2.19) (a) \[ \frac{Z_{in}}{50} = 2 - j2 \]
\[ Y_{in} = \frac{1}{Z_{in}} = 0.25 + j0.25 \]
\[ l_1 = 0.339\lambda - 0.25\lambda = 0.089\lambda \]
\[ l_2 = 0.042\lambda + (0.5\lambda - 0.32\lambda) = 0.219\lambda \]

(b) If \( l_1 \) is an open-circuited stub, then
\[ l_2 = 0.25\lambda + 0.089\lambda = 0.339\lambda \]

(c) For \( Z_{in} = \frac{2Z_{L}}{50} = 2 + j2 \), one answer is:

If \( l_1 \) is an open-circuited stub, then
\[ l_2 = 0.25\lambda + 0.089\lambda = 0.339\lambda \]
2.23) $\alpha_1 = 0.5 \lambda$, $\phi_1 = 0.6 + 0.8$  
\[ \frac{y_1}{2} = 0.6 - 0.8 \]

From the Smith Chart:
\[ l_1 = 0.126 \lambda, \quad l_2 = 0.375 \lambda - 0.166 \lambda = 0.209 \lambda \]

In Fig. P.22(b):
\[ Y = \frac{0.6 - 0.8}{50} = 12 - j 16 \text{ mS} \]
\[ Z_{01} = \frac{1}{50 \left( \frac{1}{12.16} \right)} = 64.5 \Omega \]

Using a $\frac{3\lambda}{8}$ open-circuited stub:
\[ \frac{1}{Y_{02}} = \frac{1}{16} \text{ mS}, \quad \text{or} \quad Y_{02} = 16 \text{ mS} \]
\[ Z_{02} = \frac{1}{160 \lambda^2} = 62.5 \Omega \]

(b) Balanced Form of the Stubs.
For Fig. P.22(a):
\[ Y_{ba} = \frac{1.15}{2} = 0.575 \Rightarrow l_1(ba) = 0.083 \lambda \]
For Fig. P.22(b):
\[ Z_{02(ba)} = 2(62.5) = 125 \Omega \]