$$m\frac{d^2x}{dt^2} = F(x)$$

$$\frac{dx}{dt}\cdot \quad '' \qquad\qquad \frac{dx}{dt}\cdot \quad ''$$

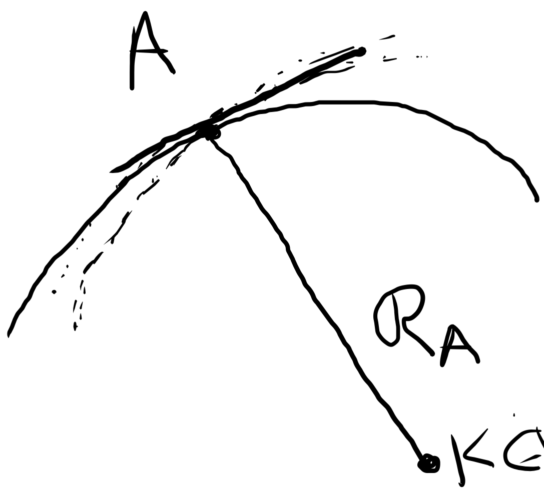
$$\frac{d}{dt}\left(\frac{1}{2}mv^2\right) = F(x)\,v = \frac{d}{dt}\left(-V(x)\right)$$

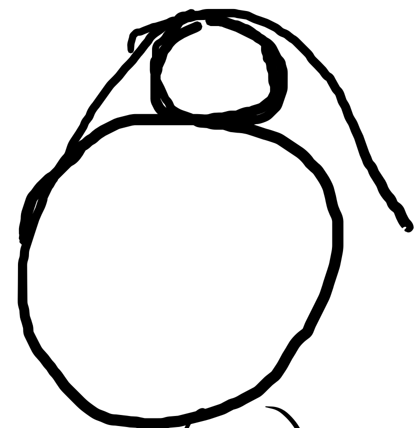
$$-\int_{x_0}^{x} F(x')\,dx'$$

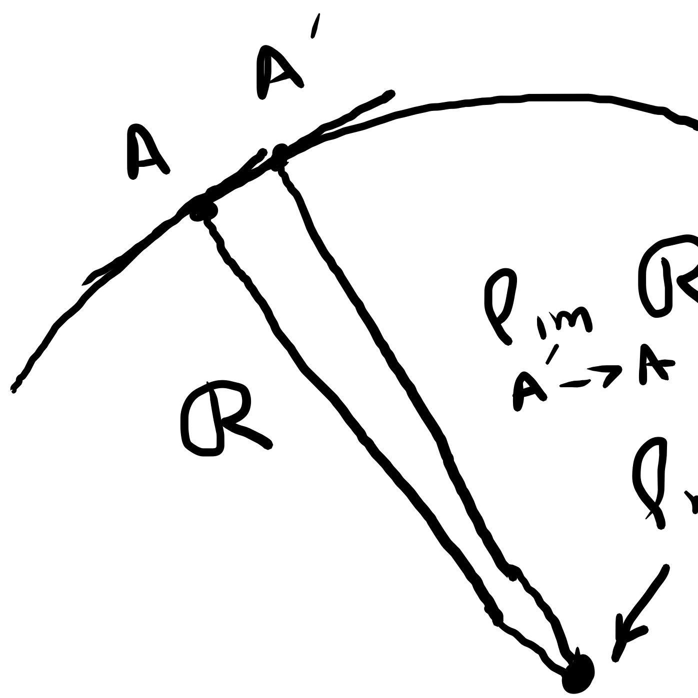
$$\frac{d}{dt}\left(\frac{1}{2}mv^2 + V(x)\right) = 0$$

