

Q1) Evaluate the integral by reversing the order of integration.

$$\int_0^{1/2} \int_{\arcsin y}^{\pi/6} \cos x \sqrt{1 + \cos^2 x} \, dx dy.$$

Q2) Find the volume of the solid in the first octant bounded by the cylinder $z = 9 - x^2$ and the plane $y = 7$. What is the average of z over that area?