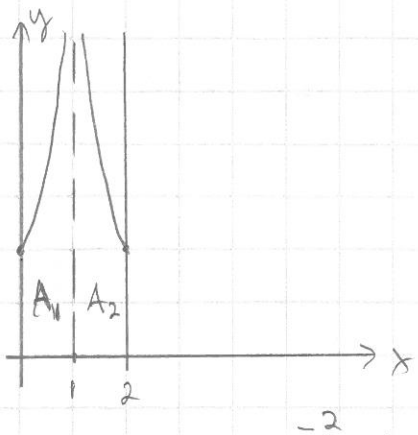
11.12 $y = \dfrac{2}{\sqrt[3]{(x-1)^2}}$, $x \neq 1$



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

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

$$= 2\Big/_0^t \left(\frac{1}{\frac{1}{3}}(x-1)^{\frac{1}{3}}\right) = 2\cdot 3\left[\sqrt[3]{t-1} - \sqrt[3]{0-1}\right]$$

$$\xrightarrow{t\to 1-} 6\left(\sqrt[3]{0} - \underbrace{\sqrt[3]{-1}}_{=-1}\right) = 6(0+1) = 6 = A_1$$

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

$$\int_s^2 \frac{2}{\sqrt[3]{(x-1)^2}}\,dx = \ldots = 2\cdot 3\left[\sqrt[3]{2-1} - \sqrt[3]{s-1}\right]$$

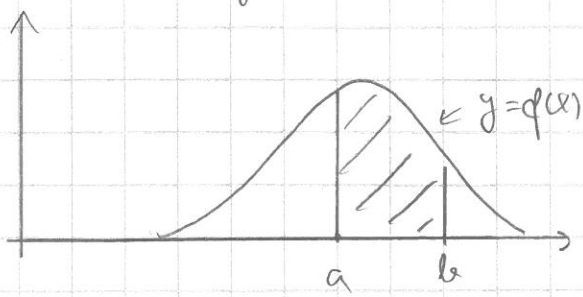
$$\xrightarrow{s\to 1+} 6\left[\underbrace{\sqrt[3]{1}}_{=1} - \underbrace{\sqrt[3]{1-1}}_{0}\right] = 6\cdot 1 = 6 = A_2$$

$$\Rightarrow A = A_1 + A_2 = 6 + 6 = \underline{12}$$

12. Tiheysfunktio

Satunnaismuuttuja $\underline{X}$ on jatkuva jos $P(\underline{X} = a) = 0$ aina

Esim. Ihmisen pituus



φ on $\underline{X}$:n tiheysfunktio jos

$$\begin{cases} 1^\circ\ \varphi(x) \geq 0 \text{ aina} \\ 2^\circ\ \displaystyle\int_{-\infty}^{\infty} \varphi(x)\,dx = 1 \\ 3^\circ\ P(a \leq \underline{X} \leq b) = \displaystyle\int_a^b \varphi(x)\,dx \end{cases}$$

$$\boxed{\begin{aligned} E(\underline{X}) &= \int_{-\infty}^{\infty} x\,\varphi(x)\,dx \\ D(\underline{X}) &= \sqrt{\int_{-\infty}^{\infty} (x - E(\underline{X}))^2 \varphi(x)\,dx} \end{aligned}}$$

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KESKIHAJONTA