$$\boxed{\frac{1}{2}mv^2 + V(x) = E} = \frac{1}{2}m\,v(0)^2 + V(x(0))$$

$$\frac{dx}{dt} = v = \pm\sqrt{\frac{2}{m}\left(E - V(x)\right)}$$

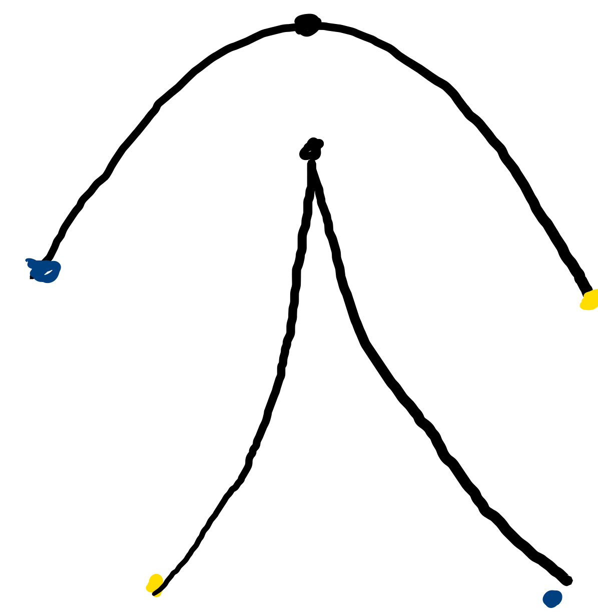


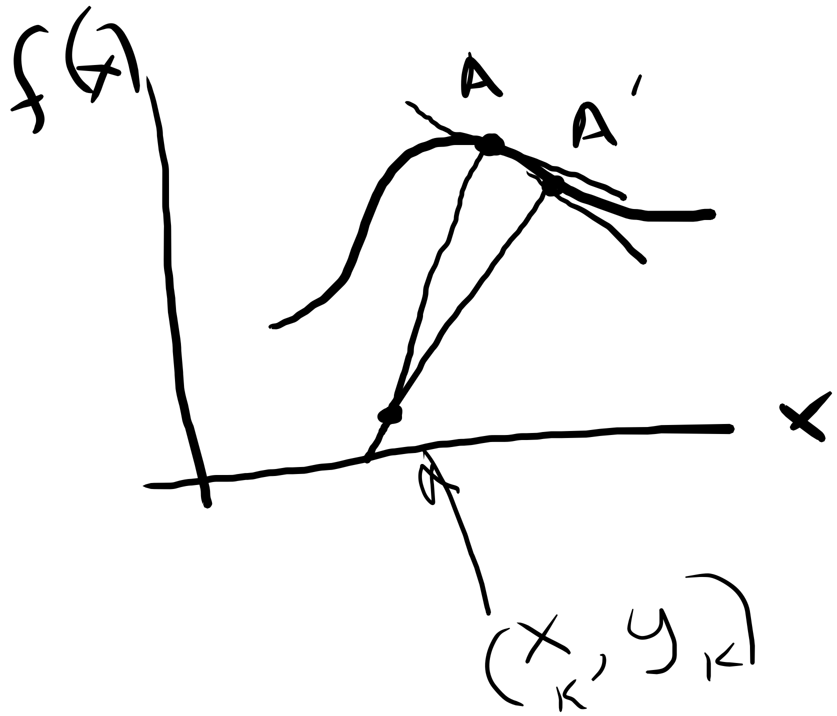




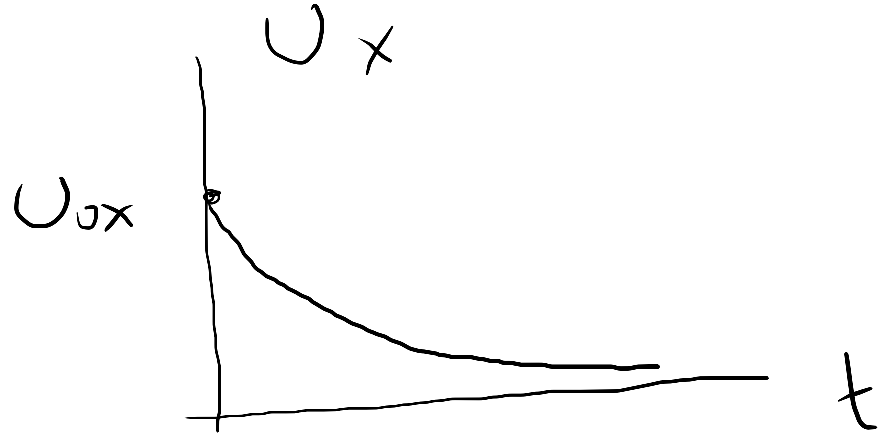
$$\lim_{A' \to A} R = R_A$$

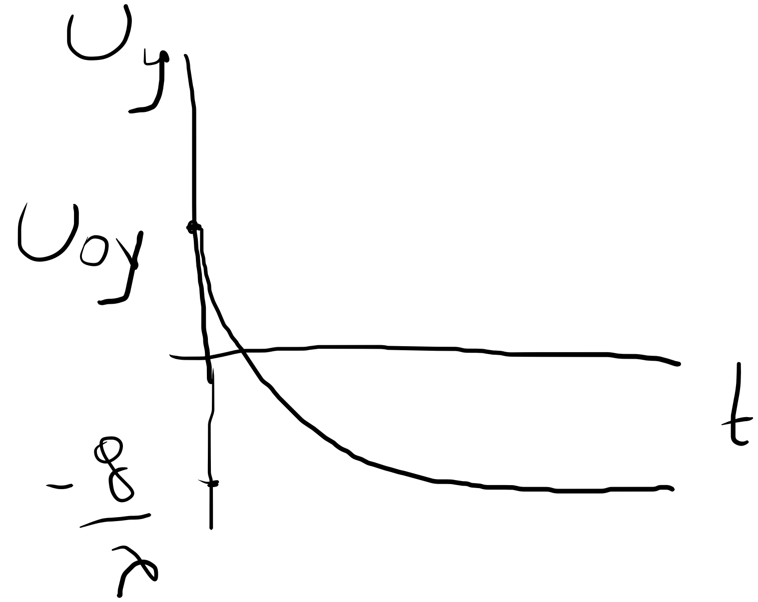
$$\lim_{A' \to A} = KK.$$



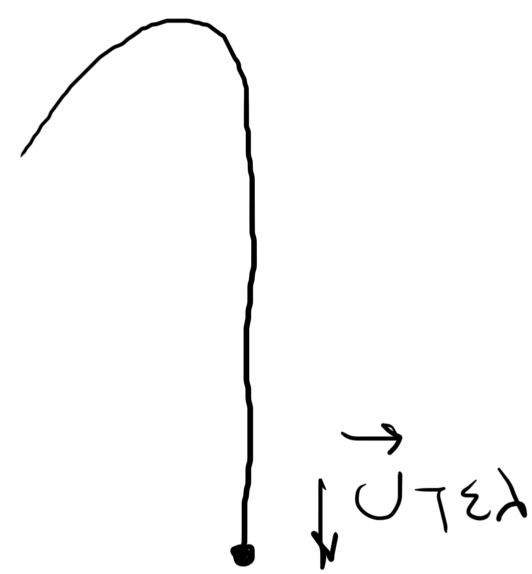


f_A, f'_A, f''_A, x_A



