$U = 8x^{1/4}y^{3/4} - 20000 \qquad x+y = 20,000$

sustituya $y = 20,000 - x$ en $U(x)$

$U(x) = 8x^{1/4}(20,000-x)^{3/4} - 20\ mil$

$U'(x) = 2x^{-3/4}(20,000-x)^{3/4} - 6x^{1/4}(20000-x)^{-1/4} = 0$

$$\frac{2}{x^{3/4}}(20,000-x)^{3/4} = \frac{6x^{1/4}}{(20,000-x)^{1/4}}$$

$$(20000-x) = 3x$$

$$20000 = 4x \Rightarrow x = 5,000.$$

$$y = 15,000.$$

Método 3: Microeconomía.

$P = x^{\alpha}y^{\beta} \qquad x+y = 20\ mil$

$\alpha + \beta = 1.$

Producción óptima $x = \alpha \cdot 20\ mil \qquad \alpha = 1/4$

$y = \beta \cdot 20\ mil \qquad \beta = 3/4.$

$$\frac{P_A}{P_B} = \frac{\alpha y}{\beta x}$$ | Precaución.

3 d) $V = RI$. $R = f(t)$ $I = g(t)$.

$$\frac{dV}{dt} = \underbrace{\frac{\partial V}{\partial R}}_{I}\frac{dR}{dt} + \underbrace{\frac{\partial V}{\partial I}}_{R.}\frac{dI}{dt}$$

$R = 400$, $I = 0.08$ $\frac{dV}{dt} = -0.01$ $\frac{dR}{dt} = -0.03$

$$-0.01 = 0.08(-0.03) + 400\frac{dI}{dt}.$$

$$400\frac{dI}{dt} = -0.01 + 0.0024 = -7.6\times10^{-3}$$

$$\frac{dI}{dt} = \frac{-7.6\times10^{-3}}{4\times10^{2}} = -1.9\times10^{-5}\ A/s.$$

$-19\ \mu A/s$

3 c) $T(x, y)$ $x = \sqrt{1+t}$, $y = 2 + \frac{t}{3}$.

$T_x(2,3) = 4$, $T_y(2,3) = 3$., $t = 3$

$$\frac{dT}{dt} = \underbrace{\frac{\partial T}{\partial x}}_{4}\frac{dx}{dt} + \underbrace{\frac{\partial T}{\partial y}}_{3.}\frac{dy}{dt}.$$

$x(3) = 2$

$y(3) = 2+1 = 3.$

$x'(t) = \frac{1}{2}(1+t)^{-1/2}$ $x'(3) = \frac{1}{2}\frac{1}{\sqrt{4}} = \frac{1}{4}$

$y'(t) = \frac{1}{3}$ $y'(3) = \frac{1}{3}$.

$$\frac{dT}{dt} = 4\left(\frac{1}{4}\right) + 3\left(\frac{1}{3}\right) = 1+1 = 2.$$