Where are we?

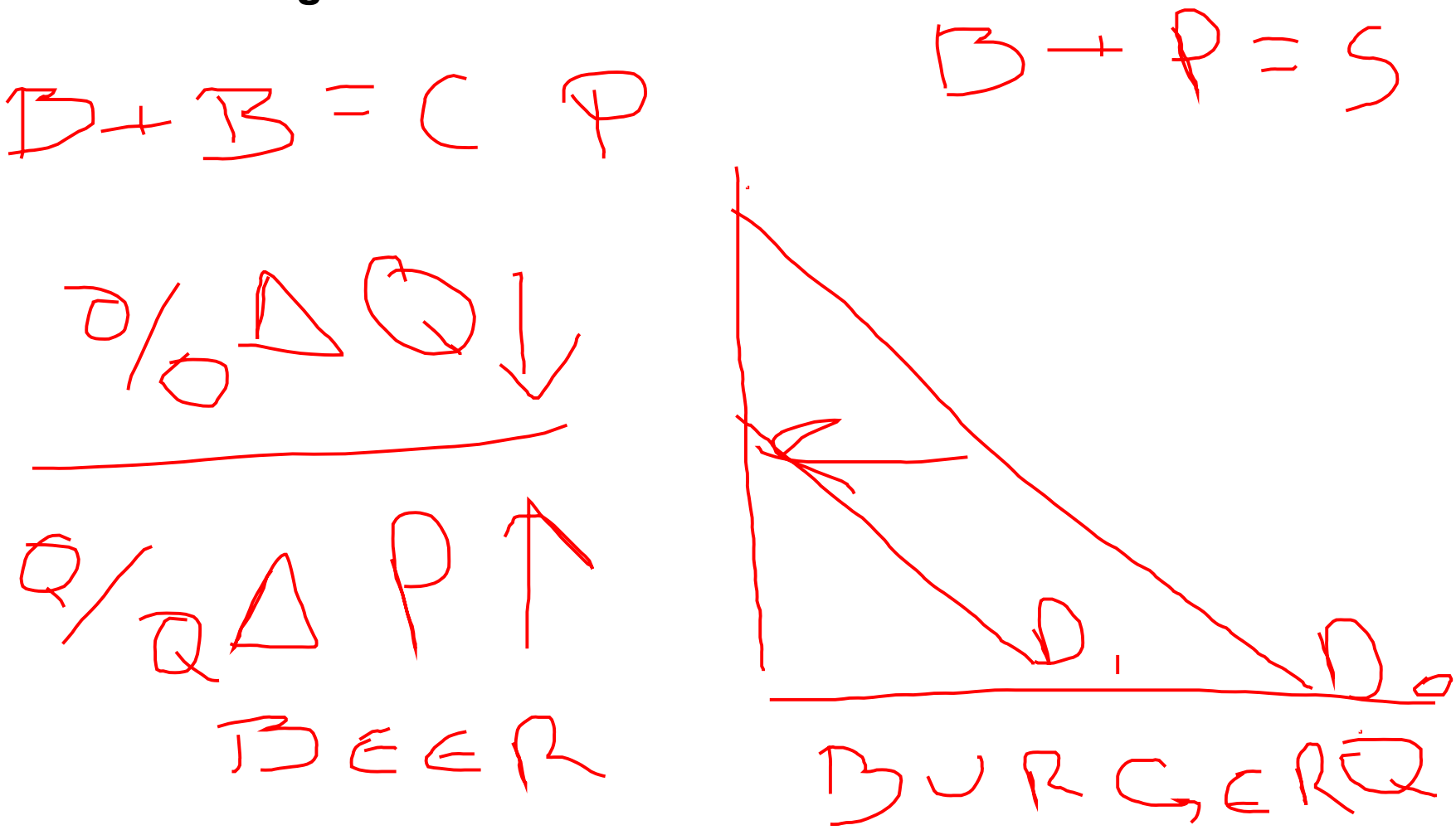
- To do today: finish the derivation of the demand curve using indifference curves
- Go on then to chapter ‘Production and Cost’
- First, though, review of short answer midterm questions