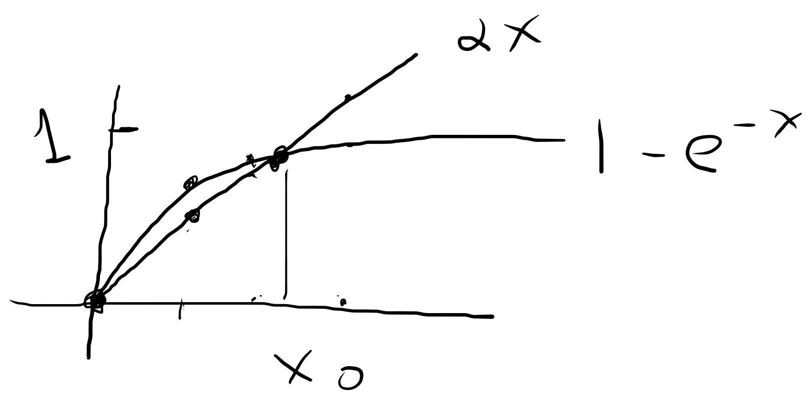


$$\vec{\upsilon}_{\tau\varepsilon\lambda} = \left(0, -g/\lambda\right)$$



$$1 - e^{-x} = \alpha x \qquad 1 - x^2 = \alpha x \longrightarrow x = \ldots$$

$$x = \ldots ?$$



$$1 - e^{-x_0} = \alpha x_0$$

$$\alpha = 1 - \varepsilon \qquad 0 < \varepsilon << 1$$

$$x_0 << 1$$

$$\simeq$$

$$\cancel{1} - \left(\cancel{1} - x_0 + \frac{x_0^2}{2} + \ldots\right) = \alpha x_0$$

