$$\begin{cases} c = \frac{1}{2}aL^2 + bL + 2c & (1) \\ b = -aL & (2) \\ \frac{1}{3}aL^3 + \frac{1}{2}bL^2 + cL = 1 & (3) \end{cases}$$

$$\underset{(2)\text{ in }(1)}{\Rightarrow} \begin{cases} c = -\frac{1}{2}aL^2 + aL^2 = \frac{1}{2}aL^2 \\ b = -aL \end{cases}$$

$$(1),(2)\text{ in }(3) \quad \frac{1}{3}aL^3 + \frac{1}{2}L^2(-aL) + L \cdot \frac{1}{2}aL^2 = 1$$

$$\Rightarrow \frac{1}{3}aL^3 \cancel{+ \frac{1}{2}aL^3} \cancel{+ \frac{1}{2}aL^3} = 1 \quad \cancel{\cdot 6}$$

$$\Rightarrow \cancel{2aL^3 - 3aL^3 +} \quad \frac{1}{3}aL^3 = 1 \Rightarrow \underline{\underline{a = \frac{3}{L^3}}}$$

Hausaufgabe

$$\Rightarrow \underline{\underline{f(x) = \frac{3}{L^3}\left(x - \frac{L}{2}\right)^2 + \frac{3}{4L}}}$$

$$\underline{\underline{b = -\frac{3}{L^2}}}$$

$$\underline{\underline{c = \frac{3}{2L}}}$$

b.) Reißstelle: $\frac{3L}{4} < x < \frac{L}{4}$ außen

$\frac{L}{4} < x < \frac{3L}{4}$ innen

Diagonalität

$$\underbrace{P\left(x < \frac{L}{4}\right) + P\left(x > \frac{3L}{4}\right)}_{\text{außen}} = k \cdot \underbrace{P\left(\frac{L}{4} < x < \frac{3L}{4}\right)}_{\text{innen}}$$

$$\Rightarrow k = \frac{P\left(x < \frac{L}{4}\right) + P\left(x > \frac{3}{4}L\right)}{P\left(\frac{L}{4} < x < \frac{3L}{4}\right)}$$

$$P\left(x < \frac{L}{4}\right) = P\left(x > \frac{3}{4}L\right), \quad P\left(\frac{L}{4} < x < \frac{3L}{4}\right) = 1 - P\left(x < \frac{L}{4}\right) - P\left(x > \frac{3}{4}L\right)$$

$$\Rightarrow k = \frac{2P\left(x < \frac{L}{4}\right)}{1 - 2P\left(x < \frac{L}{4}\right)}$$

$$P\left(x < \frac{L}{4}\right) = \int_0^{\frac{L}{4}} \frac{3}{L^3}\left(x - \frac{L}{2}\right)^2 + \frac{3}{4L}\, dx = \frac{19}{64}$$

$$\Rightarrow k = \frac{2 \cdot \frac{19}{64}}{1 - 2 \cdot \frac{19}{64}} = \frac{19}{13} = 1.46 \qquad \underline{\underline{k = 1,46}} \quad \square$$