(4)

5. Recall that D_3 is the smallest subgroup of the group of rigid motions which contains ρ and σ, where ρ is rotation counter clockwise by 120° fixing the origin and σ is reflection of the xy plane across the x axis. List 4 subgroups of D_3 in addition to D_3 and $\{id\}$. (I do not need to see any details.)

$\{id, \sigma\}$

$\{id, \sigma\rho\}$

6 $\{id, \sigma\rho^2\}$

$\{id, \rho, \rho^2\}$

6. Let x and y be elements of the group $(G, *)$. Suppose that the inverse of x is called x^{-1} and the inverse of y is called y^{-1}. Write the inverse of $x*y$ in terms of x^{-1} and y^{-1}. Explain why your answer is correct.

5

The inverse of $x*y$ is $y^{-1} * x^{-1}$ because

$(x * y) * (y^{-1} * x^{-1}) = x * (y * y^{-1}) * x^{-1} = x * x^{-1} = id$.