

Beispiele: 6.64a-c), 6.67a-b), 6.69a), 6.70a-b)c), 6.71a)c), 6.74a)d)

$$6.64a) \int_{-3}^0 x^3 dx = \frac{x^4}{4} \Big|_{-3}^0 = \frac{(-3)^4}{4} - \frac{(-3)^0}{4} = \underline{\underline{-\frac{81}{4}}}$$

$$b) \int_{-1}^2 x dx = \frac{x^2}{2} \Big|_{-1}^2 = \frac{2^2}{2} - \frac{(-1)^2}{2} = \underline{\underline{-6}}$$

$$c) \int_{\frac{1}{2}}^4 \frac{dt}{t^2} = \int_{\frac{1}{2}}^4 \frac{1}{t^2} dt = -\frac{1}{t} \Big|_{\frac{1}{2}}^4 = -\frac{1}{4} - \left(-\frac{1}{\frac{1}{2}}\right) = \underline{\underline{\frac{1}{4}}}$$

$$6.67a) \int_0^2 e^x dx = e^x \Big|_0^2 = e^2 - e^0 = \underline{\underline{6,39}}$$

$$b) \int_{-2}^2 e^t dt = e^t \Big|_{-2}^2 = e^2 - e^{-2} = \underline{\underline{7,25}}$$

$$6.69a) \int_1^3 (4x^3 - x + 2) dx = \frac{4x^4}{4} - \frac{x^2}{2} + 2x \Big|_1^3 = \left(3^4 - \frac{3^2}{2} + 2 \cdot 3\right) - \left(1^4 - \frac{1^2}{2} + 2\right) = \underline{\underline{80}}$$

$$6.70a) \int_1^4 \left(\frac{1}{2x} + \frac{1}{x^2} + \frac{x}{3}\right) dx = \frac{1}{2} \cdot \ln|x| - \frac{1}{x} + \frac{1}{3} \cdot \frac{x^2}{2} \Big|_1^4 = \left(\frac{1}{2} \cdot \ln(4) + \frac{1}{4} - \frac{1}{3} \cdot \frac{4^2}{2}\right) - \left(\frac{1}{2} \cdot \ln(1) + 1 - \frac{1}{3} \cdot \frac{1^2}{2}\right) = \underline{\underline{3,99}}$$

$$b) \int_1^4 \left(\frac{x^3}{2} + 4 \cdot \sqrt{x} + \frac{3}{x^2}\right) dx = \frac{x^4}{6} + \frac{4 \cdot \sqrt{x^3}}{\frac{3}{2}} - \frac{3}{x} \Big|_1^4 = \left(\frac{4^4}{6} + \frac{8 \cdot \sqrt{4^3}}{2} - \frac{3}{4}\right) - \left(\frac{1^4}{6} + \frac{8 \cdot \sqrt{1^3}}{2} - 3\right) = \underline{\underline{31,92}}$$

$$c) \int_1^9 \left(\frac{2}{\sqrt{t}} + 3 \cdot \sqrt[3]{t-1}\right) dt = 2 \cdot t^{-\frac{1}{2}} + 3 \cdot t^{\frac{1}{3}} - 1 \Big|_1^9 = 4 \cdot \sqrt{t} + 3 \sqrt[3]{t-1} - 1 \Big|_1^9 = \left(4 \cdot \sqrt{9} + \frac{9 \cdot \sqrt[3]{8}}{4} - 1\right) - \left(4 \cdot \sqrt{1} + \frac{9 \cdot \sqrt[3]{0}}{4} - 1\right) = \underline{\underline{39,06}}$$

$$6.71a) \int_0^{\frac{\pi}{2}} (1 + \cos(t)) dt = t + \sin(t) \Big|_0^{\frac{\pi}{2}} = \left(\frac{\pi}{2} + \cos\left(\frac{\pi}{2}\right)\right) - (0 + \sin(0)) = \underline{\underline{\frac{\pi}{2}}}$$

$$6.71b) \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 2 \cdot \sin(t) + t dt = -2 \cdot \cos(t) + \frac{t^2}{2} \Big|_{-\frac{\pi}{2}}^{\frac{\pi}{2}} = \left(-2 \cdot \cos\left(\frac{\pi}{2}\right) + \frac{\pi^2}{2}\right) - \left(-2 \cdot \cos\left(-\frac{\pi}{2}\right) + \frac{(-\frac{\pi}{2})^2}{2}\right) = \underline{\underline{0}}$$

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6.74a) c)

$$a) \int_1^b 3x^2 dx = 7$$

$$\int_1^b 3x^2 dx = x^3 \Big|_1^b = b^3 - 1^3 = 7 \quad | +1$$

$$b = \sqrt[3]{8} = \underline{\underline{2}}$$

$$b) \int_{\frac{\pi}{2}}^b \sin(t) dt = -\frac{1}{2} = \int_{\frac{\pi}{2}}^b \sin(t) dt = -\cos(t) \Big|_{\frac{\pi}{2}}^b = -\cos(b) - \left(-\cos\left(\frac{\pi}{2}\right) \right) = -\frac{1}{2}$$

$$-\cos(b) = -\frac{1}{2} \quad | \cdot (-1) \quad \cos(b) = \frac{1}{2} \quad b = \underline{\underline{\frac{\pi}{3}}}$$

$$\int_{\frac{\pi}{2}}^{\frac{\pi}{3}} \sin(t) dt$$