

S 117 Nr. 9

c) Integrationsgrenzen $\hat{=}$ Schnittpunkten von f und g

$$3x^2 - x^3 = 2x \Rightarrow 3x^2 - 2x - x^3 = x(3x - 2 - x^2) = 0 \Rightarrow \underline{\underline{x_{s_1} = 0}}$$

$$x^2 - 3x + 2 = 0 \Rightarrow x_{s_{2,3}} = +\frac{3}{2} \pm \sqrt{\frac{9}{4} - 2} = \frac{3}{2} \pm \sqrt{\frac{9}{4} - \frac{8}{4}} = \frac{3}{2} \pm \frac{1}{2}$$

$x_{s_2} = 1$ \vee $x_{s_3} = 2$ Die Schaubilder begrenzen 2 Flächen

$$2x \geq 3x^2 - x^3 \text{ f\u00fcr } 0 \leq x \leq 1$$

$$3x^2 - x^3 \geq 2x \text{ f\u00fcr } 1 \leq x \leq 2$$

$$V = \pi \cdot \int_0^1 ((2x)^2 - (3x^2 - x^3)^2) dx + \pi \int_1^2 ((3x^2 - x^3)^2 - (2x)^2) dx$$

$$V = \pi \int_0^1 (4x^2 - (9x^4 - 6x^5 + x^6)) dx + \pi \int_1^2 (9x^4 - 6x^5 + x^6 - 4x^2) dx$$

$$V = \pi \int_0^1 (-x^6 + 6x^5 - 9x^4 + 4x^2) dx + \pi \int_1^2 (x^6 - 6x^5 + 9x^4 - 4x^2) dx$$

$$V = \pi \left[-\frac{x^7}{7} + \frac{6x^6}{6} - \frac{9x^5}{5} + \frac{4x^3}{3} \right]_0^1 + \pi \left[\frac{x^7}{7} - \frac{6x^6}{6} + \frac{9x^5}{5} - \frac{4x^3}{3} \right]_1^2$$

$$V = \pi \cdot \frac{41}{105} + \pi \left[\frac{128}{105} - \left\{ -\frac{41}{105} \right\} \right] = \pi \cdot \frac{210}{105} = \underline{\underline{2 \cdot \pi \approx 6,283}}$$

$$V_1 = \pi \cdot \int_0^1 (g(x)^2 - f(x)^2) dx \approx \pi \cdot 0,390 \text{ mit GTR}$$

$$V_2 = \pi \int_1^2 (f(x)^2 - g(x)^2) dx \approx \pi \cdot 1,609 \text{ mit GTR}$$

$$V_{\text{ges}} = V_1 + V_2 = \underline{\underline{2 \cdot \pi \approx 6,283}}$$