

Pole 1 X, Y  $x_1 := 2$   $y_1 := 2$  measured Range 1  $r_1 := 1$

Pole 2 X, Y  $x_2 := 2.5$   $y_2 := 1.5$  measured Range 2  $r_2 := 1$

Guess (you expect to be here) ->  $p := 2$   $q := 1$

STEP 1 - Find coordinates of sensor >

Given  $r_1^2 = (x_1 - p)^2 + (y_1 - q)^2$

$r_2^2 = (x_2 - p)^2 + (y_2 - q)^2$

answer := Find(p, q)

answer =  $\begin{pmatrix} 1.589 \\ 1.089 \end{pmatrix}$

STEP 2 - Find bearing of chassis >

step 2a - bearing of marker 1 relative to sensor position

bearing<sub>1</sub> :=  $\text{atan}\left[\frac{(y_1 - \text{answer}_1)}{(\text{answer}_0 - x_1)}\right]$

bearing<sub>1</sub> = -65.705 deg

step 2b - add measured angle of pole relative to chassis heading.  
This could be repeated with the measured angle of the second pole and averaged.

$\theta_{\text{radar1}} := -20\text{-deg}$

$\theta_{\text{chassis}} := \text{bearing}_1 - \theta_{\text{radar1}}$

$\theta_{\text{chassis}} = -45.705\text{ deg}$

STEP 3 - Find coordinates of middle of chassis (0.15m behind sensor say) >

$a := \text{answer}_0 - 0.15 \cdot \cos(-\theta_{\text{chassis}})$

$a = 1.484$

$b := \text{answer}_1 - 0.15 \cdot \sin(-\theta_{\text{chassis}})$

$b = 0.981$

