Definitions

The proof is mostly in http://mathworld.wolfram.com/Circle-CircleIntersection.html

We take $R_1 = 1$ and $d = b$. The sine of the angle λ is therefore just $\frac{x}{R_1} = x = \frac{1 - r^2 + b^2}{2b}$, so

$$\lambda = \text{ArcSin}\left[\frac{1 - r^2 + b^2}{2\,b}\right]$$

The sine of the angle $-\phi$ is then $\frac{b - x}{r} = -\frac{1 - r^2 - b^2}{2\,b\,r}$, so

$$\phi = \text{ArcSin}\left[\frac{1 - r^2 - b^2}{2\,b\,r}\right].$$