/1

$$\int_0^{2\pi}\int_p^R\int_{-\sqrt{R^2-r^2}}^{\sqrt{R^2-r^2}} r\,dz\,dr\,d\theta = \int_0^{2\pi}\int_p^R \underbrace{r\left(\sqrt{R^2-r^2}+\sqrt{R^2-r^2}\right)}_{=2r\sqrt{R^2-r^2}}\,dr\,d\theta$$

$R^2-r^2=u$

$$= \int_0^{2\pi} 2r\int_p^R \sqrt{u}\; -\frac{1}{2r}\,du\,d\theta = \int_0^{2\pi} -1\cdot\int_p^R \frac{u^{1.5}}{1.5}\;dr\,d\theta$$

$$= \int_0^{2\pi}\left[\frac{2}{3}(R^2-r^2)^{\frac{3}{2}}\right]_p^R d\theta = \int_0^{2\pi} -\frac{2}{3}(R^2-p^2)^{\frac{3}{2}}\;d\theta$$

$$V = -\frac{2}{3}\left[\theta(R^2-p^2)^{\frac{3}{2}}\right]_0^{2\pi} = -\frac{4\pi\,(R^2-p^2)^{\frac{3}{2}}}{3}$$

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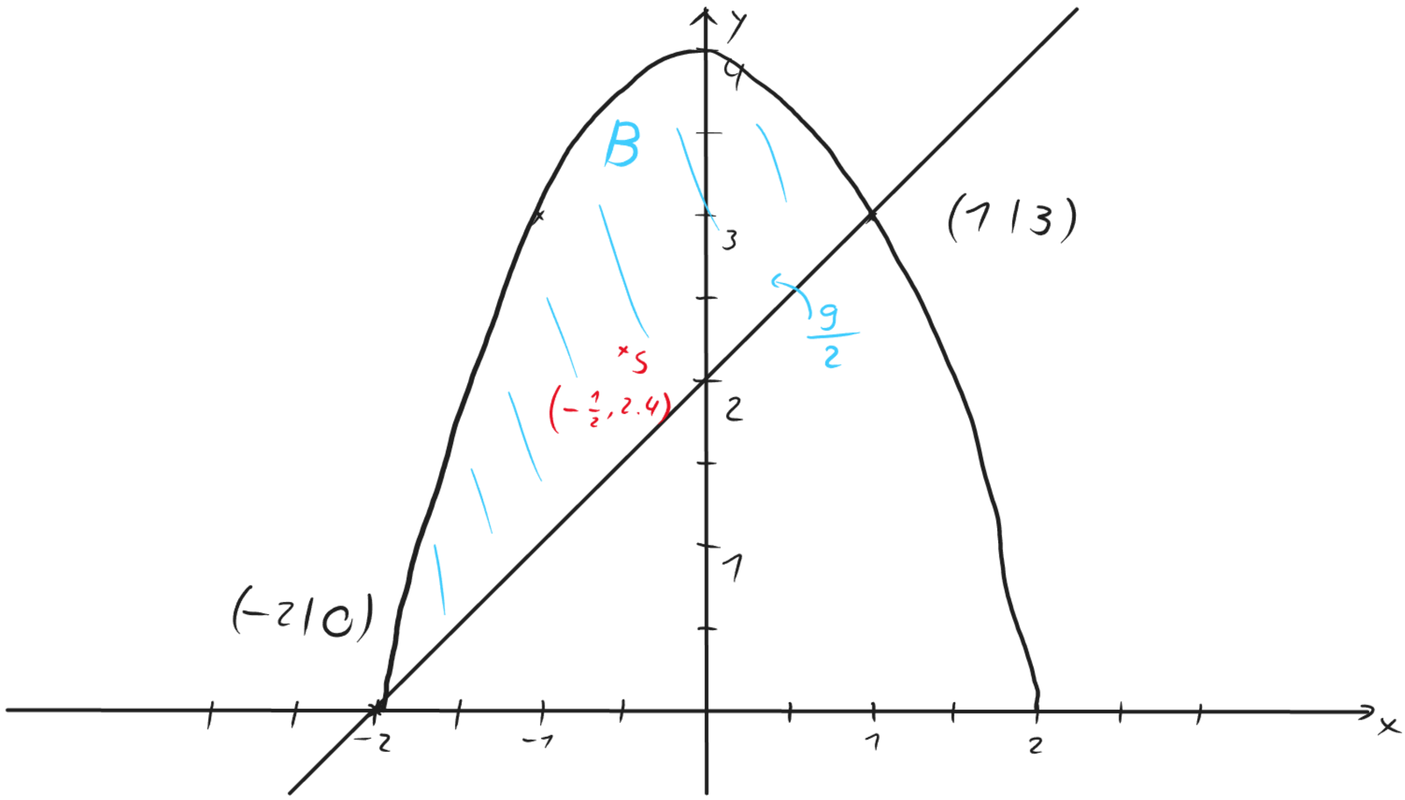

$$M_x = \frac{1}{2}\int_{-2}^{1}\left((-x^2+4)^2-(x+2)^2\right)dx$$

$$= \frac{1}{2}\int_{-2}^{1}\left((x^4-8x^2+16)-(x^2+4x+4)\right)dx$$

$$= \frac{1}{2}\int_{-2}^{1}\left(x^4-9x^2-4x-12\right)dx = \frac{1}{2}\left[\frac{x^5}{5}-3x^3-2x^2+12x\right]_{-2}^{1}$$

$$= \frac{1}{2}\left(\frac{1}{5}-3-2+12-\left(-\frac{32}{5}+24-8-24\right)\right) = 10{,}8$$

$$M_y = \int_{-2}^{1}x\left(-x^2+4-(x+2)\right)dx = \int_{-2}^{1}x\left(-x^2-x+2\right)dx = \int_{-2}^{1}-x^3-x^2+2x\ dx$$

$$= \left[\frac{-x^4}{4}-\frac{x^3}{3}+x^2\right]_{-2}^{1} = -\frac{1}{4}-\frac{1}{3}+1-\left(\frac{-16}{4}-\frac{-8}{3}+4\right) = -2{,}25$$

$$(\bar{x},\bar{y}) = \left(\frac{-2{,}25}{4.5},\frac{10{,}8}{4{,}5}\right) \qquad S\left(-\frac{1}{2},\ 2{,}4\right)$$

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$$\lim_{R_1,R_2\to\infty}\int_{-R_1}^{R_2}x\left(\frac{1}{\sqrt{2\pi}\sigma}e^{\left(-\frac{1}{2\sigma^2}(x-\mu)^2\right)}\right)dx$$

$$\lim_{R_1,R_2\to\infty}\int_{-R_1}^{R_2}x\left(\frac{1}{\sqrt{2\pi}\sigma}e^{\left(-\frac{1}{2\sigma^2}(x^2-2x\mu+\mu^2)\right)}\right)dx$$

$$\lim_{R_1,R_2\to\infty}\frac{1}{\sqrt{2\pi}\sigma}\cdot\int_{-R_1}^{R_2}xe^{\left(-\frac{1}{2\sigma^2}(x^2-2x\mu+\mu^2)\right)}dx$$

$$\lim_{R_1,R_2\to\infty}\frac{1}{\sqrt{2\pi}\sigma}\cdot\int_{-R_1}^{R_2}xe^{\left(-\frac{x^2-2x\mu+\mu^2}{2\sigma^2}\right)}dx$$