Kurzlösung Woche 4

2/20.8e: $\frac{13}{3} * \ln(2) - \frac{59}{36}$

2/20.9c: $\int_{x=-1}^{0} \int_{y=-2\sqrt{x+1}}^{2\sqrt{x+1}} f(P)\, dydx + \int_{x=0}^{8} \int_{y=-2\sqrt{x+1}}^{2-x} f(P)\, dydx$

d: $\int_{y=-1}^{0} \int_{x=1-\sqrt{1-y^2}}^{1+\sqrt{1-y^2}} f(P)\, dxdy$

2/20.10c: $\frac{1250}{3}$

2/20.12d: $\frac{27}{4}$

h: 9π

2/20.17a: 4

b: $\frac{36}{35}$

2/21.3 nur Ansätze – a: $V = \int_{x=0}^{2\pi} \int_{y=0}^{1} \int_{z=y^3}^{y} dzdydx = \frac{\pi}{2}$

b: $V = \int_{x=-1}^{0} \int_{y=0}^{x+1} \int_{z=-xy-1}^{x^2+y^2+1} dzdydx = \frac{9}{8}$

2/20.19 nur Ansatz: $M = \int_{u=0}^{1} \int_{\varphi=0}^{2\pi} (\rho_1 + \rho_2(1-u)^2)\, abu\, d\varphi du$

2/21.14: $M = 16\pi$

2/21.17: $Q = \frac{5}{4}\rho_0\pi$

2/21.18 nur Ansätze: $S_z = \frac{1}{M} \int_{\varphi=0}^{2\pi} \int_{r=1}^{2} \int_{z=-2}^{r} rz\, dzdrd\varphi = \frac{-27}{128}$

mit $M = \int_{\varphi=0}^{2\pi} \int_{r=1}^{2} \int_{z=-2}^{r} r\, dzdrd\varphi = \frac{32}{3}\pi$

$S_x = S_y = 0$ (wegen Rotationssymmetrie)

2/21.22 nur Ansätze: $M = \int_{\varphi=0}^{2\pi} \int_{r=0}^{R} \int_{\theta=0}^{\theta_0} r^2 \sin\theta\, d\theta drd\varphi = \frac{2}{3}\pi R^3(1 - \cos\theta_0)$

$S_Z = \frac{1}{M} \int_{\varphi=0}^{2\pi} \int_{r=0}^{R} \int_{\theta=0}^{\theta_0} (r \cos\theta)\, r^2 \sin\theta\, d\theta drd\varphi$

$S_Z = \frac{1}{M}\frac{1}{4}\pi R^4 \sin^2\theta_0 = \frac{3}{8}R(1 + \cos\theta_0)$

$S_x = S_y = 0$ (wegen Rotationssymmetrie)