Midterm information

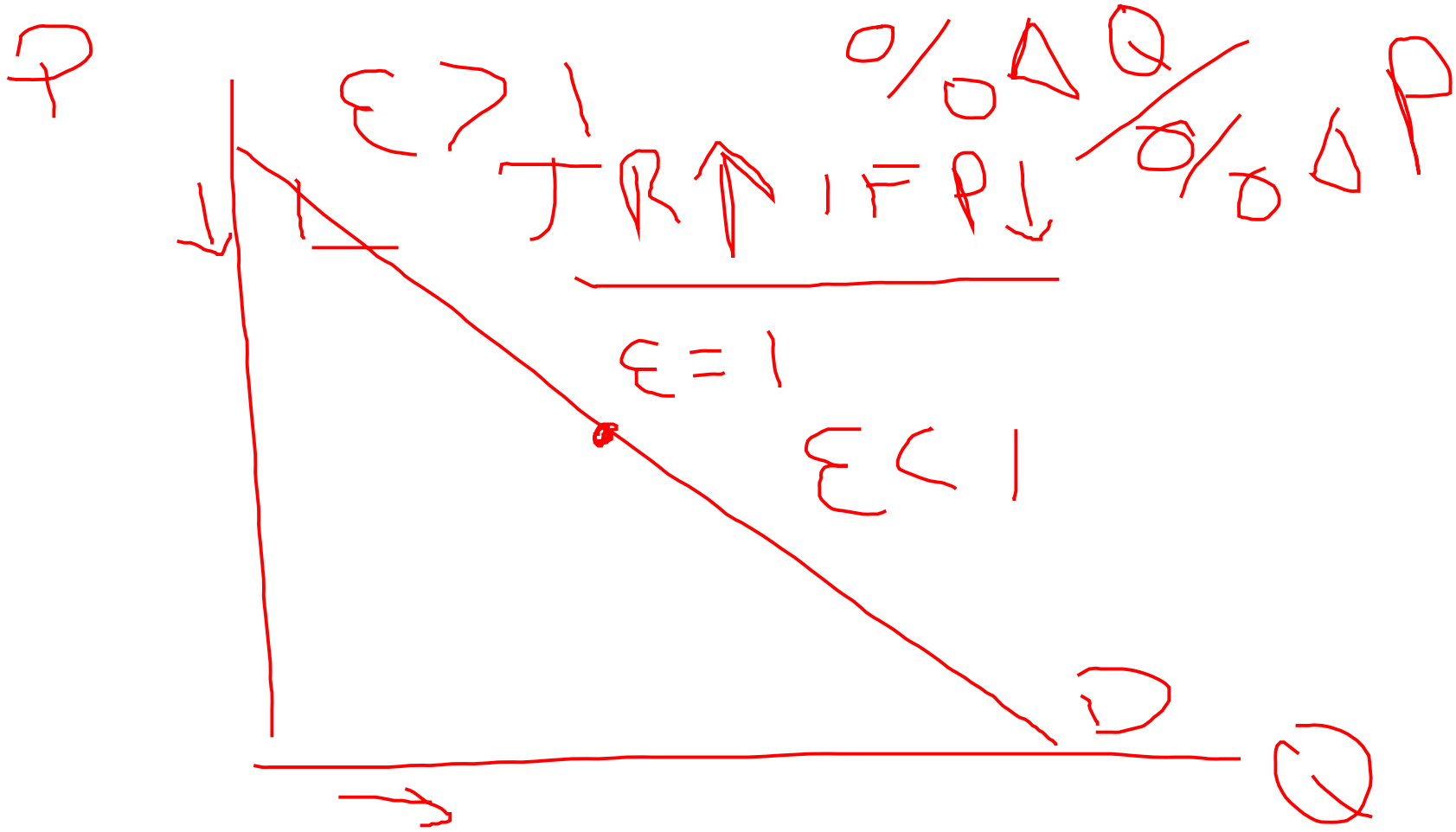
- Average grade: 30.25
- Standard deviation: 5.09
- Maximum: 38

