Iterated Integrals

Question

Which of these is equal to $\displaystyle\int_0^{1/2} \int_0^{\pi} y\cos(xy)\,dxdy$?

A. $\displaystyle\int_0^{1/2} \sin(\pi y)\,dy$

B. $\displaystyle\int_0^{1/2} y\sin(\pi y)\,dy$

C. $\displaystyle\int_0^{1/2} \sin(xy)\,dy$

D. $\displaystyle\int_0^{1/2} -y^2\sin(xy)\,dy$