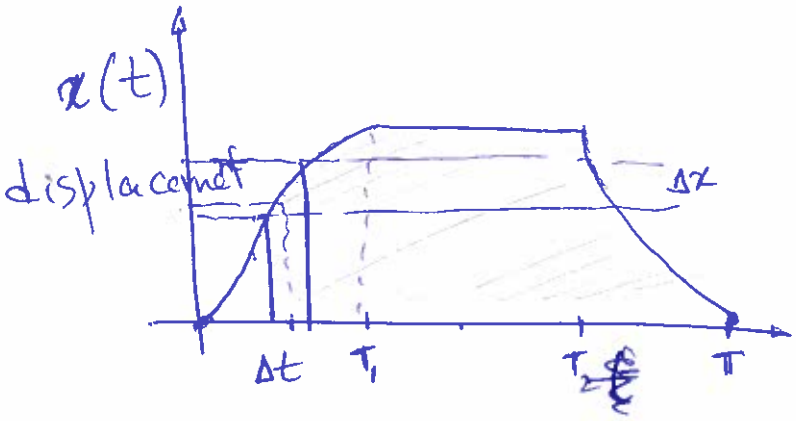
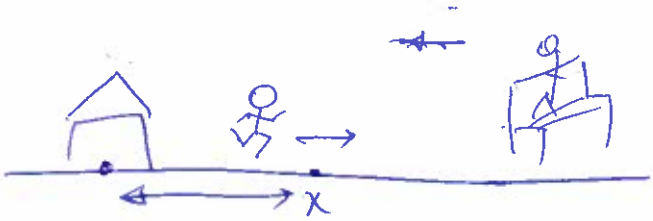




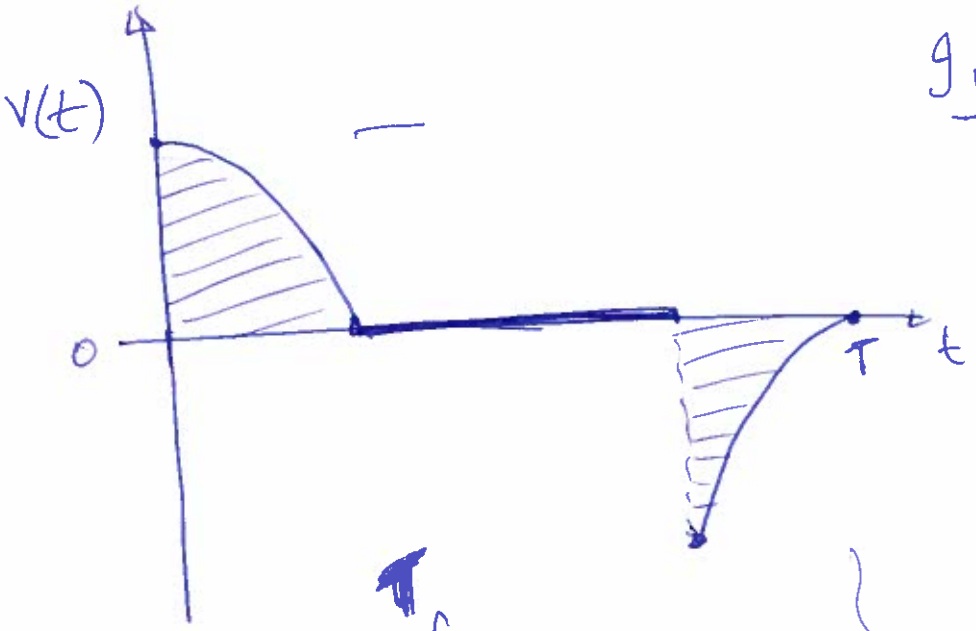
time - t s.

displacement - x(t) m

$\frac{\Delta x}{\Delta t}$ $\frac{m}{s}$.

$\Delta x / \Delta t$

$V(t)$ = (in the limit that $\Delta t \to 0$), $\frac{dx}{dt}$

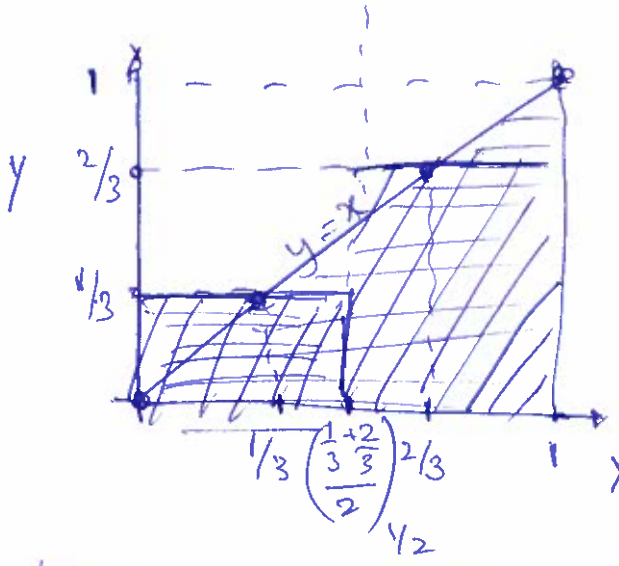


Integrate velocity

$\left(\frac{\Delta x_1}{\Delta t} + \frac{\Delta x_2}{\Delta t} + \frac{\Delta x_3}{\Delta t} \ldots \right)$

$$x(t) = \int_0^t V(t)\, dt$$

Sum of all (but in the limit)



