Q.1: Use method of cylindrical shells to find volume of the solid generated by rotating the region bounded by the curves $y = x^2$, $y = 1$, $x = 2$, $x = 3$, about $x = 1$.

Q.2: Find average value of the function $f(x) = \cos^3 x \sin 2x$ on the interval $[0, \pi]$. 
Q.3: Use a substitution and integration by parts to evaluate the integral \( \int x^3 e^x \, dx \).

Q.4: Evaluate the integral \( \int \frac{\sin x + \cos x}{\sin 2x} \, dx \).
Q.5: Evaluate the integral \( \int \sec^2 x \sin^3 (\tan x) \, dx \)

Q.6: Find volume of the solid generated by rotating the region bounded by the curves \( y = \sin x, \ x = 0, \ x = \frac{\pi}{2}, \ y = 0 \), about \( x = \pi \).