

$$\begin{aligned} 1) f(0) &= 0 \Rightarrow e = 0 \checkmark & f(x) &= ax^4 + bx^3 + cx^2 + dx + e \\ f'(0) &= 0 \Rightarrow d = 0 \checkmark & f'(x) &= 4ax^3 + 3bx^2 \\ f''(0) &= 0 \Rightarrow c = 0 \checkmark \end{aligned}$$

$$\begin{aligned} \checkmark f(2) &= 6 \\ \checkmark f'(2) &= 10 \end{aligned} \Rightarrow \begin{cases} \text{I } 16a + 8b = 6 \\ \text{II } 32a + 12b = 10 \end{cases} \Rightarrow a = \frac{1}{8} \checkmark$$

$$\text{II} - 2\text{I} \quad -4b = -2 \Rightarrow b = \frac{1}{2} \checkmark$$

$$\Rightarrow \underline{f(x) = \frac{1}{8}x^4 + \frac{1}{2}x^3} \checkmark$$

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$$2) \text{ Nst: } f(x) = 0$$

$$\frac{1}{8}x^4 + \frac{1}{2}x^3 = 0$$

$$x^3\left(\frac{1}{8}x + \frac{1}{2}\right) = 0 \checkmark$$

$$\Rightarrow x_{1,2,3} = 0 \checkmark; x_4 = -4 \checkmark$$

$$A = \int_{-4}^0 \left(\frac{1}{8}x^4 + \frac{1}{2}x^3\right) dx = \left[\frac{1}{40}x^5 + \frac{1}{8}x^4\right]_{-4}^0 \checkmark$$

$$= \frac{1}{40}(-4)^5 + \frac{1}{8}(-4)^4 - 0 \checkmark$$

$$\underline{A = 6,4} \checkmark$$

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$$3) \text{ Oberfläche } S = 162\pi \text{ cm}^2$$

$$3.1) V = r^2 \pi h \quad ; \quad 162\pi = 2r^2 \pi + 2r \pi h$$

$$\underline{h = \frac{81}{r} - r} \checkmark$$

$$V(r) = r^2 \pi \left(\frac{81}{r} - r\right)$$

$$-\pi r(r^2 - 81) = 0$$

$$\underline{V(r) = -\pi r^3 + 81\pi r} \checkmark$$

$$r_1 = 0; r_{2,3} = (\pm) 9 \checkmark$$

$$\Rightarrow \underline{\mathbb{D} = \{r \mid 0 < r < 9\}} \checkmark$$

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$$3.2) V'(r) = -3\pi r^2 + 81\pi \checkmark$$

$$V''(5,2) < 0 \Rightarrow \text{Max} \checkmark$$

$$V''(r) = -6\pi r \checkmark$$

$$V'(r) = 0: -3\pi r^2 + 81\pi = 0 \checkmark$$

$$\underline{V_{\max} = 881,51 \text{ cm}^3} \checkmark$$

$$r = (\pm) \sqrt{\frac{81}{3}} = 5,20 \text{ cm} \checkmark$$

$$\underline{h = 10,38 \text{ cm}} \checkmark$$

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