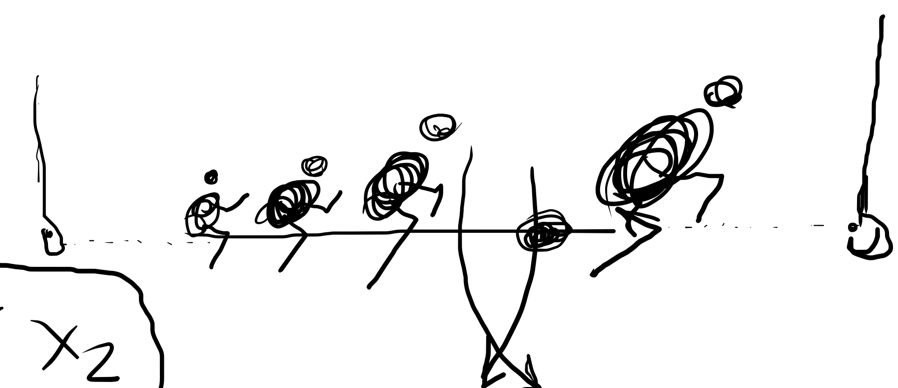
$$\cancel{x_0}\left(1 - \frac{x_0}{2}\right) = \alpha \cancel{x_0}$$

$$x_0 \simeq 2(1-\alpha)$$

$$\frac{dm}{dx} = \lim_{\delta x \to 0} \frac{\delta m}{\delta x} = \frac{100g}{1m} = \frac{1g}{1cm}$$

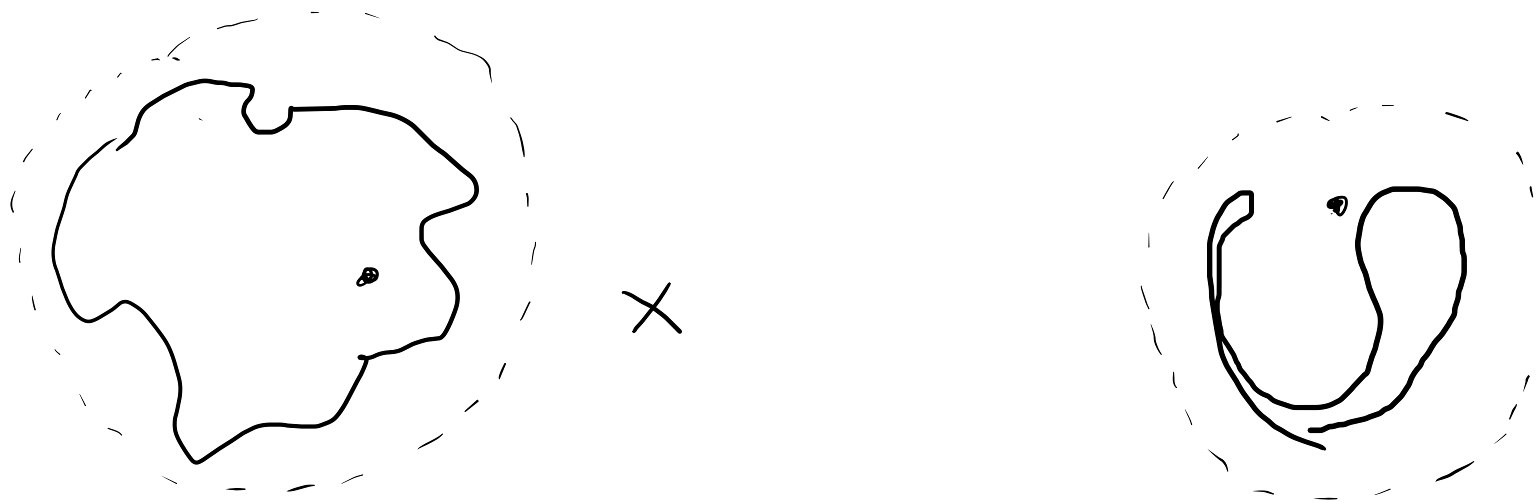
$$\frac{dm}{dx}(x) = \rho_1 + \frac{(x-x_1)}{L}(\rho_2 - \rho_1)$$

