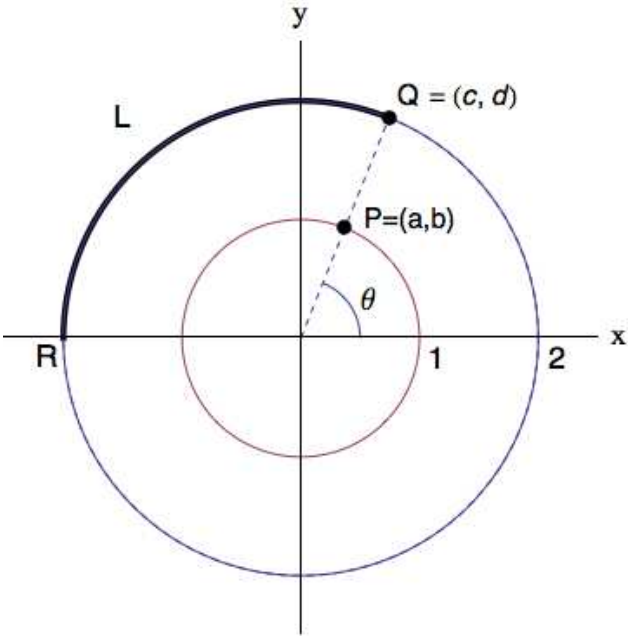
6. [6 points] The points $P = (a, b)$ and $Q = (c, d)$ lie on the unit circle and the circle of radius 2, respectively, centered at the origin. The point P lies in the line segment between the origin and the point Q. The angle θ (measured in radians), is formed by the positive x-axis and the line between the origin and the point Q (see the figure below).



a. [2 points] Find an expression in terms of θ that computes the length L of the arc between the points Q and $R = (-2, 0)$ (see the the arc in bold in the figure above).

L=_____.

b. [4 points] Find a formula for each of the quantities below **only** in terms of the constants **a** and/or **b**.

$\cos\theta =$ _____ $\tan\theta =$ _____

$c =$_____ $\sin(\theta + \pi) =$ _____