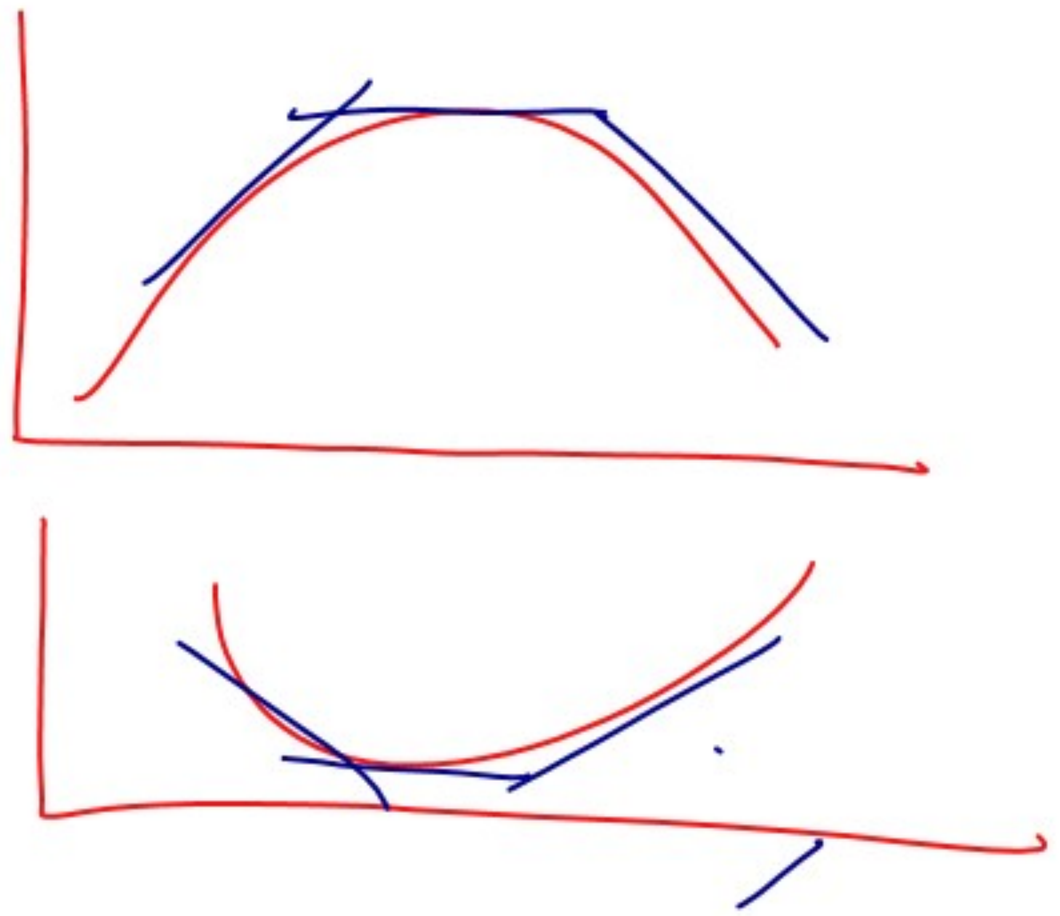
$$\max_{\{x\}} u(x) \quad \text{s.a.} \quad px = w$$

