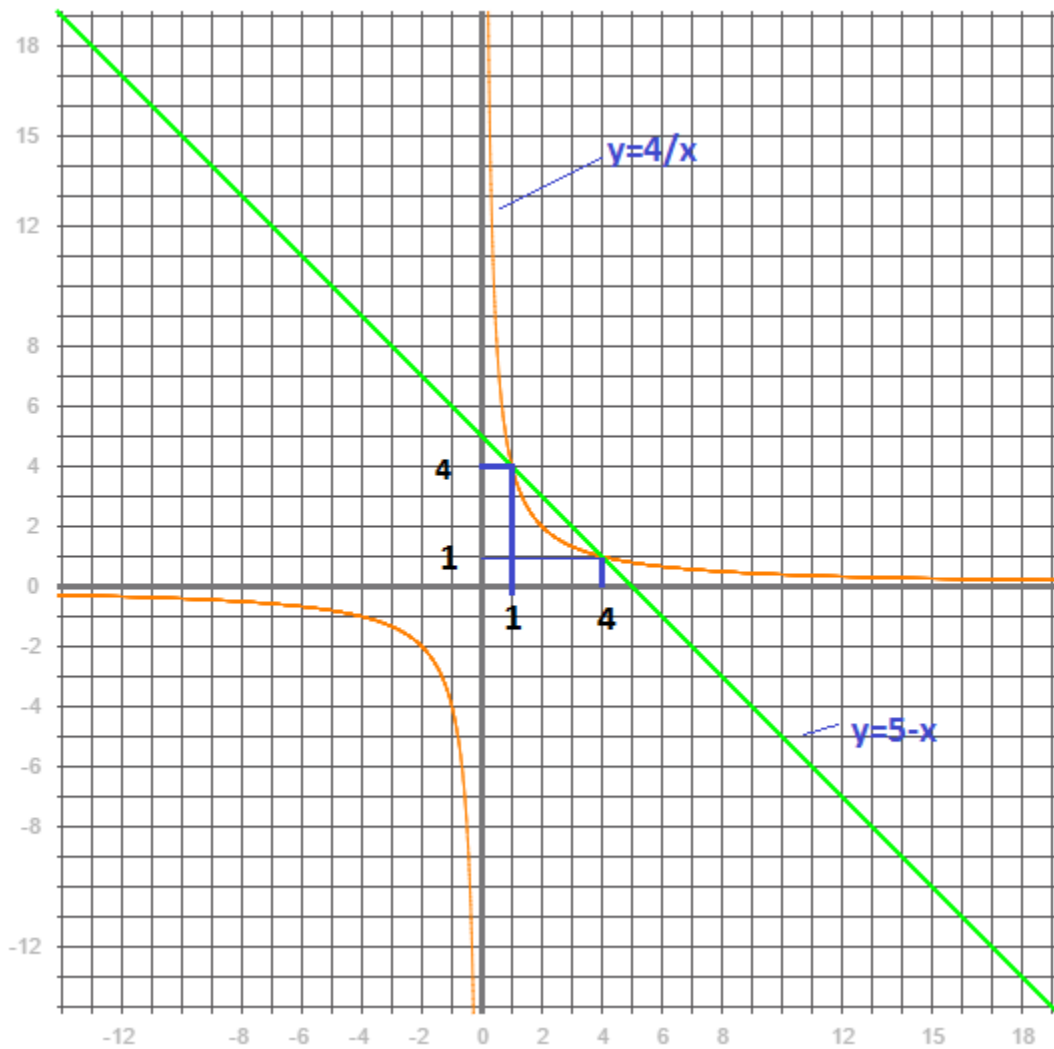


1. Let G be the region enclosed by the curves $y=4/x$ and $y=5-x$

Find the volume of the solid generated by rotating the region G about the x -axis.

Answer :

Here's the picture of the region G :



The intersections of the two curves are at $(1,4)$ and $(4, 1)$.

For revolution about the x -axis, we use the method of washers. The outside radius is the top curve $\frac{x}{4}$ and the inside radius is the bottom curve $5 - x$. Thus, the volume V is given by

$$\begin{aligned} V &= \pi \int_1^4 \left[(5-x)^2 - \left(\frac{4}{x}\right)^2 \right] dx = \pi \int_1^4 \left[(5-x)^2 - \frac{16}{x^2} \right] dx \\ &= \pi \left(- \int_1^4 (5-x)^2 d(5-x) - 16 \int_1^4 \frac{1}{x^2} dx \right) = \pi \left\{ - \left[\frac{(5-x)^3}{3} \right]_1^4 - 16 \left[\frac{1}{x} \right]_1^4 \right\} = 9\pi \end{aligned}$$

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