$$\boxed{x_1 \le \frac{\int_{x_1}^{x_2} \rho(x)\, x\, dx}{M} = X_{CM} \le x_2}$$



$$\rho(x) = \rho(x_1) + \Theta(x)$$

$$\int_{x_1}^{x_2} \rho(x_1)\, x\, dx + \int \Theta(x)\, x\, dx$$



$$\boxed{a = \frac{d^2x}{dt^2} = \frac{d}{dt}v}$$

$x = 1 + t + t^2$

$a = 2$

$x = \sin t + t^3$

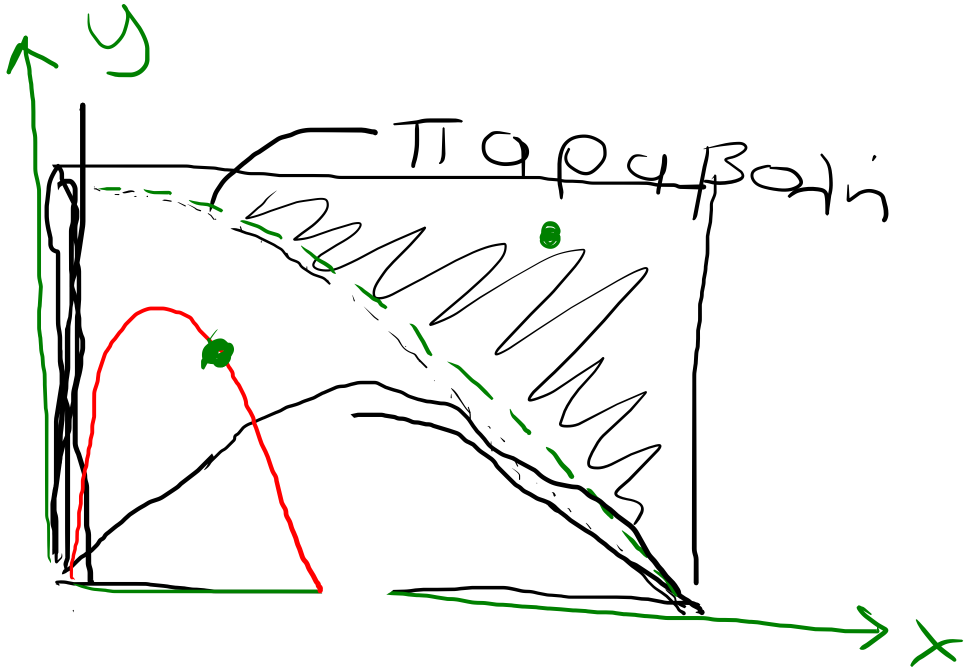
$a = -\sin t + 6t$

$$\vec{r}(t) = \big(x(t), y(t), z(t)\big) = (t, t^2, t^3)$$

$$\vec{a} = \left(\frac{d^2x}{dt^2}, \frac{d^2y}{dt^2}, \frac{d^2z}{dt^2}\right) = (0, 2, 6t)$$

$$\frac{\int dm\,(x, y)}{M} = (x_{KM}, y_{KM}) = \left(\frac{\int dm\, x}{M}, \frac{\int dm\, y}{M} \right)$$

