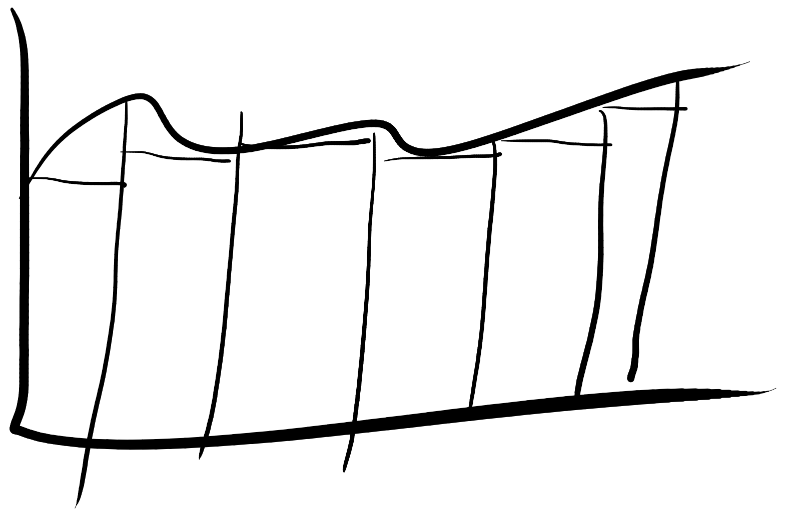
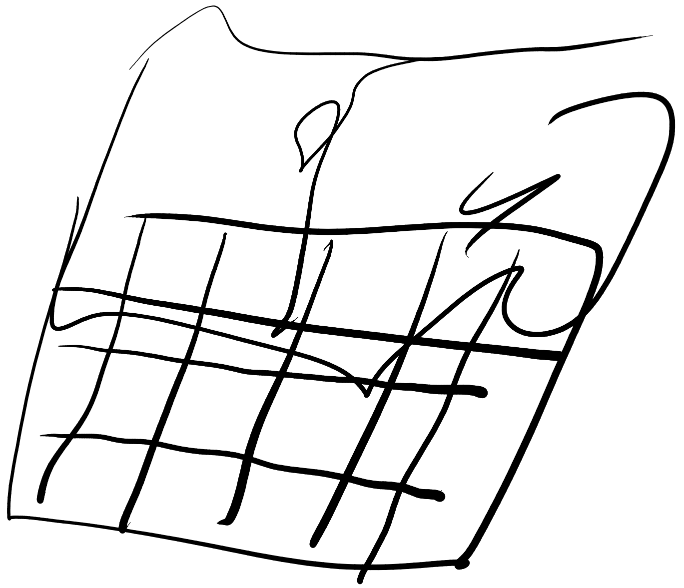
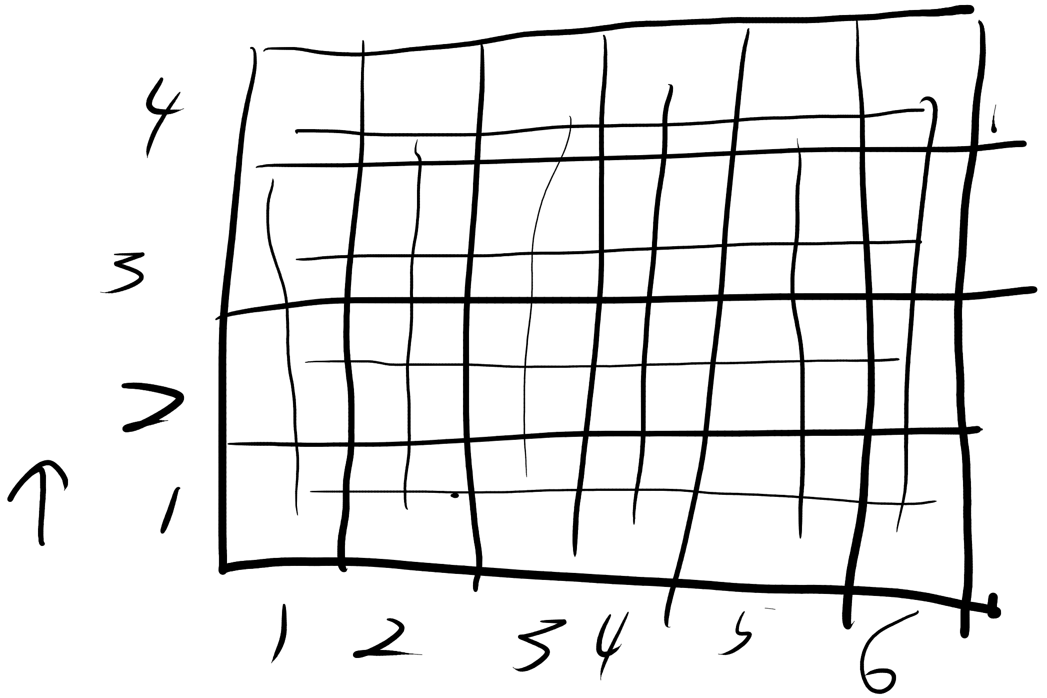
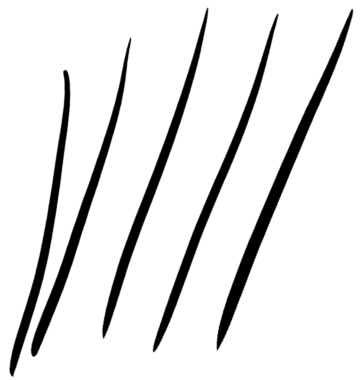




