Exercice 6 :

a) $I = \int_0^{\frac{\pi}{4}} \cos 2t\, dt = \left[\frac{1}{2}\sin 2t\right]_0^{\frac{\pi}{4}} = \frac{1}{2}\sin\frac{\pi}{2} = \frac{1}{2}$.

$J = \int_1^{\frac{1}{2}} \sin(\pi t + \frac{\pi}{4})dt = \left[-\frac{1}{\pi}\cos(\pi t + \frac{\pi}{4})\right]_1^{\frac{1}{2}} = 0$.

b) $I = \int_0^2 \frac{du}{2u+1} = \frac{1}{2}\int_0^2 \frac{2\,du}{2u+1} = \frac{1}{2}\left[\ln|2u+1|\right]_0^2 = \frac{1}{2}\ln 5$.

$J = \frac{1}{2}\int_2^1 \frac{2(u+1)}{u^2+2u}du = \frac{1}{2}\left[\ln|u^2+2u|\right]_2^1 = \frac{1}{2}(\ln 3 - \ln 8) = \frac{1}{2}\ln\left(\frac{3}{8}\right)$.

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