mapsto <\sigma>xy$$

a well-defined FUNCTION from $S \times S$ to S? EXPLAIN.

<u>NO</u> $<\sigma>\rho = <\sigma>\sigma\rho$

$<\sigma>\rho = <\sigma>\sigma\rho$

but $<\sigma>\rho \cdot <\sigma>\rho$ " = " $<\sigma>\rho^2$ we are different

and $<\sigma>\sigma\rho \cdot <\sigma>\sigma\rho$ " = " $<\sigma>\sigma\rho\sigma\rho = <\sigma>i_0$