

We need to show $ea = a$ and $y(a)a = e$, for all $a \in G$.

$$\begin{aligned}
 e &= y(a)y(y(a)) = (y(a)e)y(y(a)) = \\
 & (y(a)(ay(a)))y(y(a)) = \\
 & ((y(a)a)y(a))y(y(a)) = \\
 & (y(a)a)(y(a)y(y(a))) = \\
 & (y(a)a)e = \\
 & y(a)a
 \end{aligned}$$

Using this we also easily have $a = ae = a(y(a)a) = (ay(a))a = ea$.