$$\cancel{\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \sqrt{1+\frac{1}{tg^2 x}}\,dx} =$$

$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \sqrt{1+\left(\frac{dx}{dx}\log(\sin x)\right)^2}\,dx =$$

$$= \int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \sqrt{1+\left(\frac{\cos x}{\sin x}\right)^2}\,dx = \int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \sqrt{1+\frac{1}{tg^2 x}}\,dx =$$

$$= \frac{\log\frac{3}{2}}{2} + \frac{\log 2}{2} + C$$

8 Практикум

$y = x, \quad y = x^2; \quad V_{oy} - ?$

$$V_{oy} = \pi \int_0^1 x_2^2(y) - x_1^2(y)\,dy$$

$x_2^2(y) = y$

$x_1(y) = y$

$x^2(y) = y^2$

$x^2 = x \Rightarrow x_1 = 0$

$x_2 = 1$

$y_1 = c = 0$

$y_2 = d = 1$

$$V_{0y} = \pi \int_0^1 (y - y^2)\,dy = \pi \left(\frac{y^2}{2} - \frac{y^3}{3}\right)\Bigg|_0^1 =$$

$$= \pi\left(\frac{1}{2} - \frac{1}{3}\right) = \frac{\pi}{6}$$

9 Практикум

$$\int_1^{+\infty} \frac{dx}{\sqrt{x}} \quad \lim_{b \to +\infty} \ln|\sqrt{x}|\Big|_1^b = \lim_{b \to \infty} \ln\sqrt{b} - \ln 1| =$$

$$= +\infty - 0 = +\infty \Rightarrow \text{Расх.}$$