The figure above shows the high pass L match topology $R_s = 8 \, \text{ohm}$ and $R_p = 75 \, \text{ohm}$.

$$Q^2 = \frac{R_p}{R_s} - 1$$

$Q \approx 2.9$, $Q = \frac{X_s}{R_s}$ and $Q = \frac{X_p}{R_p}$ putting values in for $R_s$ and $R_p$ we get $X_s = -j \, 23.2$ and $X_p = j \, 25.86$

b-

at 100 Mhz $1/\omega C = 23.2$ gives $C \approx 68 \, \text{pF}$ and $\omega L = 25.86$ gives $L \approx 40 \, \text{nH}$

c and d ) If the circuit given above matches 8 ohms to 75 ohm if the L match circuit is flipped the matching should be from 75 ohms to 8 ohms. The matching circuit below does the job.

The impedences are the same $C = 68 \, \text{pF}$ and $L = 40 \, \text{nH}$ below the matching can be seen on the smith chart.
8 ohm to 50 ohm match
2. a-

We have to get rid of the 25 j using the capacitor. Thus taking $R_s=10$ and $R_p=100$ we get $Q^2=(R_p/R_s)-1$. If $Q=3$, $X_s/R_s=Q$ and $R_p/R_s=Q$ gives $X_s=-30j$ and $X_p=33.33j$ but we have to include the $j25$ of the load in the serial match component $X_s=-30j-25j=-55j$ and $X_p=33.33j$.

b- The match should be performable with $Q=2$, $X_s=-20j-25j$ and $X_p=25j$.

c- $X_s=-1.36j$ and $X_p=0.75j$. 