1) Plot reflection coefficient $\Gamma = 0.707\angle -45°$ for a 50 Ω transmission line

- Use straight edge to draw radial line from center of Smith chart through the -45° mark on "ANGLE OF REFLECTION COEFFCIENT IN DEGREES" scale (inner ring surrounding Smith chart).
- Use "REFL. COEFF. V or I" scale at bottom right of chart to set compass to $|\Gamma| = 0.707$, and draw arc, centered on Smith chart, through -45° radial line.
- The intersection of radial line & arc marks $\Gamma = 0.707\angle -45°$ on Smith chart.

2) Read normalized impedance *z* corresponding to $\Gamma = 0.707\angle -45°$

- On Smith chart, at $\Gamma = 0.707\angle -45°$ point, locate and read/interpolate value of appropriate "*r*" circle (family of circles centered on horizontal axis and with values shown on horizontal axis) as ***r* = 1**.
- On Smith chart, at $\Gamma = 0.707\angle -45°$ point, locate and read/interpolate value of appropriate "*x*" arc (reactance values shown on inside of outer ring of Smith chart; values above horizontal axis are positive/inductive while those below are negative/capacitive) as ***x* = -2**.
- Put together to get normalized impedance $\boldsymbol{z = 1 - j2\ \Omega/\Omega}$**.**
- Find impedance corresponding to $\Gamma = 0.707\angle -45°$ by multiplying *z* w/ characteristic impedance to get $Z = Z_0 z = 50(1 - j2) \Rightarrow \boldsymbol{Z = 50 - j100\ \Omega}$.

3) Read standing wave ratio SWR (VSWR) corresponding to $\Gamma = 0.707\angle -45°$

- Use "REFL. COEFF. V or I" scale at bottom right to set your compass to $|\Gamma| = 0.707$.
- Draw 0.707 arc, centered on Smith chart scales, through SWR (VSWR) scale on bottom left.
- Read standing wave ratio to be **VSWR = 5.8 .**

Simple Smith Chart