The disk D can be described in polar coordinates as $D = \{(r, \theta) \mid 0 \le r \le 2,\ 0 \le \theta \le 2\pi\}$
. Then
$\iint_D 5xy\,dA = 5\int_0^{2\pi}\int_0^2 (r\cos\theta)(r\sin\theta)\,r\,dr\,d\theta = 5\left(\int_0^{2\pi}\sin\theta\cos\theta\,d\theta\right)\left(\int_0^2 r^3\,dr\right) = 5\left[\frac{1}{2}\sin^2\theta\right]_0^{2\pi}\left[\frac{1}{4}r^4\right]_0^2 = 0$