$$\int_a^b f(t)\,dt = F(b) - F(a)$$

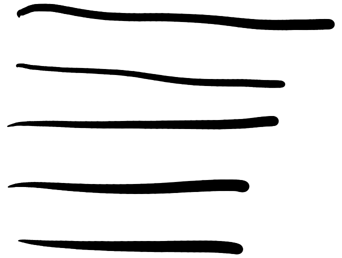


$$\iint_R f\,dA = \int_a^b \boxed{\int_c^d f\,dy}\,dx$$

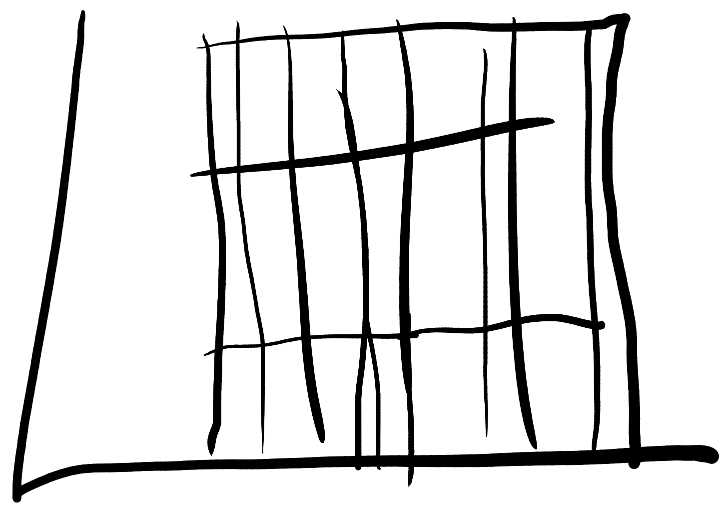


$R = [a,b] \times [c,d]$

$$= \int_c^d \int_a^b f\,dx\,dy$$



$R = [1,4] \times [0,3]$ $\quad f(x,y) = xy^2$



$$\int_1^4 \int_0^3 xy^2 \, dy \, dx = \int_1^4 x \frac{y^3}{3} \Big|_0^3 dx = \int_1^4 9x \, dx$$

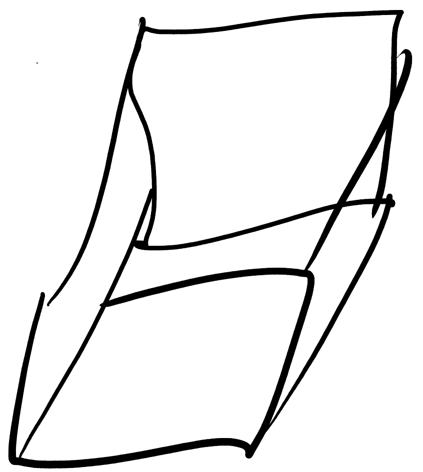
$$= \frac{9x^2}{2} \Big|_1^4 = \frac{135}{2}$$

$$\int_0^3 \int_1^4 xy^2 \, dx \, dy = \int_0^3 \frac{x^2 y^2}{2} \Big|_1^4 dy = \int_0^3 \frac{15}{2} y^2 \, dy = \frac{135}{2}$$

