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 $L \subseteq \Gamma_p^*$.

3.5 Solution in book.

3.6 For any given S_i, there is no guarantee M will not loop (i.e. not accept or reject the input), meaning there is no guarantee the algorithm will complete.