a) $l_{i_1} = -2(-149.521 - (-134.178)) = \underline{30.68}$

$l_{i_2} = -2(-139.747 - (-134.178)) = \underline{11.14}$

$l_{i_1}, l_{i_2} = -2(-152.763 - (-134.178)) = \underline{37.17}$

For l_{i_1} @ $\alpha = 5\%$ $\chi^2(1) = 3.84$
hence H_0 rejected

l_{i_2} @ $\alpha = 5\%$ $\chi^2(1) = 3.84$.
hence H_0 rejected

l_{i_1}, l_{i_2} @ $\alpha = 5\%$, $\chi^2(2) = 5.99$
hence H_0 rejected.

Hence l_{i_1}, l_{i_2} & (l_{i_1}, l_{i_2}) are all significant

b) Mc Fadden R^2 could be used, because number of coefficient are the same,

$$R^2 = 1 - \frac{\log(L(\theta))}{\log(L(\theta_0))}$$

$R_1^2 = 0.1216$ $R_2^2 = 0.1220$ $R_3^2 = 0.1467$ $R_4^2 = 0.1460$

Third model R_3^2 performs well.