Evaluate the integral

$$\iint_R \sin(x^2+y^2)dA\,,$$

where R is the annular region

$$1 \le x^2+y^2 \le 16\,.$$

1. SOLUTION

$$\iint_R \sin(x^2+y^2)dA = \int_0^{2\pi} d\theta \int_1^4 dr\, r sin(r^2) = \pi(\cos 1 - \cos 16)$$