

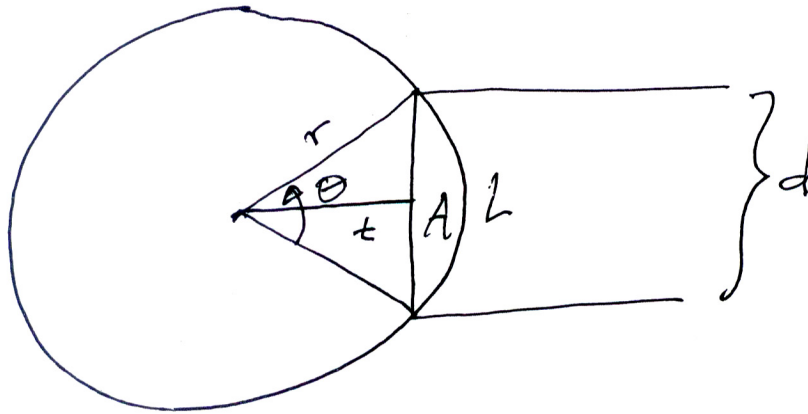
The Bow-and-Arrow Problem

A chord of length d is at distance t from the center of a given circle.

- 1) Calculate the length of the arc subtended by the chord.
- 2) Calculate the area of the minor segment.

Note: Round intermediate results to 3 decimal places, and final results to 2 decimal places.

Solution:



$$t \tan\left(\frac{\theta}{2}\right) = \frac{\left(\frac{d}{2}\right)}{t} = \frac{d}{2t}$$

$$\therefore \frac{\theta}{2} = \arctan\left(\frac{d}{2t}\right)$$

$$\therefore \theta = 2 \arctan\left(\frac{d}{2t}\right)$$

$$r = \sqrt{t^2 + \left(\frac{d}{2}\right)^2}$$

$$L = r\theta$$

$$A = \frac{1}{2}r^2(\theta - \sin\theta)$$

θ measured in radians

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