draw the state diagram of a pushdown automaton.

a) $\{w/w \text{ starts and ends with same symbol}\}$.

b) $\{w \mid \text{the length of } w \text{ is odd}\}$.

a)

$0, \varepsilon \to \varepsilon$
$1, \varepsilon \to \varepsilon$

$0, 0 \to \varepsilon$
$1, 1 \to \varepsilon$

$0, \varepsilon \to 0$
$1, \varepsilon \to 1$

q_1 → q_2 → q_3

$0, \varepsilon \to \varepsilon$
$1, \varepsilon \to \varepsilon$

b)

$0, \varepsilon \to \varepsilon$
$1, \varepsilon \to \varepsilon$

q_1 → q_2

$0, \varepsilon \to \varepsilon$
$1, \varepsilon \to \varepsilon$