$$\mathcal{L} = u(x) + \lambda(w - px)$$

$$\max_{\{y\}} p \cdot y - CT(y)$$



$a > 0$

$b > 0$

$$a^{\alpha} a^{\beta} = a^{\alpha+\beta}$$

$$(a^{\alpha})^{\beta} = a^{\alpha\beta}$$

$$\frac{a^{\alpha}}{a^{\beta}} = a^{\alpha-\beta}$$

$x > 0$

$y > 0$

$$x \cdot y = e^{\ln x} e^{\ln y} = e^{\ln x + \ln y}$$

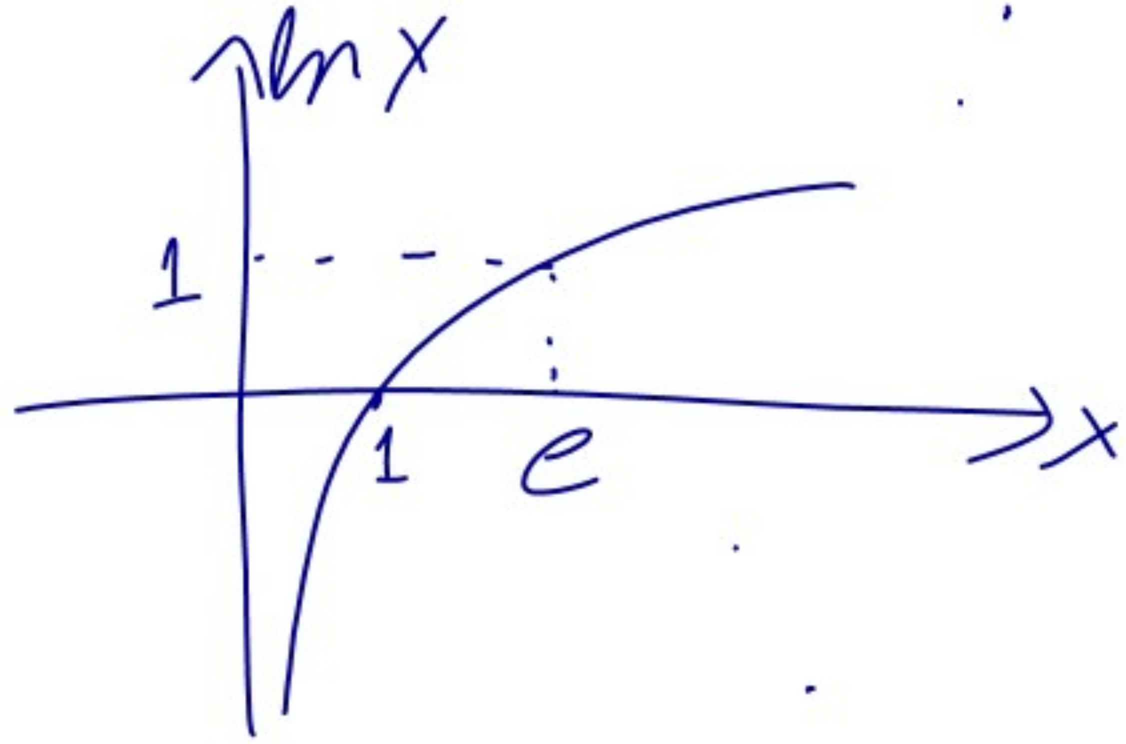
$\ln x = t$

т.ч. $e^{t} = x$

$$e^{\ln x} = x$$

$x > 0$

$$e^0 = 1$$



$$e^{f(x)+\gamma(x)+z} = e^{g(x)}$$

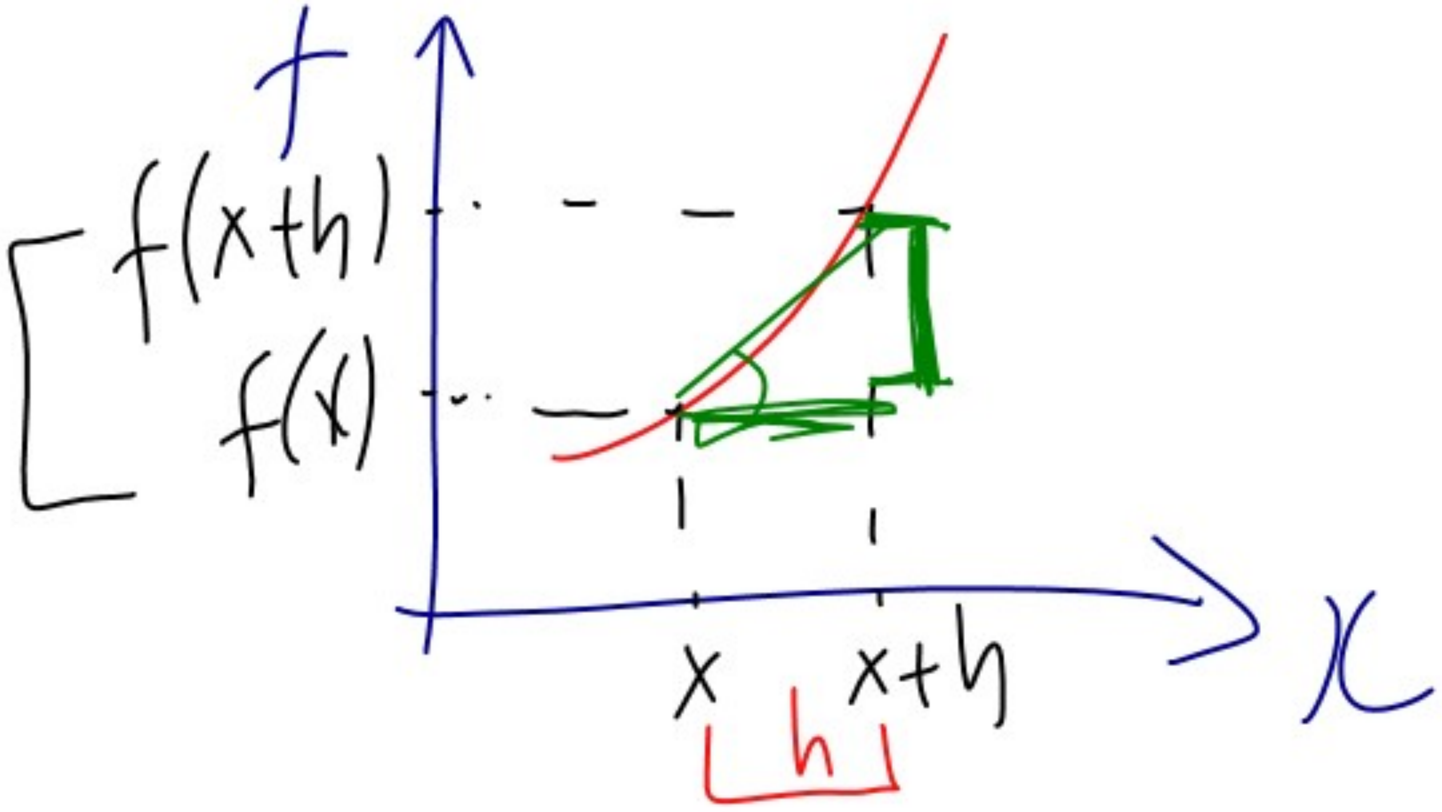
$$f(x)+\gamma(x)+z = g(x)$$

