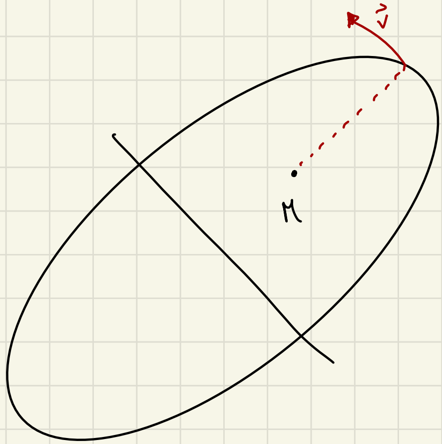


$$\vec{L} = \vec{r} \wedge \vec{p}$$

$$\vec{L} = (a-c)\, m\, v_p = (a+c)\, m\, v_a$$

Devo dire quanto è v. So che

$$\frac{a^3}{T^2} = k = \frac{GM}{4\pi^2} \qquad (a-c)\, v_p = (a+c)\, v_a$$

$$I(r)\,\alpha(r) = 0 \qquad \frac{1}{2} m r^2 \cdot \ddot{r} = 0$$

$$E = \frac{1}{2} m v_p^2 - G\frac{mM}{a-c}$$

$$\frac{1}{2} v_p^2 - G\frac{M}{a-c} = \frac{1}{2} v_a^2 - G\frac{M}{a+c}$$

$$\frac{1}{2}(a+c)\overbrace{(a-c)\, v_p}^{(a+c)v_a}\, v_p - GM(a+c) =$$

$$\frac{1}{2}(a-c)\underbrace{(a+c)\, v_a}_{(a-c)\, v_p}\, v_a - GM(a-c)$$

$$\frac{1}{2} v_a v_p (\cancel{a^2} + \cancel{c^2} + 2ac) - \cancel{GMa} - GMc =$$

$$\frac{1}{2} v_a v_p (\cancel{a^2} + \cancel{c^2} - 2ac) - \cancel{GMa} + GMc$$

$$\cancel{2}\, v_a v_p\, a\cancel{c} = \cancel{2}\, GM\cancel{c}$$

$$v_a v_p = \frac{GM}{a} \qquad \frac{(a-c)}{a+c} v_p = (\cancel{a+c})\, v_a$$

$$L^2 = (a-c)^2 m^2 \cdot \frac{a+c}{a-c}\, \frac{GM}{a}$$

$$L^2 = (a-c)(a+c)\, m^2\, \frac{GM}{a}$$

$$L^2 = b^2 m^2\, \frac{GM}{a}$$

$$\rightsquigarrow L = bm\sqrt{\frac{GM}{a}}$$

$$\frac{a^3}{T^2} = \frac{GM}{4\pi^2} \qquad \rightsquigarrow L = bm \cdot 2\pi\sqrt{\frac{a^3}{T^2}} = \frac{2\pi a b m}{T}$$

$$\log_{\log_5(e)}(\ln 6) = \log_{\log_5(e)} \frac{\log_5 6}{\log_5 e}$$

$$= \log_{\log_5(e)} \left(\frac{\log_5 e}{\log_5 6} \right)^{-1}$$

$$= - \log_{\log_5(e)} \log_5(e) + \log_{\log_5(e)}(\log_5 6)$$

$$\begin{cases} y - \ln(\bar{x}) = m(x - \bar{x}) \\ y = \ln(x) \end{cases}$$

$$\ln(x) - \ln(\bar{x}) = m(x - \bar{x})$$

Devo trovare m in modo che abbia ! soluzione

$$\ln(x) - mx = -m\bar{x} + \ln(\bar{x})$$

$$\ln(x) - \ln(e^{mx}) = -m\bar{x} + \ln(\bar{x})$$

$$\frac{x}{e^{mx}} = e^{\ln(\bar{x}) - m\bar{x}}$$

$$\frac{x}{e^{mx}} = \frac{\bar{x}}{e^{m\bar{x}}}$$

$$\begin{cases} x - \ln y = 1 \\ y - \ln x = 1 \end{cases}$$

$x - \cancel{y - \ln y} + \ln(x) = y + \ln(y)$ Dato che $x, y > 0$

$f(x) = x + \ln(x)$ è crescente (somma di fz crescenti)

