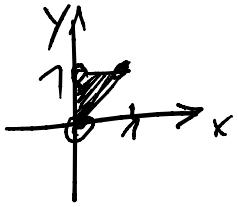
1) $\iint \sqrt{x+y}\,dx\,dy = \int_0^1 \left(\int_0^y \sqrt{x+y}\,dx \right) dy$



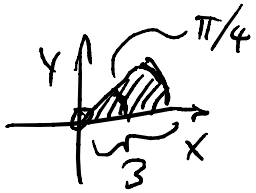
$$\left[\frac{2}{3}(x+y)^{3/2} \right]_{x=0}^{x=y}$$

$$\frac{2}{3}(2y)^{3/2} - \frac{2}{3}y^{3/2}$$

$$= \left[\frac{2}{3}2^{3/2}\frac{2}{5}y^{5/2} - \frac{2}{3}\frac{2}{5}y^{5/2} \right]_{y=0}^{y=1}$$

$$= \frac{4}{15}2^{3/2} - \frac{4}{15} - 0 = \frac{4}{15}(2^{3/2}-1)$$

2) $\int\int x\,dx\,dy = \int_0^{\pi/4} \left(\int_0^{\frac{3}{r\cos\varphi}} r\cos\varphi \cdot r\,dr \right) d\varphi$



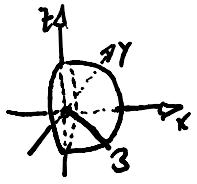
$$\left[\frac{r^3}{3}\cos\varphi \right]_{r=0}^{r=3}$$

$$9\cos\varphi - 0$$

$$= \int_0^{\pi/4} 9\cos\varphi\,d\varphi = \left[9\sin\varphi \right]_{\varphi=0}^{\varphi=\pi/4}$$

$$= 9 \cdot \frac{1}{\sqrt{2}} - 0 = \frac{9}{\sqrt{2}}$$

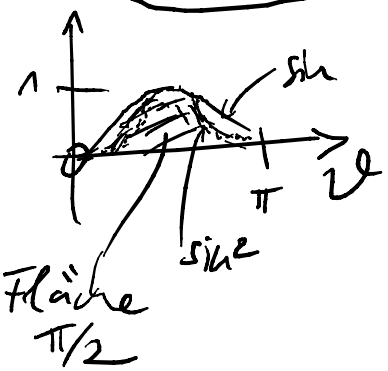
3) $$\iiint \frac{x}{x^2+y^2+z^2}\, dx\, dy\, dz$$



$$= \int_{-\pi/2}^{\pi/2} \left(\int_0^{\pi} \left(\int_0^{3} \frac{r \sin\vartheta \cos\varphi}{r^2} r^2 \sin\vartheta \, dr \right) d\vartheta \right) d\varphi$$

$$\left[\frac{r^2}{2} (\sin\vartheta)^2 \cos\varphi \right]_{r=0}^{r=3}$$

$$\frac{9}{2} (\sin\vartheta)^2 \cos\varphi - 0$$



$$\frac{9}{2} \frac{\pi}{2} \cos\varphi$$

$$= \int_{-\pi/2}^{\pi/2} \frac{9\pi}{4} \cos\varphi \, d\varphi = \left[\frac{9\pi}{4} \sin\varphi \right]_{\varphi=-\pi/2}^{\varphi=\pi/2}$$

$$= \frac{9\pi}{4} - - \frac{9\pi}{4} = \frac{9\pi}{2}$$