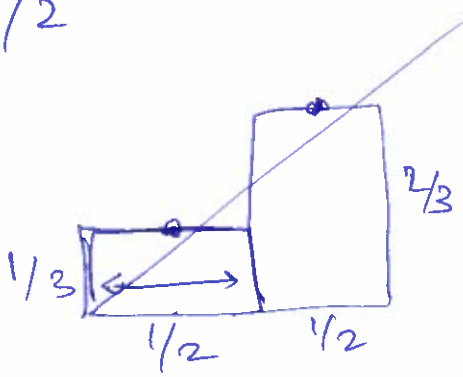
$y = f(x)$

$y = x$, for $x \in [0, 1]$

$$I = \int_0^1 f(x)\,dx$$

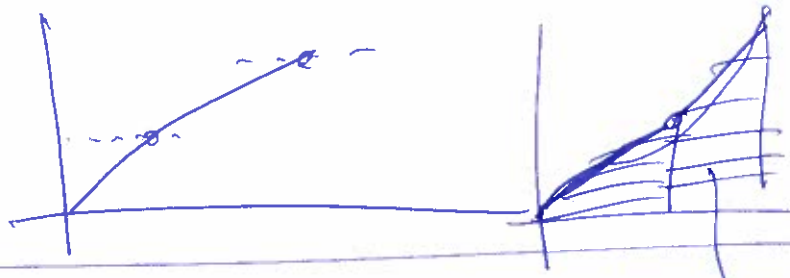
Answer: $1/2$

$$E_1 = \frac{f(0) + f(1)}{2} = \frac{0+1}{2} = 1/2$$



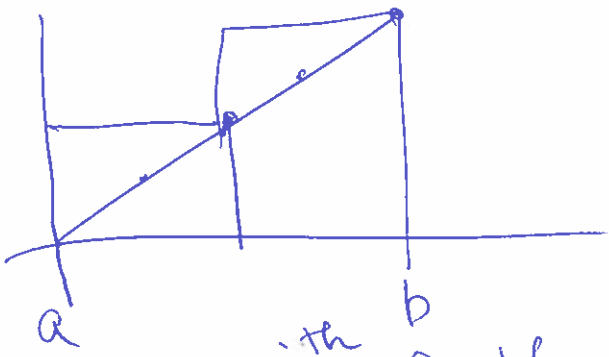
$$E_2 = \frac{1}{2} \times \frac{1}{3} + \frac{1}{2} \times \frac{2}{3}$$

$$= 1/2$$

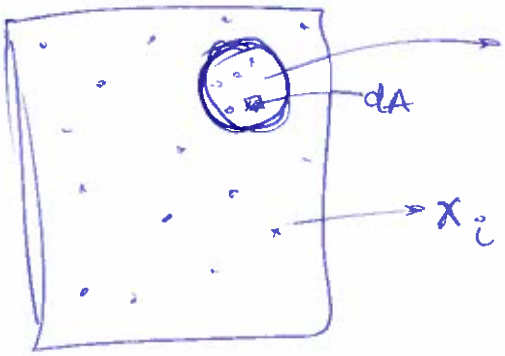


Assume $f(x)$ is a constant within each interval.

trapezoid not rectangle



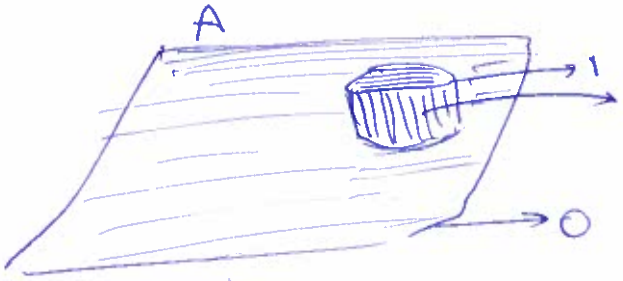
i^{th} sample $\quad a + i\,\frac{b-a}{n}$



