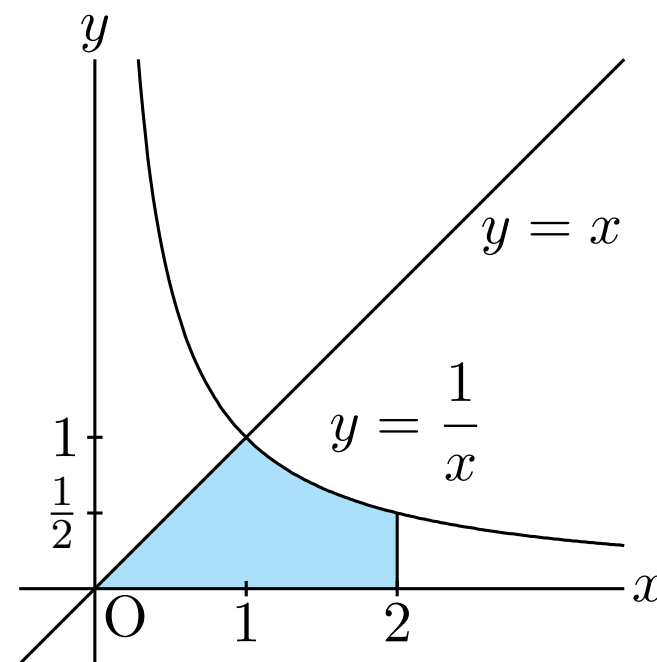


D は図の通りで、次の 2 つの領域 D_1 , D_2 に分けられる.

$$D_1 : 0 \leq x \leq 1, 0 \leq y \leq x$$

$$D_2 : 1 \leq x \leq 2, 0 \leq y \leq \frac{1}{x}$$

$$\iint_D y\sqrt{x} \, dx dy$$



$$\begin{aligned} &= \int_0^1 \left\{ \int_0^x y \sqrt{x} \, dy \right\} dx + \int_1^2 \left\{ \int_0^{\frac{1}{x}} y \sqrt{x} \, dy \right\} dx \\ &= \int_0^1 \sqrt{x} \left[\frac{y^2}{2} \right]_0^x dx + \int_1^2 \sqrt{x} \left[\frac{y^2}{2} \right]_0^{\frac{1}{x}} dx \\ &= \frac{1}{2} \int_0^1 x^{\frac{5}{2}} dx + \frac{1}{2} \int_1^2 x^{-\frac{3}{2}} dx \end{aligned}$$

$$\begin{aligned} &= \frac{1}{2} \left[\frac{2}{7} x^{\frac{7}{2}} \right]_0^1 + \frac{1}{2} \left[-2x^{-\frac{1}{2}} \right]_1^2 \\ &= \frac{1}{7} + \left(-\frac{1}{\sqrt{2}} + 1 \right) = \frac{8}{7} - \frac{1}{\sqrt{2}} \end{aligned}$$