S 116 Nr. 1

a) $V_a = \pi \cdot \int_{-1}^{2} \left(\sqrt{x+1}\right)^2 dx = \pi \int_{-1}^{2} (x+1)\, dx = \pi \left[\frac{x^2}{2} + x \right]_{-1}^{2}$

$V_a = \pi \cdot \left[\frac{4}{2} + 2 - \left\{ \frac{1}{2} - 1 \right\} \right] = \pi \cdot \left[4{,}5 \right] = \underline{\underline{4{,}5 \cdot \pi}} \approx \underline{\underline{14{,}137}}$

---

b) $V_b = \pi \cdot \int_{1}^{3} \left(\frac{1}{x}\right)^2 dx = \pi \int_{1}^{3} \frac{1}{x^2}\, dx = \pi \left[-\frac{1}{x} \right]_{1}^{3} = \pi \cdot \left[-\frac{1}{3} - \left\{ -\frac{1}{1} \right\} \right]$

$V_b = \pi \cdot \frac{2}{3} = \underline{\underline{\frac{2}{3} \cdot \pi}} \approx \underline{\underline{2{,}094}}$

---

c) $V_c = \pi \int_{x_{N_1}}^{x_{N_2}} \left(x^2 - 6x + 8 \right)^2 dx$; $x_{N_{1,2}} = +3 \pm \sqrt{9-8} = 3 \pm 1$

$x_{N_1} = \underline{\underline{2}} \vee x_{N_2} = \underline{\underline{4}}$ Nullstellen von f

$V_c = \pi \cdot \int_{2}^{4} (x^2 - 6x + 8) \cdot (x^2 - 6x + 8)\, dx =$

$V_c = \pi \cdot \int_{2}^{4} (x^4 - \underline{6x^3} + 8x^2 - \underline{6x^3} + 36x^2 - 48x + 8x^2 - 48x + 64)\, dx$

$V_c = \pi \cdot \int_{2}^{4} (x^4 - 12x^3 + 52x^2 - 96x + 64)\, dx$

$V_c = \pi \cdot \left[\frac{x^5}{5} - \frac{12x^4}{4} + \frac{52x^3}{3} - \frac{96x^2}{2} + 64x \right]_{2}^{4}$

$V_c = \pi \left[34{,}1\overline{3} - \left\{ 33{,}0\overline{6} \right\} \right] \approx \underline{\underline{\pi \cdot 1{,}0\overline{6}}} \approx \underline{\underline{3{,}351}}$