Thursday, May 9, 2019 9:44 AM

(25) $r = \theta$

$\frac{dr}{d\theta} = 1$

$$\int_0^{\pi} \sqrt{\theta^2 + 1^2}\, d\theta$$

use table of integrals

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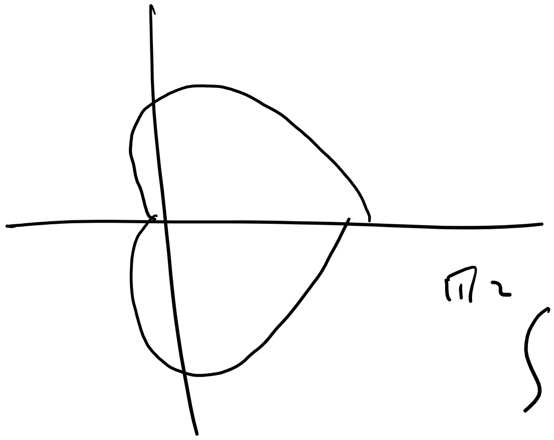

$r = 1 + \cos\theta$

$\frac{dr}{d\theta} = -\sin\theta$

$$\int_0^{\pi/2} \sqrt{(1+\cos\theta)^2 + \sin^2\theta}\, d\theta$$

(16) $\frac{1}{2}\int_0^k \theta^2 \, d\theta = \frac{1}{2}\cdot\frac{1}{3}\,\theta^3 \Big|_0^k$

$= \frac{1}{6}k^3$ (A)

(17) E

(24) II. $\int_1^\infty \frac{1}{2x-1}\,dx = \frac{1}{2}\ln|2x-1|\Big|_1^\infty$

(C)

(25) $y = \cos\theta \sin\theta$ $\quad \frac{dy}{d\theta} = -\sin^2\theta + \cos^2\theta$

$x = \cos^2\theta$

$\frac{dx}{d\theta} = 2\cos\theta(-\sin\theta)$

$\frac{dy}{d\theta}\Big|_{\theta=\pi/6} = -\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 = -\frac{1}{4} + \frac{3}{4} = \frac{1}{2}$

$\frac{dx}{d\theta}\Big|_{\theta=\pi/6} = 2 \cdot \frac{\sqrt{3}}{2}\left(-\frac{1}{2}\right) = -\frac{\sqrt{3}}{2}$

$\frac{dy}{dx} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{1}{\sqrt{3}}$ (B)