$$\frac{\int dm\, \vec{r}}{M} = (x_{KM}, y_{KM}) = \vec{R}_{KM}$$



$$y_* = 1 - x_*^2$$

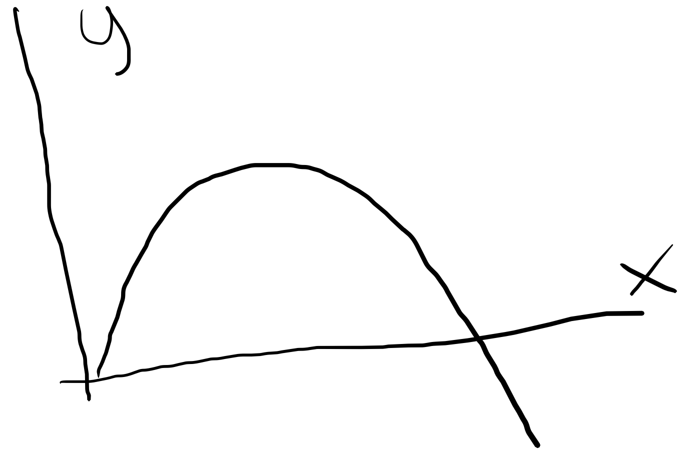
$y > y_*$ (ασφαλής)

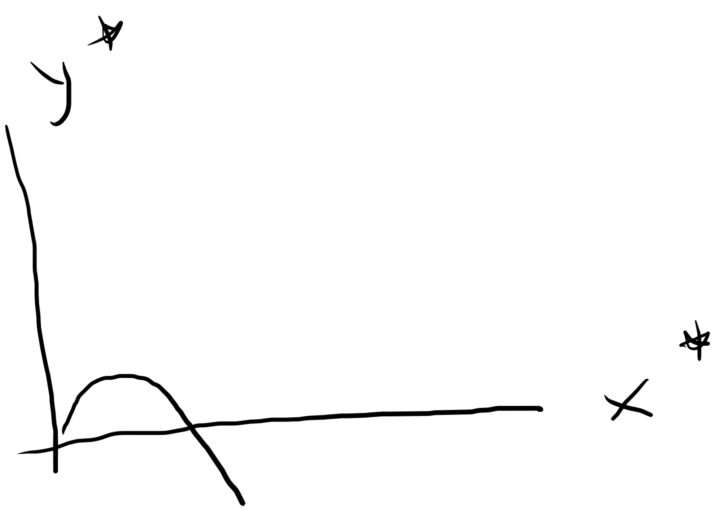
$$x = \frac{v_0/g \pm \sqrt{\bigcirc}}{2}$$

$$\frac{x}{v_0/g} = f(\theta)$$

$$\boxed{f'(\theta) = 0}$$

$$f\left(\sin, \cos, \tan\varphi, \lambda = 2gH/v_0^2\right)$$


y
x


y*
x*

$$1 = \Big(\underbrace{\lambda u_{y_0}/g}_{\sigma} + 1\Big)\Big(1 - \delta/2\Big)$$

$$\cancel{1} = \sigma + \cancel{1} - \frac{\delta}{2}(\sigma + 1)$$

$$\frac{\delta}{2}(\sigma+1) = \sigma \implies \delta = \frac{2\sigma}{\sigma+1} = \frac{2\lambda u_{y_0}/g}{\frac{\lambda u_{y_0}}{g} + 1} = \frac{2\lambda u_{y_0}}{\cancel{\lambda u_{y_0}} + g}$$

