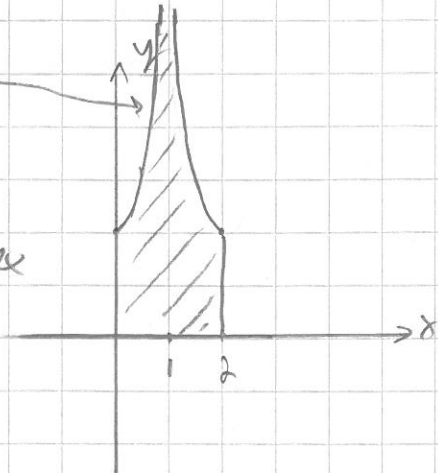


$$\Rightarrow I = I_1 + I_2 = -2 + 2 = 0$$

11.12

$$y = \frac{2}{\sqrt[3]{(x-1)^2}}, \quad x \in [0, 2], \quad x \neq 1$$



$$A = A_1 + A_2 = \int_0^1 \frac{2}{\sqrt[3]{(x-1)^2}} dx + \int_1^2 \frac{2}{\sqrt[3]{(x-1)^2}} dx$$

$$\int_0^t \frac{2}{\sqrt[3]{(x-1)^2}} dx = \int_0^t 2(x-1)^{-\frac{2}{3}} dx$$

$$= 2 \int_0^t \underbrace{1}_{f'(x)} \cdot \underbrace{(x-1)}_{f(x)}^{-\frac{2}{3}} dx = 2 \int_0^t \frac{1}{3} (x-1)^{\frac{1}{3}} \frac{1}{\sqrt[3]{x-1}} dx$$

$$= 2 \left[ 3 \cdot \sqrt[3]{t-1} - 3 \cdot \sqrt[3]{0-1} \right]$$

$$\xrightarrow{t \rightarrow 1^-} 2 \left[ 3 \cdot \underbrace{\sqrt[3]{0}}_{=0} - 3 \cdot \underbrace{\sqrt[3]{-1}}_{=-1} \right] = 2 \cdot 3 = 6$$

$$\int_x^2 \frac{2}{\sqrt[3]{(x-1)^2}} dx = \dots = 2 \left[ 3 \cdot \sqrt[3]{2-1} - 3 \cdot \sqrt[3]{x-1} \right]$$

$$\xrightarrow{x \rightarrow 1^+} 2 \left[ 3 \cdot \underbrace{\sqrt[3]{1}}_{=1} - 3 \cdot \underbrace{\sqrt[3]{0}}_{=0} \right] = 2 \cdot 3 = 6$$

$$\Rightarrow A = A_1 + A_2 = 6 + 6 = 12$$

11.13 a)  $\int_{-\pi}^{\pi} \sin x dx = \int_{-\pi}^{\pi} -\cos x = -\cos x \Big|_{-\pi}^{\pi} = -\cos \pi - (-\cos(-\pi))$

$$= -\cos \pi + \underbrace{\cos(-\pi)}_{\cos \pi} = -\cos \pi + \cos \pi = 0$$

$$\xrightarrow{\pi \rightarrow \infty} \underline{0}$$

## 12. Tiläysfunktio

Satunnaismuuttuja  $X$  on jatkuva jos  $P(X=a) = 0$  aine

Esim. Jhminen pituus

