

EJERCICIO 1

Examen Parcial 2

$$1- T = 500 - 0.6x^2 - 1.5y^2$$

$$\frac{dT}{dx} = -1.2x \Big|_{(2,3)} \\ = -1.2(2)$$

$$\frac{dT}{dy} = -3y \Big|_{2,3} \\ = -3(3)$$

$$\frac{dT}{dx} > \frac{dT}{dy}$$

$$\frac{dT}{dx} = -2.4$$

$$\frac{dT}{dy} = -9$$

La temperatura en el punto "x" es mayor que "y"

EJERCICIO 2

$$\text{II- } V = \frac{\pi r^2 h}{3} \quad h = 20 \text{ in} \quad dh = dr = \frac{1}{16} \text{ in} \\ r = 8 \text{ in}$$

$$\frac{dV}{dr} = \frac{2\pi r h}{3} \quad \frac{dV}{dh} = \frac{\pi r^2}{3}$$

$$\left[\left(\frac{2\pi r h}{3} \right) (dr) \right] + \left[\left(\frac{\pi r^2}{3} \right) (dh) \right] = \left[\left(\frac{2\pi(8)(20)}{3} \right) \left(\frac{1}{16} \text{ in} \right) \right] + \left[\left(\frac{\pi(8)^2}{3} \right) \left(\frac{1}{16} \text{ in} \right) \right]$$

$$20.9439 + 4.1888 = \underline{25.1327 \text{ in}}$$

$$V = \frac{\pi(8)^2(20)}{3} = \underline{1340.4128 \text{ in}} \quad -P$$

$$\frac{25.1327}{1340.41} = 0.0187 = \underline{1.87\%}$$

EJERCICIO 3

$$\text{III- } P(L, K) = 1.01 L^{0.75} K^{0.25}$$

$$\text{a) } \frac{dP}{dL} = \frac{(0.75)(1.01)K^{0.25}}{L^{0.25}}$$

$$\frac{0.7575 K^{0.25}}{L^{0.25}}$$

$$\frac{dP}{dK} = \frac{(0.25)1.01L^{0.75}}{K^{0.75}}$$

$$\frac{0.2525 L^{0.75}}{K^{0.75}}$$

$$\text{b) } \frac{0.7575 K^{0.25}}{L^{0.25}} \Big|_{(194, 407)}$$

$$\frac{0.2525 L^{0.75}}{K^{0.75}} \Big|_{(194, 407)}$$

$$\frac{0.7575(407)^{0.25}}{(194)^{0.25}}$$

$$\frac{0.2525(194)^{0.75}}{(407)^{0.75}}$$

$$\frac{dP}{dL} \quad 0.9116 \quad \text{en } 1920$$

$$\frac{dP}{dK} \quad 0.1448 \quad \text{en } 1920$$

$$\frac{0.7575 K^{0.25}}{L^{0.25}} \Big|_{(100, 100)}$$

$$\frac{0.2525 L^{0.75}}{K^{0.75}} \Big|_{(100, 100)}$$

$$\frac{0.7575(100)^{0.25}}{100^{0.25}}$$

$$\frac{0.2525(100)^{0.75}}{(100)^{0.75}}$$

$$\frac{dP}{dL} \quad 0.7575 \quad \text{en } 1899$$

$$\frac{dP}{dK} \quad 0.2525 \quad \text{en } 1899$$

$$\frac{dP}{dL} \text{ de } 1920 > \frac{dP}{dL} \text{ de } 1899$$

$$\frac{dP}{dK} \text{ de } 1899 > \frac{dP}{dK} \text{ de } 1920$$

Conclusión: La productividad marginal de la mano de obra es mayor en 1920 y la de capital era mayor en 1899.

EJERCICIO 4

4- $P = 8.31 \frac{T}{V}$ $V = \frac{8.31 T}{P}$ $\frac{dP}{dt} = 0.05 \frac{KPa}{s}$

$\frac{\partial V}{\partial T} = \frac{8.31}{P}$ $\frac{\partial V}{\partial P} = -\left(\frac{8.31 T}{P^2}\right)$ $\frac{dT}{dt} = 0.15 \frac{K}{s}$

$V \rightarrow P > T$

$\frac{\partial V}{\partial T} \frac{dT}{dt} + \frac{\partial V}{\partial P} \frac{dP}{dt}$

$\left(\frac{8.31}{P}\right) \left(0.15 \frac{K}{s}\right) + \left(-\frac{8.31 T}{P^2}\right) \left(0.05 \frac{KPa}{s}\right)$

$\left(\frac{8.31}{20}\right) (0.15) + \left(-\frac{8.31 (320)}{(20)^2}\right) (0.05)$

$0.0623 - 0.3324 = -0.2701$