$\Rightarrow x = y$

$e^x > x+1$

$x - \ln(x) = 1$

$x = 1 + \ln(x)$

$x = \ln(e) + \ln(x)$

$x = \ln(x \cdot e)$

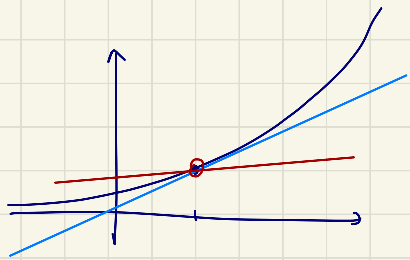
$\boxed{e^x = x \cdot e}$

$x - 1 = \ln(x)$

$\boxed{e^{x-1} = x}$

$e^x = e \cdot x$ $x = 1$

$x = 1$ funzione



$\Rightarrow x > 1$

$e^x > x$ tra $(0,1)$? $e^x = x \cdot e$

$e^{x-1} - x = 0$

So che $e^x > 1 + x$

$e^{x-1} - x > 1 + (x-1) + x$

$2x$

$x + 1 > x \cdot e$

$x - 1 > 0$

$x > 1$ $x > -1$

$x(\cancel{e-1}) < \frac{1}{e-1}$

Se $x > 1 \Rightarrow$

$e^{x-1} - x > 2x > 0$

$\Rightarrow$ Sol tra $(0,1]$

$x = 1$ ✓

$x - \ln(x) = 1$

$e^x > x+1$
$x>0$

$e^{t-1} > t$
$t>1$

$x-1 = \ln(x)$

$e^{x-1} = x$ $\quad \forall x>1$ non c'è soluzione

$x, y > 0$

$$\begin{cases} x - \ln(y) = 1 \\ y - \ln(x) = 1 \end{cases}$$

$\boxed{e^x > 1+x}$ $(x>0)$

$x-1 = t$

$x + \ln(x) = y + \ln(y) \implies x = y$

$x > \ln(x+1)$

$x - \ln(x) = 1$

$x-1 = \ln(x)$

$x>1$ $\quad \underbrace{e^{x-1} = x}$ $\quad e^t = 1+t$ $\quad t>0$

$x=1$

$x \in (0,1)$

Θ ?

D

Q

$$E_i = \frac{1}{2}\cancel{m}v^2 + \left(-G\frac{\cancel{m}M_T}{d-R_M}\right) + \left(-\frac{G\cancel{m}M_M}{R_M}\right) + \cancel{U_{TM}}$$

$$E_f = 0 + \left(-\frac{G\cancel{m}M_T}{R_T}\right) + \left(-\frac{G\cancel{m}M_M}{d-R_T}\right) + \cancel{U_{TM}}$$

Marte - Terra

$$\frac{1}{2}v^2 = -G\left(\frac{M_T}{R_T} + \frac{M_M}{d-R_T} - \frac{M_T}{d-R_M} - \frac{M_M}{R_M}\right)$$

$$(d^2 - R_T d - R_M d + R_T R_M)$$

$$= -G\left(\frac{R_M M_T (d-R_T)(d-R_M) + R_M R_T M_M (d-R_M)}{R_T R_M (d-R_T)(d-R_M)}\right.$$

$$\left. - R_M R_T M_T (d-R_T) - R_T M_M (d-R_T)(d-R_M)\right)$$

$$d^2(R_M M_T - R_T M_M) - d(R_T R_M M_T + R_M^2 M_T - R_T R_M M_M$$

$$R_M R_T M_T - R_T^2 M_M - R_T R_M M_M$$