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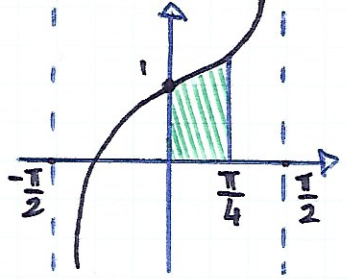


$f(x) = 1 + \tan x$

$0 < x < \frac{\pi}{4}$

$$S(x) = \frac{b \cdot h}{2} = \frac{\sqrt{3}}{4} f(x)^2$$

$$V = \int_0^{\frac{\pi}{4}} \frac{\sqrt{3}}{4} (1+\tan x)^2 \, dx = \frac{\sqrt{3}}{4} \int_0^{\frac{\pi}{4}} (1 + 2\tan x + \tan^2 x) \, dx =$$

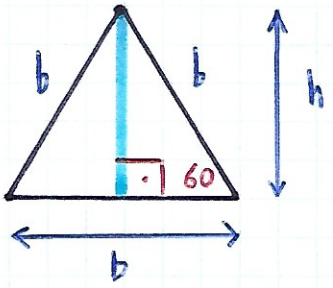
$$= \int_0^{\frac{\pi}{4}} \left(1 + \frac{2\sin x}{\cos x} + \frac{\sin^2 x}{\cos^2 x}\right) dx = \frac{\sqrt{3}}{4} \left[\int_0^{\frac{\pi}{4}} \frac{\cos^2 x + 2\sin x \cos x + \sin^2 x}{\cos^2 x} \, dx \right] =$$

$$= \frac{\sqrt{3}}{4} \int_0^{\frac{\pi}{4}} \frac{1 + 2\sin x \cos x}{\cos^2 x} \, dx = \frac{\sqrt{3}}{4} \left[\int_0^{\pi/4} \frac{1}{\cos^2 x} \, dx + \int_0^{\pi/4} \frac{2\sin x}{\cos x} \, dx \right] =$$

$$= \frac{\sqrt{3}}{4} \left[\tan x - 2 \ln(\cos x) \right]_0^{\pi/4} =$$

$$= \frac{\sqrt{3}}{4} \left[\tan \frac{\pi}{4} - 2 \ln\left(\cos \frac{\pi}{4}\right) - \tan 0 + 2 \ln(\cos 0) \right] =$$

$$= \frac{\sqrt{3}}{4} \left[1 - \ln \frac{1}{2} - 0 \right] = \frac{\sqrt{3}}{4} (1 + \ln 2)$$



$$A = \frac{bh}{2}$$

$$h = b \sin 60 = \frac{\sqrt{3}}{2} b$$

$$A = \frac{1}{2} b \cdot b \cdot \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4} b^2$$