

Double Integrals in Polar Coordinates



Question

Consider the double integral formula in Cartesian coordinates

$$\int_0^1 \int_{\sqrt{1-x^2}}^{\sqrt{9-x^2}} \frac{1}{\sqrt{x^2+y^2}} dy dx + \int_1^3 \int_0^{\sqrt{9-x^2}} \frac{1}{\sqrt{x^2+y^2}} dy dx$$

Which of the following integral formulas in polar coordinates is this equivalent to?

A. $\int_0^{\pi/2} \int_0^1 dr d\theta + \int_0^{\pi} \int_0^3 dr d\theta$

B. $\int_0^{\pi/2} \int_1^3 dr d\theta$

C. $\int_0^{\pi} \int_0^1 r dr d\theta + \int_0^{\pi} \int_0^3 r dr d\theta$

D. $\int_0^{\pi/2} \int_1^3 r dr d\theta$