

$$\begin{aligned}
 V &= \int_0^1 \int_{y^3}^{y^2} (6x + y^2) dx dy = \int_0^1 [3x^2 + xy^2]_{x=y^3}^{x=y^2} dy \\
 &= \int_0^1 (4y^4 - 3y^6 - y^5) dy = \left[\frac{4}{5}y^5 - \frac{3}{7}y^7 - \frac{1}{6}y^6 \right]_0^1 = \frac{43}{210}
 \end{aligned}$$