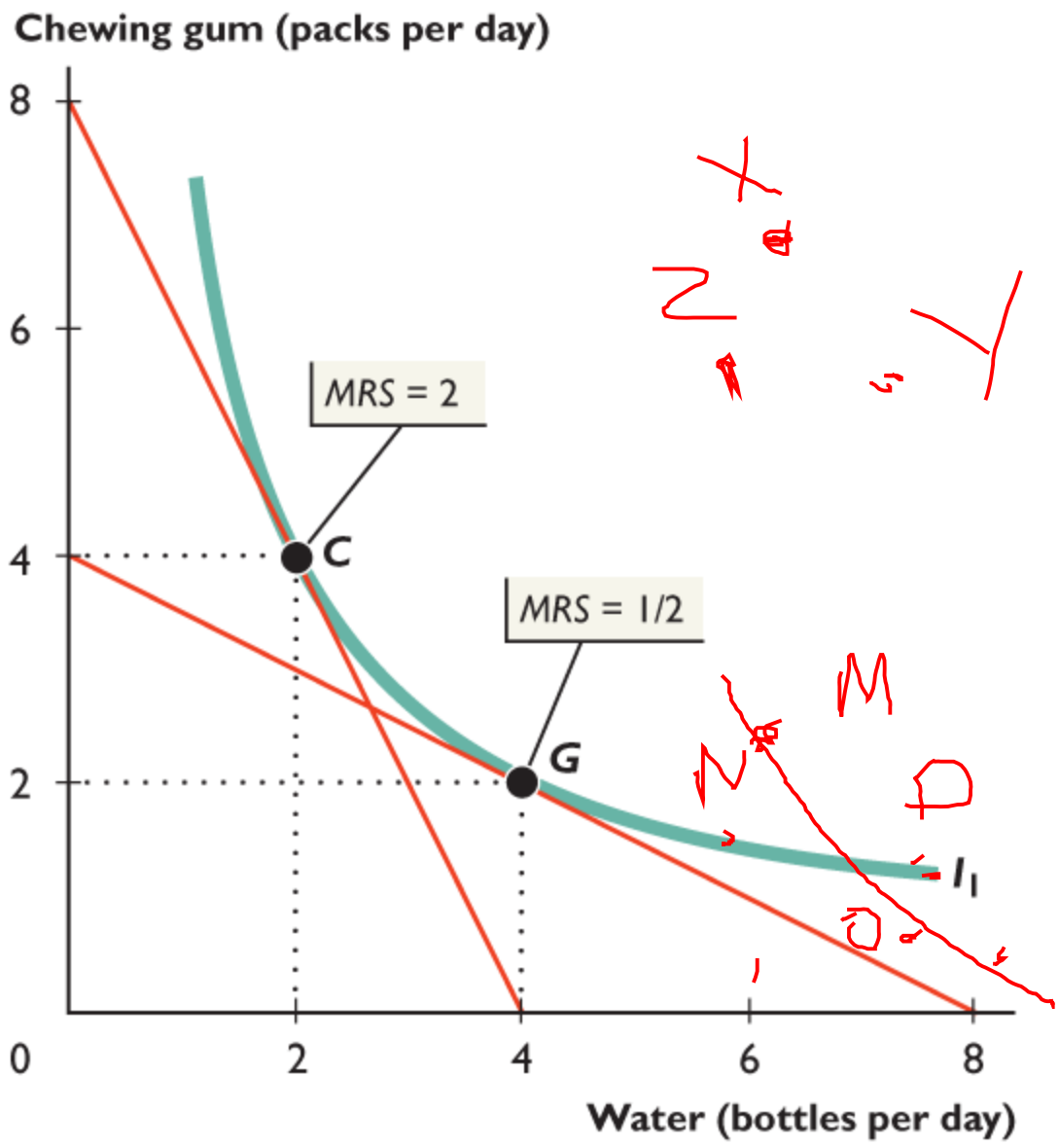
- Second midterm will count more heavily if your grade is better on that exam.

The cross elasticity of demand for two goods is less than zero. Explain what the relationship is between these two goods and draw on a graph what happens in the market for the first good if the price of the second good rises.



Demonstrate on a graph and explain in words (making reference to the elasticity formula) why elasticity of demand varies along a straight line demand curve. Explain the relationship between total revenue and elasticity with reference to the top, midpoint and bottom sections of the demand curve.