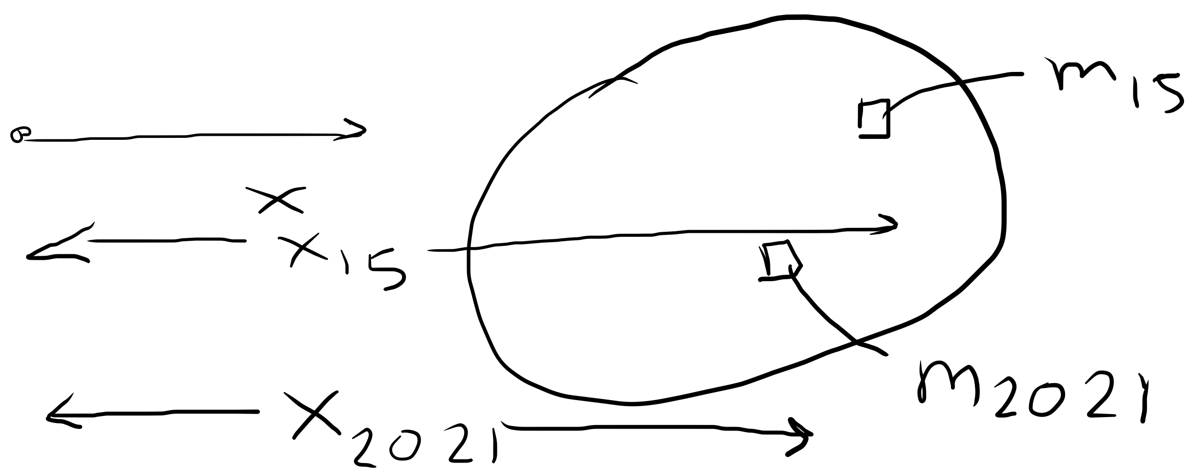
$$\simeq \frac{2\lambda u_{y_0}}{g}$$

$$\int dm\, x = \lim_{N\to\infty}\sum_{i=1}^{N}\Delta m_i\, x_i$$

$$= \int dm(x)\, x = \int \frac{dm}{dx}\, dx\, x$$

σταθ (αφ είναι ομογενές το σώμα

$$= \frac{dm}{dx}\int_{x_{αρ}}^{x_{δεξ}} x\, dx$$



$$\int_{\alpha}^{\beta} f(x)\, dx = F(\beta) - F(\alpha)$$

$$= \left[F(x)\right]_{\alpha}^{\beta}$$

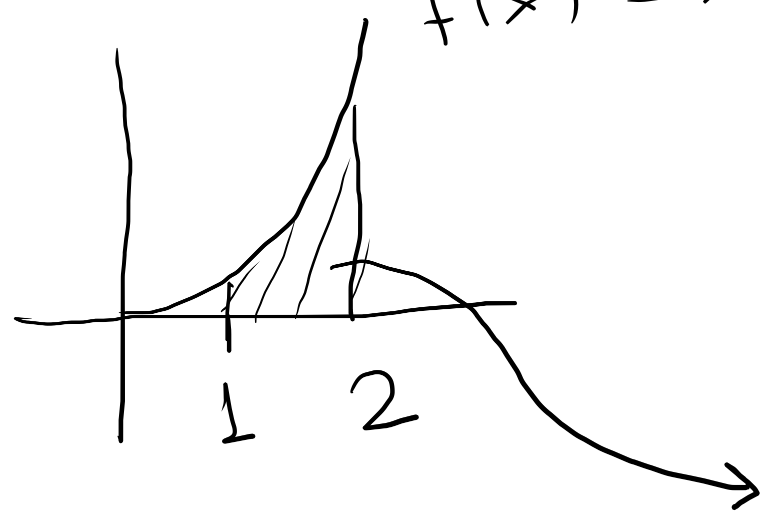
$$\int f(x)\, dx = \boxed{F(x)}$$

$$F'(x) = f(x)$$

$\int f(x)\,dx$ = αόριστο ολοκλ $= F(x)$

$$\int_{a}^{\beta} f(x)\,dx = F(\beta) - F(a) \qquad \tilde{F}_{(x)} = F(x) + 5$$

