# Kharazmi University

# Faculty of Physics

## شماره‌ی تکلیف: ۴

**Problem 1:**

Find the arc length of the function $y = \frac{1}{2}(e^x + e^{-x})$ from $x = -2$ to $x = 2$.

**Answer:** $e^2 - e^{-2}$

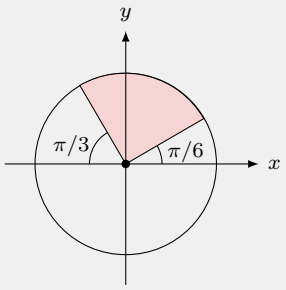
**Problem 2:**

Find the arc length of the function $y = f(x) = \int_1^x \sqrt{x'^2 - 1}dx'$ from $x = 2$ to $x = 4$

**Answer:** $6$

**Problem 3:**

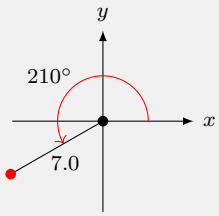
Consider a circular disk with radius $a$. Calculate the area of the portion of this circle that is enclosed between the angles $\phi = \frac{\pi}{6}$ and $\phi = \frac{2\pi}{3}$.




**Answer:** $\frac{\pi a^2}{4}$

**Problem 4:**

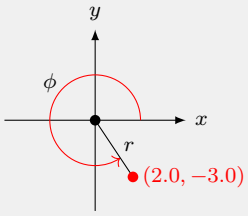
Find the cartesian coordinates of the point whose polar coordinates are $(\rho, \phi) = (7.0, 210°)$.



**Answer:** $\left(-\frac{7\sqrt{3}}{2}, -\frac{7}{2}\right) = (-6.06, -3.5)$

**Problem 5:**

Find the polar coordinates of the point whose cartesian coordinates are $(x, y) = (2.0, -3.0)$.




$$(\rho, \phi) = ?$$

**Answer:** $\left(\sqrt{13},\ 2\pi - \tan^{-1}\left(\frac{3}{2}\right)\right) = (3.61, 303.69°)$