An aerial photograph of a city landscape. In the foreground, there is a large green golf course with a winding path and a small pond. A multi-lane road curves through the middle of the image. In the background, there are various city buildings, including a large white building on the right. The sky is clear and blue.

# Unit 2

## Producer Behavior (Ch. 6)

### 9/23

**ECON 323 – MICROECONOMIC THEORY – DR. STRICKLAND**

# Introduction



**How do firms determine production?**

Goal: **maximize profits**. This informs:

- How much to produce (output)
- Which combination of inputs to use

# Production



**Production:** process of turning inputs into outputs

- Output: goods/services  $q$  OR  $Q$
- Inputs: capital and labor  
 $(K)$   $(L)$

**Production function:** describes the relationship between combinations of inputs and a firm's output

$$q = f(K, L)$$

COBB DOUGLAS:  $q = K^a L^b$ ,  $a > 0$ ,  $b > 0$

# Production in the Short Run



**Short run:** period in which capital is fixed

$$q = f(\bar{K}, L)$$

$$\text{ex. } q = K^{0.5} L^{0.5} \Rightarrow \bar{K} = 4 \Rightarrow q = (4)^{0.5} L^{0.5} = \underline{2L^{0.5}}$$

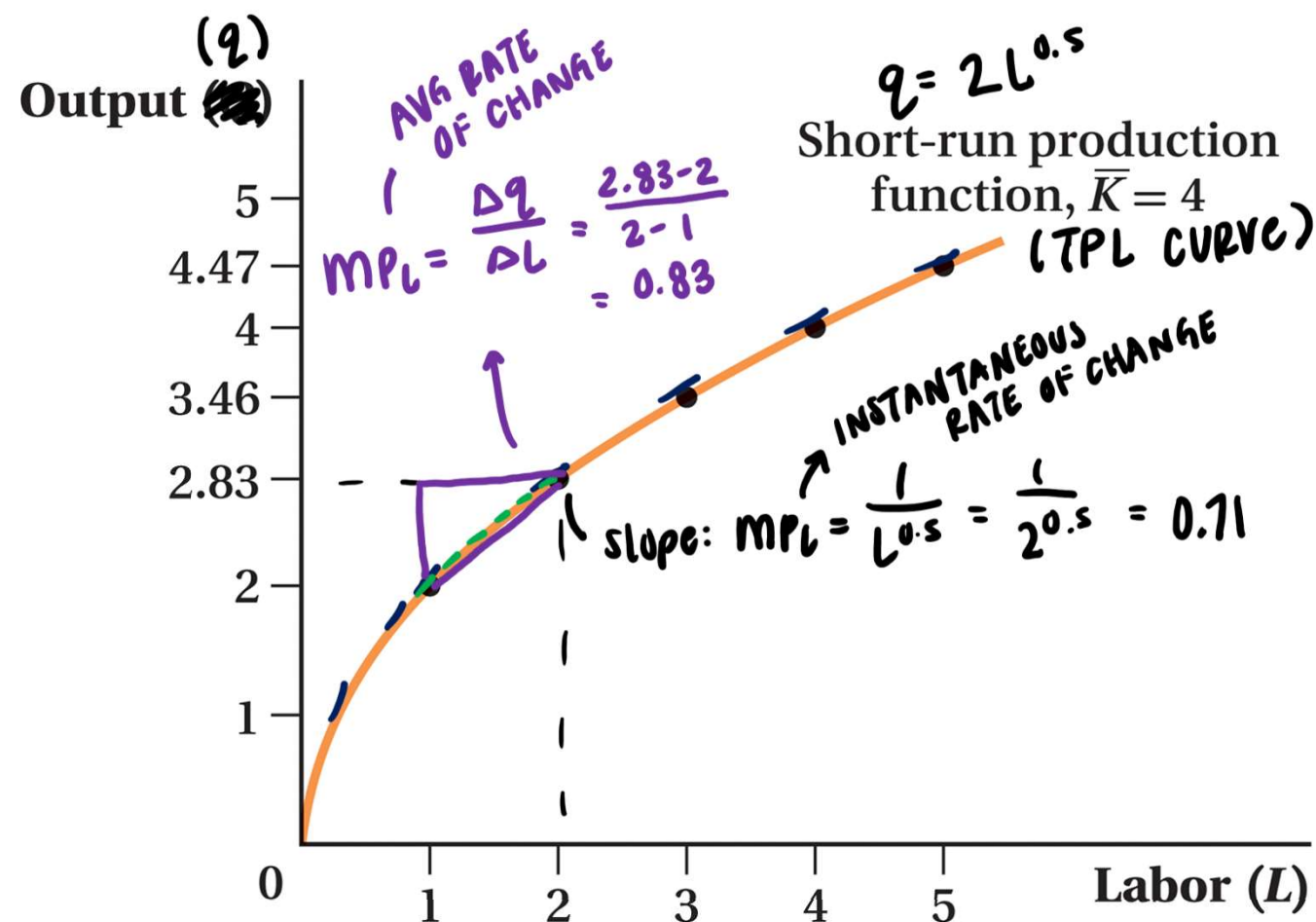
"SHORT RUN PRODUCTION FUNCTION"

Production metrics:

- Marginal product of labor  $MP_L = \frac{\Delta q}{\Delta L}$
- Average product of labor  $AP_L = \frac{q}{L}$

"TOTAL PRODUCTIVITY OF LABOR" (TPL)

# Production in the Short Run



① UPWARD SLOPING  
 $\uparrow L \Rightarrow \uparrow q$

② SLOPE IS MPL:  
 $MPL = \frac{\Delta q}{\Delta L}$

SLOPE IS DECREASING  
 (STEEPER  $\rightarrow$  FLATTER)  
 \* DIMINISHING MARGINAL  
 RETURNS (DIMINISHING  
 MPL)

③  $APL = \frac{q}{L}$   
 ex.  $L=2$ :  $APL = \frac{2.83}{2} = 1.42$