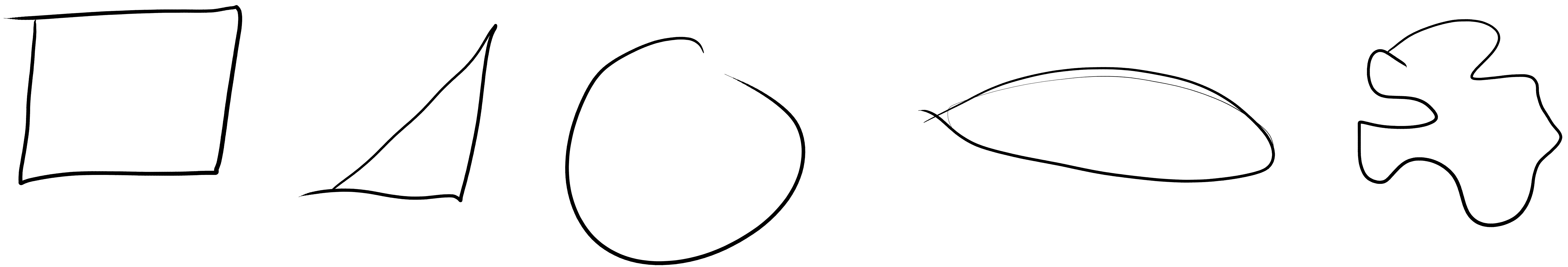
3
3
2
2
6
8

box 3 inch^2 base
4 inches tall

density $\rho = 1 + xy + yz + xz^2$



$$\int_0^3 \left(\int_0^3 \left(\int_0^4 1 + xy + yz + xz^2 \, dz \right) dy \right) dx$$



$f(x,y) = xy$

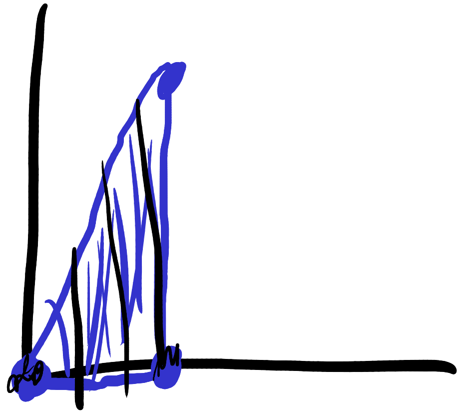
Δ corners

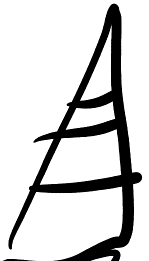
$(0,0), (1,0),$

$(1,3)$

$$\int_0^1 \int_0^{3x} xy \, dy \, dx = \int_0^1 \frac{xy^2}{2} \Big|_0^{3x} dx$$

$$= \int_0^1 \frac{9x^3}{2} dx = \frac{9x^4}{8} \Big|_0^1 = \frac{9}{8}$$





$y = 3x$

$x = \frac{1}{3}y$

$$\int_0^3 \int_{\frac{y}{3}}^1 xy \quad dy = 9/8$$

$f(x,y) = y\sqrt{x}$

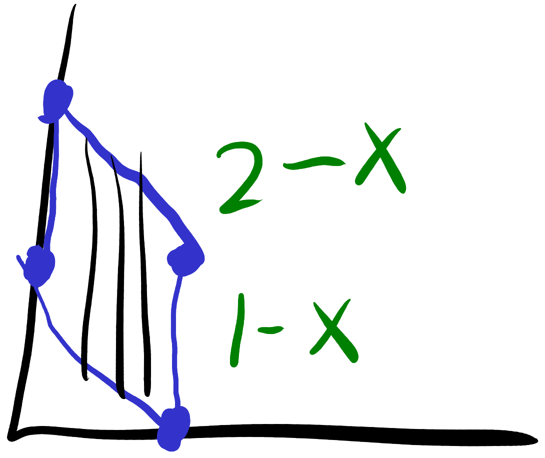
parallelogram

(0,1), (0,2),

(1,0), (1,1)

✓ $\int_0^1 \int_{1-x}^{2-x} y\sqrt{x}\,dy\,dx = \int_0^1 \frac{y^2}{2}\sqrt{x}\Big|_{1-x}^{2-x} dx$

$= \int_0^1 \frac{3}{2}\sqrt{x} - x^{3/2}\,dx = \overset{\checkmark}{3/5}$



$\int_0^1 \int_{1-y}^{1} y\sqrt{x}\,dx\,dy + \int_1^2 \int_0^{2-y} y\sqrt{x}\,dx\,dy$

$= \ldots\ldots = 3/5$

$$\int_0^1 \int_{1-x}^{2-x} dy\,dx \qquad \text{Right}$$

$$\int_{1-x}^{2-x} \int_0^1 dx\,dy \qquad \text{Wrong}$$