Introduction to Coding Theory Assignment 14

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1 Q1

$e_R = 1, 2$, $e_L =$ does not exist

2 Q2

$e_L = 0, -1, 1$, $e_R =$ does not exist

3 Q3

$e_R =$ does not exist , $e_L =$ does not exist

4 Q4

(a)
$e_L = e_R$
Suppose both exist for $\circ$ over elements of S.
Then, look at $e_L \circ e_R$
This gives us $e_L \circ e_R = e_R$
But as e_R is the right identity, we get $e_L \circ e_R = e_L$
As such, $e_L = e_R$

(b) We already know that if e_L and e_R exist, then $e_L = e_R$
Let $e = e_L = e_R$, and have two distinct values e_1 and e_2, such that $e_1 \neq e_2$
Then we get $e_1 \circ e_2 = e_1$, and $e_1 \circ e_2 = e_2$
Therfore, either e_L or e_R is unique.

5 Q5

(a)

$$\begin{bmatrix} 1/4 & 1/4 \\ 1/4 & 1/4 \end{bmatrix}$$

(b)

$$\begin{bmatrix} 1/2 & 1/2 \\ 1/2 & 1/2 \end{bmatrix}$$