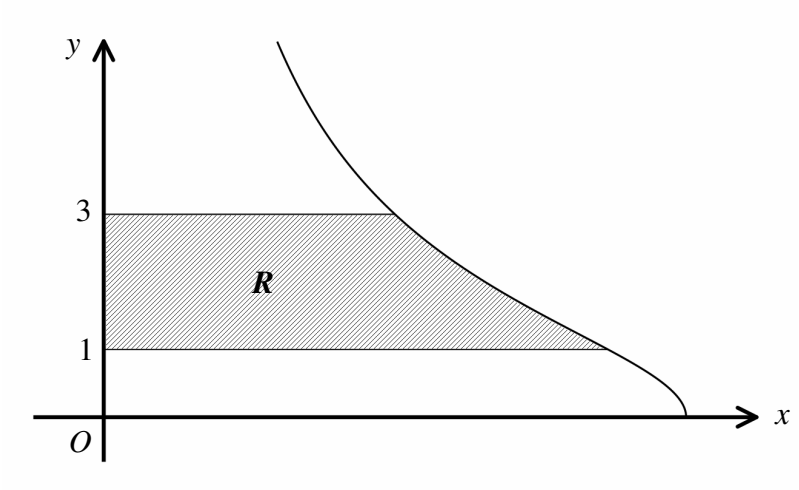
**Question (****)**




The figure above shows the curve with parametric equations

$$x = 2\cos^2\theta, \quad y = \sqrt{3}\tan\theta, \ 0 \le \theta < \frac{\pi}{2}.$$

The finite region $R$ shown shaded in the figure, bounded by the curve, the $y$ axis, and the straight lines with equations $y = 1$ and $y = 3$.

Use integration in parametric to show that the volume of the solid formed when $R$ is fully revolved about the $y$ axis is $\dfrac{\pi^2}{\sqrt{3}}$.

proof