Area of Circle

$$\int_{\circ} dA \approx$$

$$\approx \sum_{i=1} f_i$$

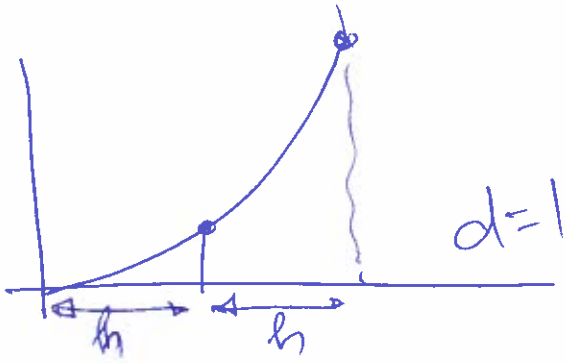


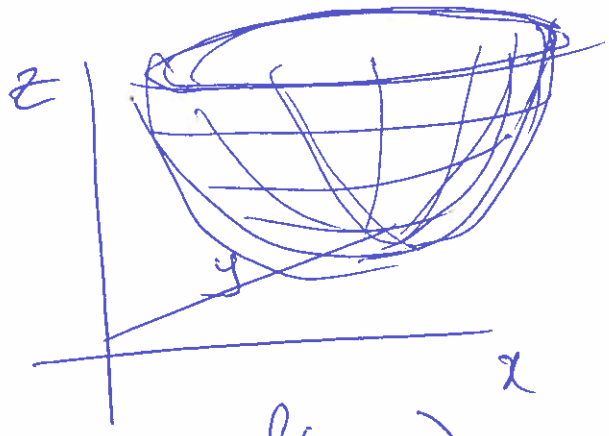
$$\int_{\square} f(x,y)\,dA = \int_{\circ} 1\,dA + \int_{\square - \circ} 0\,dA$$

Drawing random in $\square$, $= \int_{\circ} dA =$ Area of Circle.

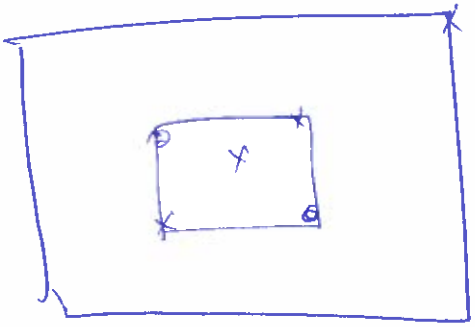
$$I \approx \frac{\sum f(x_i)}{N} \qquad x_i \to \text{uniform in } \square$$

$$= \$ \qquad \text{but } f(x_i) = \begin{cases} 1 \\ 0 \end{cases} \Big\} \text{ inside circle.}$$



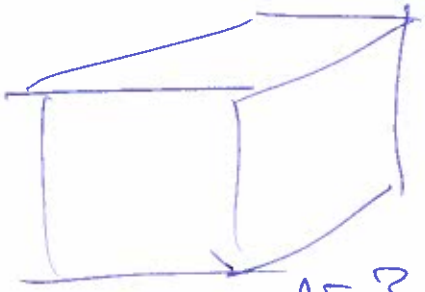


$z = f(x,y)$



d=2

exponentially (in d) many samples

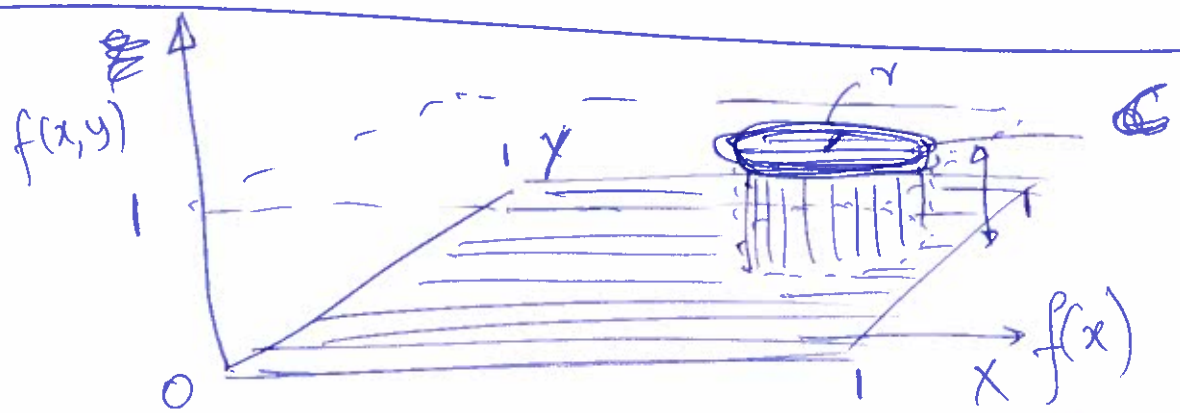


d=3

8 samples

40 dim space

2^{40} samples



$$I = \int_0^1 \int_0^1 f(x,y)\,dx\,dy \qquad f(x,y) = \begin{cases} 1 & \text{if inside } C \\ 0 & \text{otherwise} \end{cases}$$

$$= \text{Area}(C) * 1 = \pi r^2$$

$E_I = \pi r^2$

$\pi = E_I / r^2$