Problem 5

i) $L = \{w : w \in \{a,b\}^* \mid \#a(w)=\#b(w) \bmod 3\}$

Comments: Most people got this. Another solution a few gave was
$L = \{\varepsilon, ab, ba, aaa, bbb, aabb, bbaa\}^*$. A counter example just noticed to this solution is string 'aababaa'. Intuitively, one can iterate between the 2 non-final nodes indefinitely. This is the reason you should favor the first approach in expressing solutions.

ii) $L = \{0,1\}^* - R$
where we define the strings rejected as $R = \{w: w \in \{0,1\}^* \mid \exists x,y \in \{0,1\}^*$ s.t. $w=xy$, $y = 00$ or $y=11$ and x contains substring 00 or 11$\}$

Comments: Expressing the language computed by this automaton was a bit trickier. When struggling to generalize the strings accepted by an automaton, it may be beneficial to examine the strings rejected, as it was in this case.

In general, try to be more formal and at the same time less sloppy. Some students just listed the strings this automaton rejected, and gave no further explanation. The question asked for the language the automaton computes.