$$\ln a^b = b \ln a \qquad e^{b \ln a} = (e^{\ln a})^b = a^b$$

$f : \mathbb{R} \to \mathbb{R}$

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$f(x+h) - f(x)$



$$f(x) = g(\underbrace{h(z(x))}_{y}))$$

$$g(y)$$

$$y = h(\alpha)$$

$$dy = h'(\alpha)\,d\alpha$$

$$\alpha = z(x)$$

$$d\alpha = z'(x)\,dx$$

$$dg = g'(y)\,dy = g'(h(\alpha))\,h'(\alpha)\,d\alpha$$

$$= g'(h(z(x)))\,h'(z(x))\,z'(x)\,dx$$

$$\frac{d a^x}{dx} = \frac{d (e^{\ln a})^x}{dx} = \frac{d e^{x \ln a}}{dx} =$$

y

$a > 0$

$x a^{x-1}$

$$\frac{d x^n}{dx} = n x^{n-1}$$

$z = e^{x \ln a}$

$y = x \ln a$

$dy = \ln a \cdot dx$

$z = e^y$

$dz = e^y dy$

$dz = e^{x \ln a} \ln a \cdot dx$

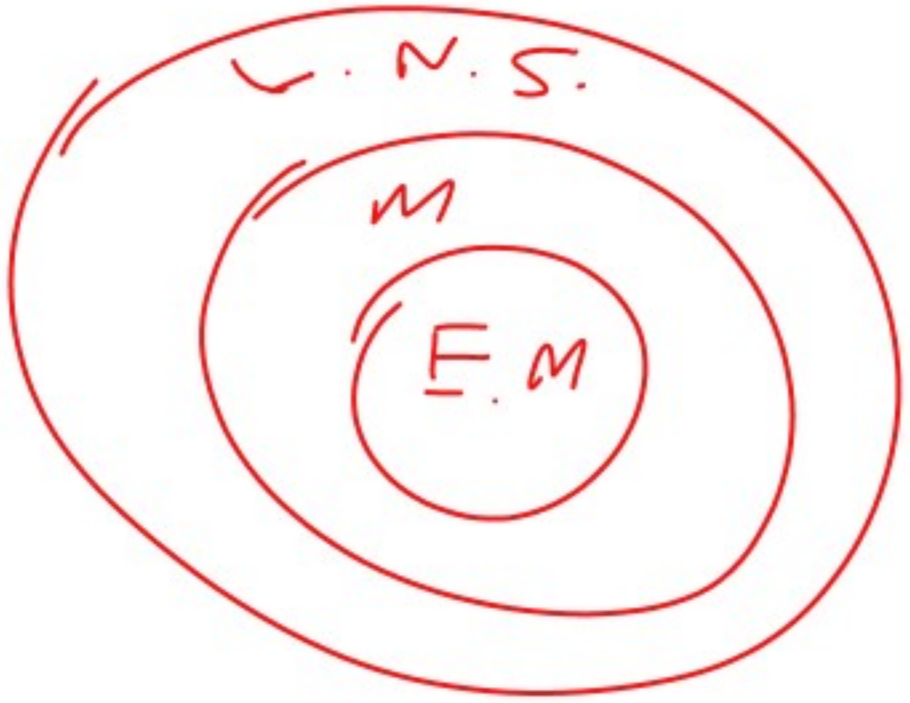
$$\frac{d a^x}{dx} = a^x \ln a$$

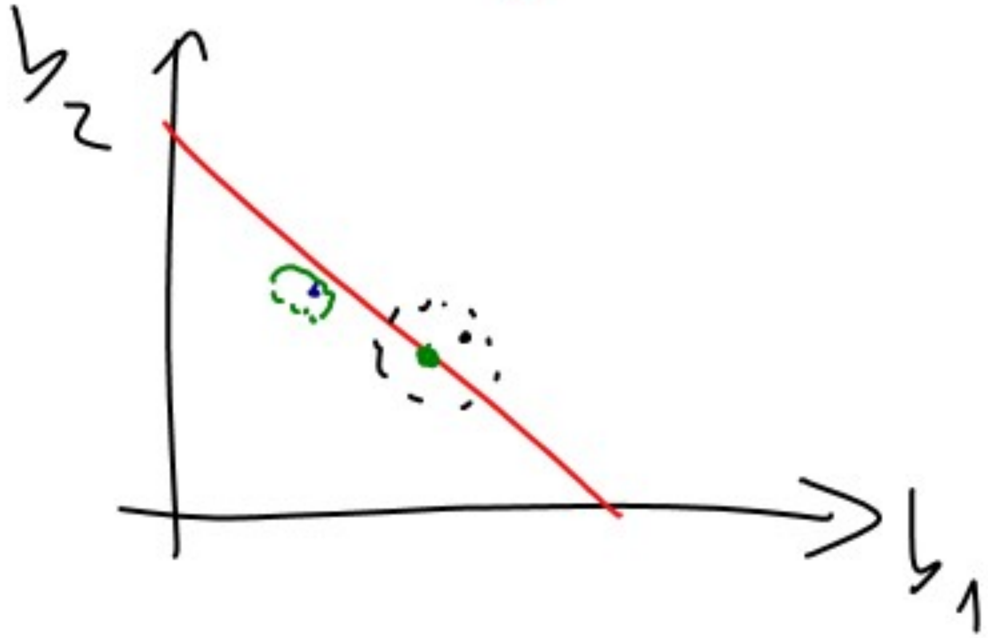
$h, X \in \mathbb{R}^m_+$

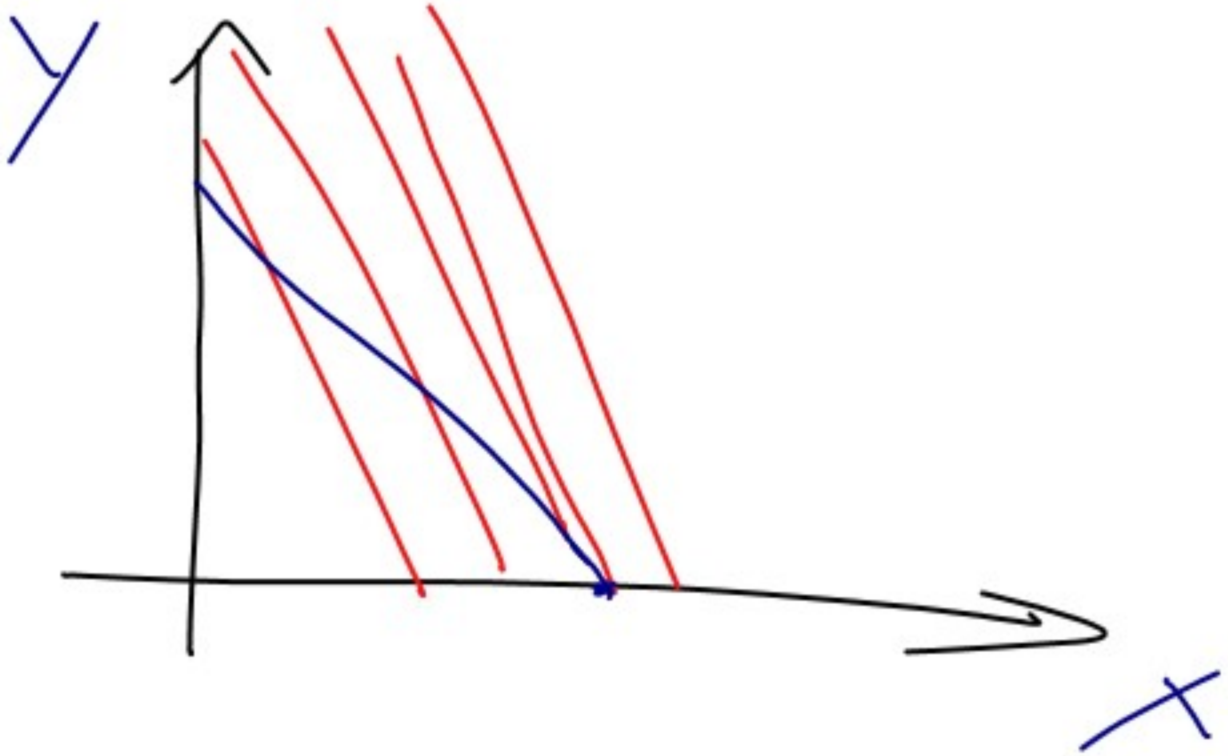
u

$$\max_{\{X\}} u(X) \quad \text{s.a. } pX \leq w$$

$$\min_{\{h\}} h \cdot p \quad \text{s.a. } u(h) \geq \bar{u}$$







$$u(x,y) = ax + by$$

$$a, b > 0$$

$$y^* = 0$$

$$x^* = w/\ell_x$$

$$h_x = \frac{\partial e}{\partial \ell_x} = \frac{\bar{u}}{a}$$

$$h_y = \frac{\partial e}{\partial \ell_y} = 0$$

$$v(x^*, y^*) = a\frac{w}{\ell_x} + b \cdot 0$$

$$\boxed{v = a\frac{w}{\ell_x}}$$

$$\bar{u} = \frac{ae}{\ell_x} \longrightarrow e = \frac{\bar{u}\,\ell_x}{a}$$

$$h_x^* = \frac{\bar{m}}{a}$$

$$h_y^* = 0$$

$$e(\bar{m}, p_x, p_y) = 0 \cdot p_y + p_x \frac{\bar{m}}{a}$$

$$v = \frac{w \cdot a}{p_x}$$

$$x^* = -\frac{\frac{\partial v}{\partial p_x}}{\frac{\partial v}{\partial w}} = -\frac{-\frac{w a}{p_x^2}}{a / p_x} = \frac{w a}{p_x}$$