

Polar Area

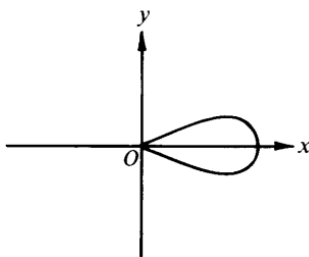
Name: _____

9. The area of the closed region bounded by the polar graph of $r = \sqrt{3 + \cos \theta}$ is given by the integral

(A) $\int_0^{2\pi} \sqrt{3 + \cos \theta} d\theta$ (B) $\int_0^{\pi} \sqrt{3 + \cos \theta} d\theta$ (C) $2 \int_0^{\pi/2} (3 + \cos \theta) d\theta$
(D) $\int_0^{\pi} (3 + \cos \theta) d\theta$ (E) $2 \int_0^{\pi/2} \sqrt{3 + \cos \theta} d\theta$

40. The area of the region enclosed by the polar curve $r = 1 - \cos \theta$ is

(A) $\frac{3}{4}\pi$ (B) π (C) $\frac{3}{2}\pi$ (D) 2π (E) 3π



23. Which of the following gives the area of the region enclosed by the loop of the graph of the polar curve $r = 4 \cos(3\theta)$ shown in the figure above?

(A) $16 \int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \cos(3\theta) d\theta$ (B) $8 \int_{-\frac{\pi}{6}}^{\frac{\pi}{6}} \cos(3\theta) d\theta$ (C) $8 \int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \cos^2(3\theta) d\theta$
(D) $16 \int_{-\frac{\pi}{6}}^{\frac{\pi}{6}} \cos^2(3\theta) d\theta$ (E) $8 \int_{-\frac{\pi}{6}}^{\frac{\pi}{6}} \cos^2(3\theta) d\theta$

21. Which of the following is equal to the area of the region inside the polar curve $r = 2 \cos \theta$ and outside the polar curve $r = \cos \theta$?

(A) $3 \int_0^{\frac{\pi}{2}} \cos^2 \theta \, d\theta$ (B) $3 \int_0^{\pi} \cos^2 \theta \, d\theta$ (C) $\frac{3}{2} \int_0^{\frac{\pi}{2}} \cos^2 \theta \, d\theta$ (D) $3 \int_0^{\frac{\pi}{2}} \cos \theta \, d\theta$ (E) $3 \int_0^{\pi} \cos \theta \, d\theta$

5. Find the area inside the inner loop of $r = 3 - 8\cos(\theta)$.

(A) 7.868 (B) 15.269 (C) 30.539 (D) 1.186 (E) 5.279

Answers:

9) D

40) C

23) E

21) A

5) B