



# In-class Question 2: How to calculate arc length?

**d** is distance A to B  $= \text{sqrt}(dx^2 + dy^2)$

$\alpha$  is angular change from A to B  $= \text{atan2}(dy, dx) - \text{robot.phi}$

From drawing:

$$\sin(\alpha/2) = (d/2) / r$$

solving for r:

$$r = d / (2 * \sin(\alpha/2))$$

We know for arc s:

$$s = r * \alpha$$

(assuming  $\alpha$  in range  $[0..2\pi]$ )

otherwise first convert from degrees to rad)

