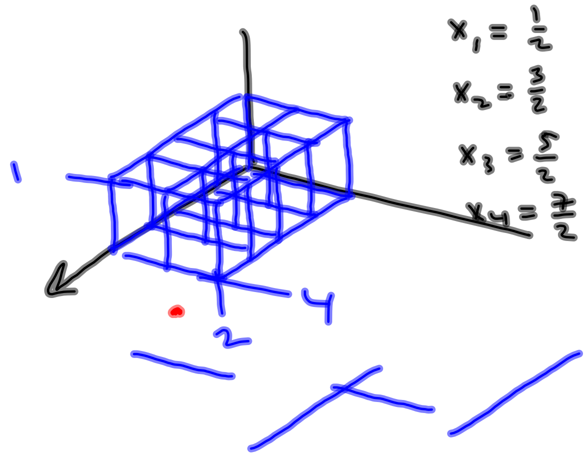
16.6 #26

$$B = \{(x,y,z) \mid 0 \le x \le 4, 0 \le y \le 2, 0 \le z \le 1\}$$



$x_1 = \frac{1}{2}$ $y_1 = \frac{1}{2}$ $z_1 = \frac{1}{2}$

$x_2 = \frac{3}{2}$ $y_2 = \frac{3}{2}$

$x_3 = \frac{5}{2}$

$x_4 = \frac{7}{2}$

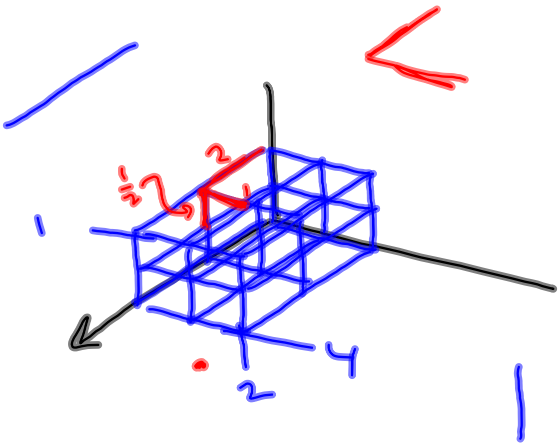
That's what I thought

$x_i = \frac{2i-1}{2}$, $i = 1, \dots, 4$

$y_j = \frac{2j-1}{2}$, $j = 1, \dots, 2$

$z_k = \frac{2k-1}{2}$, $k = 1$

$$\iiint_B \sin(xy^2z^3)\, dV$$



Book way

$x_1 = 1 \quad y_1 = \frac{1}{2} \quad z_1 = \frac{1}{4}$

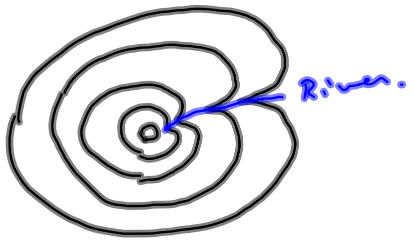
$x_2 = 3 \quad y_2 = \frac{3}{2} \quad z_2 = \frac{3}{4}$

$\Delta V = 1$

$$\sum_{k=1}^{2} \sum_{j=1}^{2} \sum_{i=1}^{2} \sin\left((2i-1)\left(\frac{2j-1}{2}\right)^2\left(\frac{2k-1}{4}\right)^3\right) \cdot 1$$

Apr 11-12:23 PM

16.1 A sketch? See Gradient?



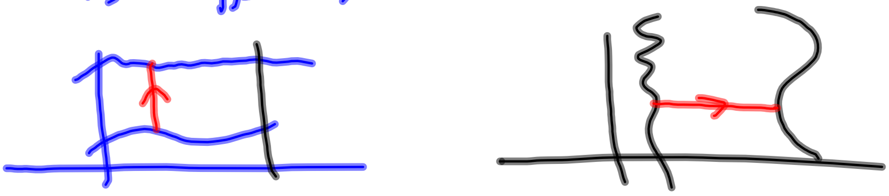
16.2 Fubini: Stuff Evaluate

$\iint_R$ & $\iiint_E$ on rectangular domains.

$R = [a,b] \times [c,d]$

$E = [a,b] \times [c,d] \times [e,f]$

16.3 Type I, II

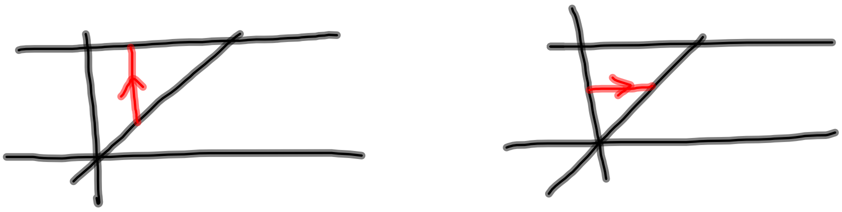


$\iint f\,dy\,dx$ $\iint f\,dx\,dy$

Maybe a "do it I & II way".

#48

$$\int_0^1\int_x^1 e^{\frac{x}{y}}\,dy\,dx = \int_0^1\int_0^y e^{\frac{x}{y}}\,dx\,dy$$



$$= \int_0^1\int_0^y y e^{\frac{x}{y}}\cdot\frac{1}{y}\,dx\,dy = \int_0^1 \left[y e^{\frac{x}{y}}\right]_{0=x}^{y=x} dy$$

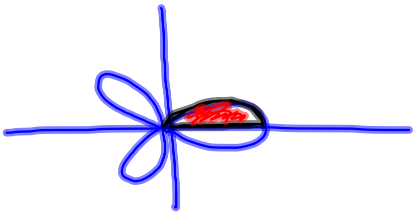
$u = \frac{x}{y}$ $du = \frac{1}{y}dx$
y is constant

$$= \int_0^1 [ye - y]\,dy$$

$$= \int_0^1 (e-1)y\,dy = \frac{1}{2}(e-1)\left[y^2\right]_0^1 = \frac{1}{2}(e-1)$$

16.4 Polar coordinates.

Area of one loop of $r = \cos(3\theta)$



old way:

$A = \frac{1}{2} r^2 \theta$

$A = \frac{1}{2} f(\theta)^2 \cdot \theta$

$\cos 3\theta = 0$ @

$3\theta = \frac{\pi}{2}$

$\theta = \frac{\pi}{6}$

$$A = 2 \cdot \frac{1}{2} \int_0^{\frac{\pi}{6}} \cos^2(3\theta)\, d\theta = \frac{\pi}{12}$$

16.4 way: Find the volume over the region of $f(r,\theta) = 1$

$$\int_{-\frac{\pi}{6}}^{\frac{\pi}{6}} \int_0^{\cos(3\theta)} 1\, r\, dr\, d\theta$$