$f(x) = x^2$



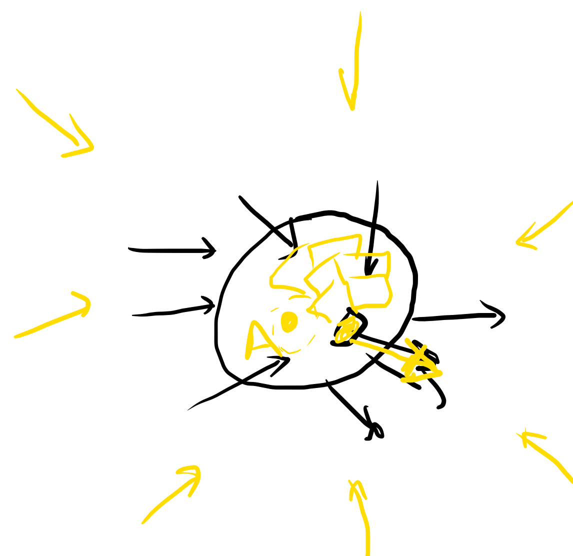
$$\int x^2\,dx = \frac{x^3}{3}$$

$$\frac{2^3}{3} - \frac{1^3}{3}$$

$$dm = \frac{dm}{dx}\, dx = f(x)\, dx$$

$$\int dm\, x = \int f(x)\, x\, dx = \int g(x)\, dx$$

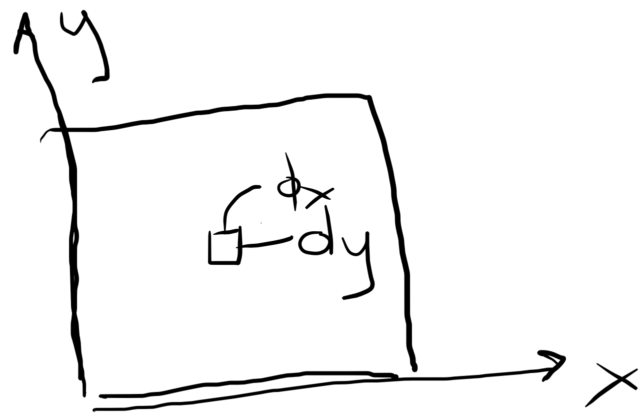
$$\operatorname{div} \vec{A}\Big|_A = \vec{\nabla} \cdot \vec{A} = \lim_{V \to 0} \frac{\text{ροή σε μια κλειστή } S}{V(S)}$$



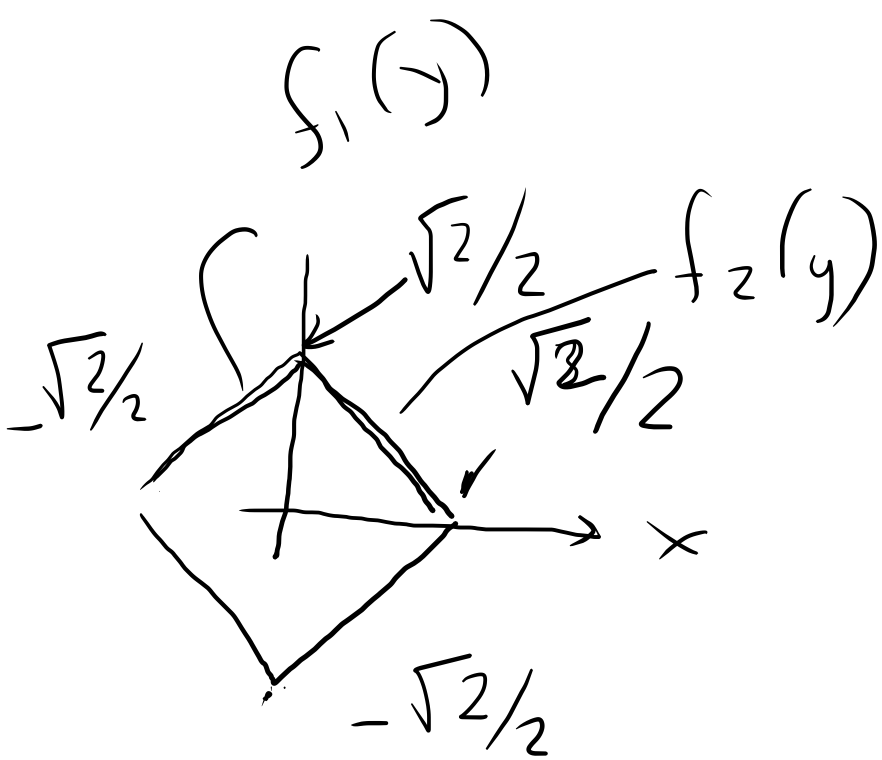
$$\text{ροή} = \int \vec{A} \cdot d\vec{S}$$

$\vec{\nabla} \times \vec{A}$

$$\operatorname{curl} \vec{A} = \vec{\nabla} \times \vec{A} = \lim_{S \to 0} \frac{\int_C \vec{A} \cdot d\vec{\ell}}{S(A)}$$



$$\iint_{\square} 1 \, dx \, dy = \int_0^1 \left(\int_0^1 dx \right) dy = \int_0^1 1 \, dy = 1$$



$$\int_{-\sqrt{2}/2}^{+\sqrt{2}/2} \left(\int_{f_1(y)}^{f_2(x)} dx \right) dy$$