3.1 (a) 0.

$q_1\, 0 \sqcup$
$\sqcup\, q_2 \sqcup$
$\sqcup\, \sqcup\, q_{accept}$

(b) 00.

$q_1\, 0\, 0 \sqcup$
$\sqcup\, q_2\, 0 \sqcup$
$\sqcup\, x\, q_3 \sqcup$
$\sqcup\, q_5\, x \sqcup$
$q_5\, \sqcup\, x \sqcup$
$\sqcup\, q_2\, x \sqcup$
$\sqcup\, x\, q_2 \sqcup$
$\sqcup\, x\, \sqcup\, q_{accept}$

(c) 000.

$q_1\, 0\, 0\, 0 \sqcup$
$\sqcup\, q_2\, 0\, 0 \sqcup$
$\sqcup\, x\, q_3\, 0 \sqcup$
$\sqcup\, x\, 0\, q_4 \sqcup$
$\sqcup\, x\, 0\, \sqcup\, q_{reject}$

(d) 000000.

$q_1\,0\,0\,0\,0\,0\,0\,\sqcup$

$\sqcup\,q_2\,0\,0\,0\,0\,0\,\sqcup$

$\sqcup\,x\,0\,q_4\,0\,0\,0\,\sqcup$

$\sqcup\,x\,0\,x\,q_3\,0\,0\,\sqcup$

$\sqcup\,x\,0\,x\,0\,q_4\,0\,\sqcup$

$\sqcup\,x\,0\,x\,0\,x\,q_3\,\sqcup$

$\sqcup\,x\,0\,x\,0\,q_5\,x\,\sqcup$

$\sqcup\,x\,0\,x\,q_5\,0\,x\,\sqcup$

$\sqcup\,x\,0\,q_5\,x\,0\,x\,\sqcup$

$\sqcup\,x\,q_5\,0\,x\,0\,x\,\sqcup$

$\sqcup\,q_5\,x\,0\,x\,0\,x\,\sqcup$

$q_2\,\sqcup\,x\,0\,x\,0\,x\,\sqcup$

$\sqcup\,q_2\,x\,0\,x\,0\,x\,\sqcup$

$\sqcup\,x\,q_2\,0\,x\,0\,x\,\sqcup$

$\sqcup\,x\,x\,q_3\,x\,0\,x\,\sqcup$

$\sqcup\,x\,x\,x\,0\,q_4\,x\,\sqcup$

$\sqcup\,x\,x\,x\,0\,x\,q_4\,\sqcup$

$\sqcup\,x\,x\,x\,0\,x\,\sqcup\,q_{reject}$

3.2 (a) 11.

$q_1\,1\,1\,\sqcup$

$x\,q_3\,1\,\sqcup$

$x\,1\,q_3\,\sqcup$

$x\,1\,q_{reject}\,\sqcup$

(b) 1#1.

$q_1 \, 1 \, \# \, 1 \sqcup$

$x \, q_3 \, \# \, 1 \sqcup$

$x \, \# \, q_5 \, 1 \sqcup$

$x \, q_6 \, \# \, x \sqcup$

$q_7 \, x \, \# \, x \sqcup$

$x \, q_1 \, \# \, x \sqcup$

$x \, \# \, q_8 \, x \sqcup$

$x \, \# \, x \, q_8 \sqcup$

$x \, \# \, x \, \sqcup \, q_{accept}$

(c) 1##1.

$q_1 \, 1 \, \# \, \# \, 1 \sqcup$

$x \, \# \, q_5 \# \, 1 \sqcup$

$x \, \# \, q_{reject} \# \, 1 \sqcup$

(d) 10#11.

$q_1 \, 1 \, 0 \, \# \, 1 \, 1 \sqcup$

$x \, q_3 \, 0 \, \# \, 1 \, 1 \sqcup$

$x \, 0 \, q_3 \, \# \, 1 \, 1 \sqcup$

$x \, 0 \, \# \, q_5 \, 1 \, 1 \sqcup$

$x \, 0 \, q_5 \, \# \, x \, 1 \sqcup$

$x \, 0 \, q_6 \, \# \, x \, 1 \sqcup$

$x \, q_7 \, 0 \, \# \, x \, 1 \sqcup$

$q_7 \, x \, 0 \, \# \, x \, 1 \sqcup$

$x \, q_1 \, 0 \, \# \, x \, 1 \sqcup$

$x \, x \, q_2 \, \# \, x \, 1 \sqcup$

$x \, x \, \# \, q_4 \, x \, 1 \sqcup$

$x \, x \, \# \, x \, q_4 \, 1 \sqcup$

$x \, x \, \# \, x \, q_{reject} \, 1 \sqcup$

(e) 10#10.

$q_1\,1\,0\,\#\,1\,0\,\sqcup$

$x\,q_3\,0\,\#\,1\,0\,\sqcup$

$x\,0\,q_3\,\#\,1\,0\,\sqcup$

$x\,0\,\#\,q_5\,1\,0\,\sqcup$

$x\,0\,q_6\,\#\,x\,0\,\sqcup$

$x\,q_7\,0\,\#\,x\,0\,\sqcup$

$q_7\,x\,0\,\#\,x\,0\,\sqcup$

$x\,q_1\,0\,\#\,x\,0\,\sqcup$

$x\,x\,q_2\,\#\,x\,0\,\sqcup$

$x\,x\,\#\,q_4\,x\,0\,\sqcup$

$x\,x\,\#\,x\,q_4\,0\,\sqcup$

$x\,x\,\#\,q_6\,x\,x\,\sqcup$

$x\,x\,q_6\,\#\,x\,x\,\sqcup$

$x\,q_7\,x\,\#\,x\,x\,\sqcup$

$x\,x\,q_1\,\#\,x\,x\,\sqcup$

$x\,x\,\#\,q_8\,x\,x\,\sqcup$

$x\,x\,\#\,x\,q_8\,x\,\sqcup$

$x\,x\,\#\,x\,x\,q_8\,\sqcup$

$x\,x\,\#\,x\,x\,\sqcup\,q_{accept}$

3.3 Solution in book.

3.4 An enumerator E can be defined as a 2-tape Turing machine with the transition function:

$$\delta : Q \times \Gamma_{tape} \longrightarrow Q \times \Gamma_{tape} \times \Gamma_{print} \times \{L, R, S\} \times \{R, S\}$$

The language enumerated by the enumerator is $L \subseteq \Gamma_p*$.