A2. c) Gerade $y = v$ $(v < 1)$

$P_1(x_1 \mid v)$ und <u>symmetr.</u> dazu $P_2(x_2 \mid v)$

$P_1\left(x_1 \,\middle|\, \frac{x^2-4t^2}{x^2-t^2}\right)$ weil $v = \frac{x^2-4t^2}{x^2-t^2}$ $\curvearrowright$ $x^2 = \frac{t^2(v-4)}{v-1}$

(s. unten (*

<u>Flächeninhalt</u>: $A = x\,(4-v)$

$$A(v) = x \cdot (4-v)$$

$$\downarrow$$

x in Abhgkt. von v ausdrücken:

$$v = \frac{x^2-4t^2}{x^2-t^2} \qquad (\rightarrow \text{nach } x \text{ auflösen})$$

$$(x^2-t^2)\cdot v = x^2-4t^2$$

$$x^2 \cdot v - t^2 v = x^2 - 4t^2 \qquad |-x^2 \quad |+t^2 v$$

$$x^2 \cdot v - x^2 = -4t^2 + t^2 v$$

$$x^2 \cdot (v-1) = t^2 v - 4t^2$$

$$\underline{\underline{x^2 = \frac{t^2(v-4)}{v-1}}} \qquad (*) \qquad (v<1)$$

$$x = \sqrt{\frac{t^2(v-4)}{v-1}} \qquad (v<1)$$

$$A(v) = \sqrt{\frac{t^2(v-4)}{v-1}} \cdot (4-v) = t\sqrt{\frac{v-4}{v-1}} \cdot (4-v)$$

$$A(v) = (4t-tv)\sqrt{\frac{v-4}{v-1}} \cdot \qquad \text{soll } \underline{\text{max.}} \text{ sein}$$

$A'(v) = 0$ und

$A''(v) < 0$

$$A'(v) = -t \cdot \sqrt{\frac{v-4}{v-1}} + (4t-tv) \cdot \frac{3}{2} \cdot \frac{1}{(v-1)\cdot\sqrt{v-4}\sqrt{v}}$$

$$A'(v) = 0$$

$$-t \cdot \sqrt{\frac{v-4}{v-1}} + \frac{3}{2}\cdot(4t-tv)\cdot\frac{1}{(v-1)\cdot\sqrt{v-4}\sqrt{v-1}} = 0$$

$$\frac{3}{2}(4t-tv)\cdot\frac{1}{(v-1)\cdot\sqrt{v-4}\sqrt{v-1}} = t\,\frac{\sqrt{v-4}}{\sqrt{v-1}} \qquad \left|\cdot (v-1)\sqrt{v-4}\sqrt{v-}\right.$$

$$\frac{3}{2}(4t-tv) = t\cdot(v-4)(v-1)$$