Learning Objective 3.5: I can identify the various quantities represented on the Smith Chart.

Show your work. Check each calculation on a printed Smith chart. Write a **Documentation** line at the end (**None** if you did not collaborate). All lines are lossless with $Z_0 = 50\,\Omega$.

1. **From impedance to Γ.** Each load below terminates a $50\,\Omega$ line.

   (a) $Z_L = 100 - j50\,\Omega$. Find z_L, Γ in rectangular and polar form, and the VSWR.

   Γ =

   VSWR =

   (b) $Z_L = 25 + j25\,\Omega$. Find Γ in polar form.

   Γ =

   (c) The loads in parts (a) and (b) have the same $|\Gamma|$. What does that mean on the chart, and what does it say about their VSWRs?

2. **From Γ to impedance.** Use $z = (1+\Gamma)/(1-\Gamma)$.

   (a) $\Gamma = 0.5\angle 90°$. Find Z_L.

   $Z_L =$

   (b) $\Gamma = -0.6$. Find Z_L, and say where the point is on the chart.

   $Z_L =$

   (c) Without computing, name the load at each point: $\Gamma = -1$, $\Gamma = 0$, $\Gamma = +1$, and $\Gamma = +j$.

3. **The grid circles.**

(a) Find the center and radius of the $r = 3$ circle.

center =

radius =

(b) Find the center and radius of the $x = 0.5$ circle.

center =

radius =

(c) A load has a VSWR of 3. Find $|\Gamma|$, and the two resistances where its VSWR circle crosses the real axis.

$|\Gamma|$ =

crossings =

Documentation: _____