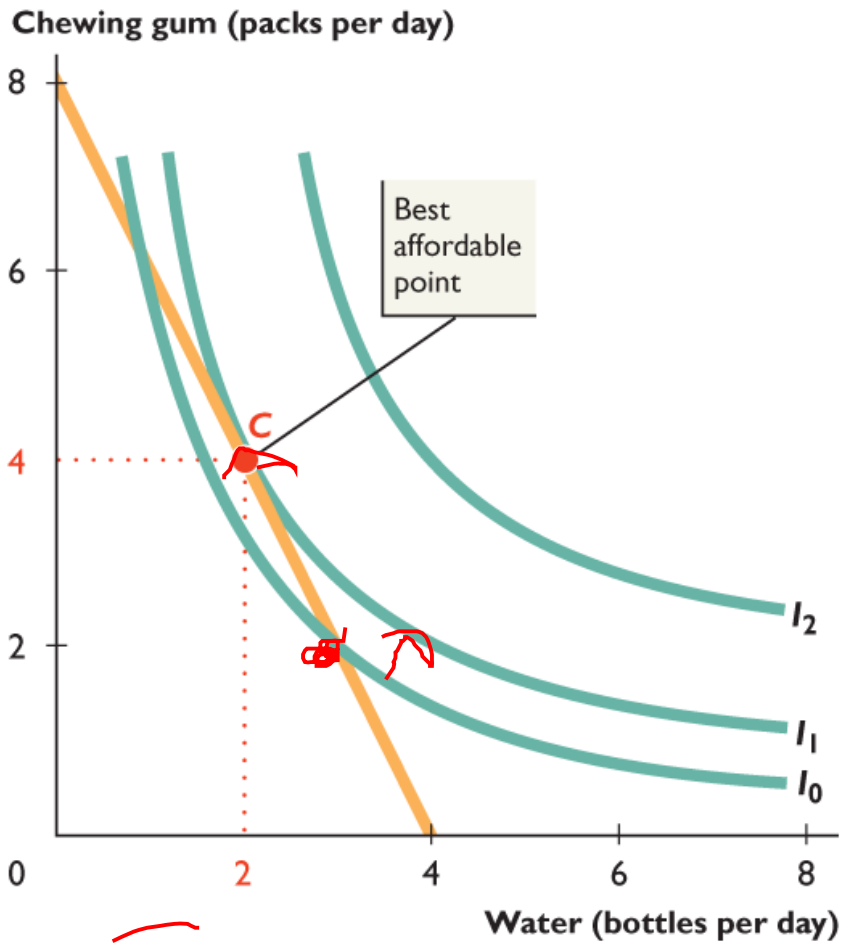

Chewing gum (packs per day)
8
6
4
2
0
2
4
6
8
Water (bottles per day)
MRS = 2
MRS = 1/2
C
G
I_1

Consumer Equilibrium Graphically

Had MU/$ = for all goods

Now have slopes of budget line and indifference curves
These are = at equilibrium

The best affordable point is *C*. At point *C*, on budget line and also on the highest attainable indifference curve.



Deriving the Demand Curve with Indifference Curves

To derive demand curve for bottled water:

- Change the price of water
- Shift the budget line
- Work out the new best affordable point

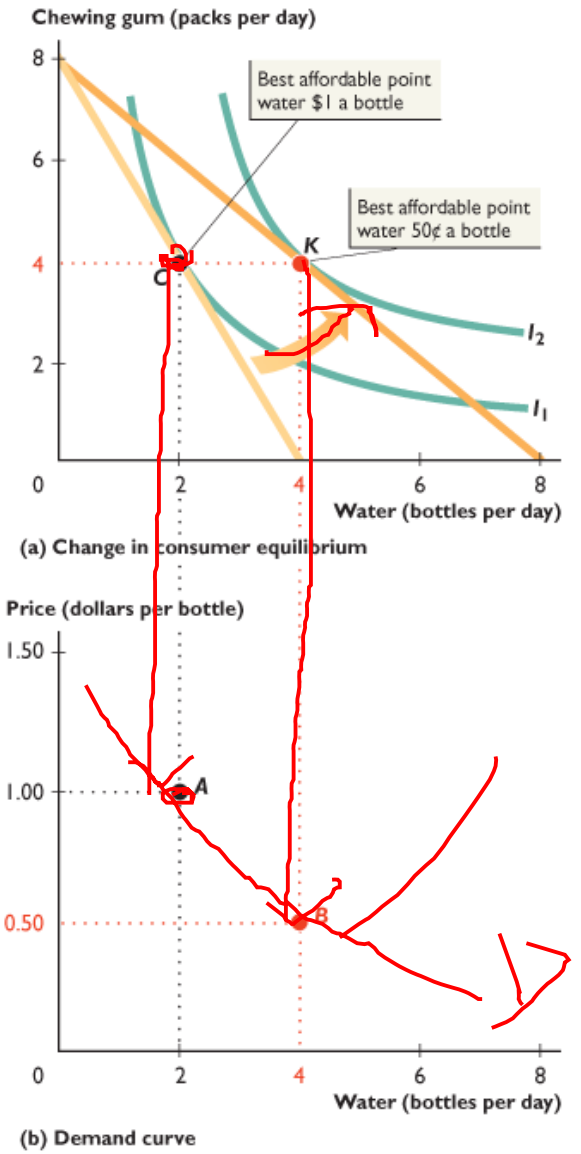
Deriving the demand curve (for the x good)

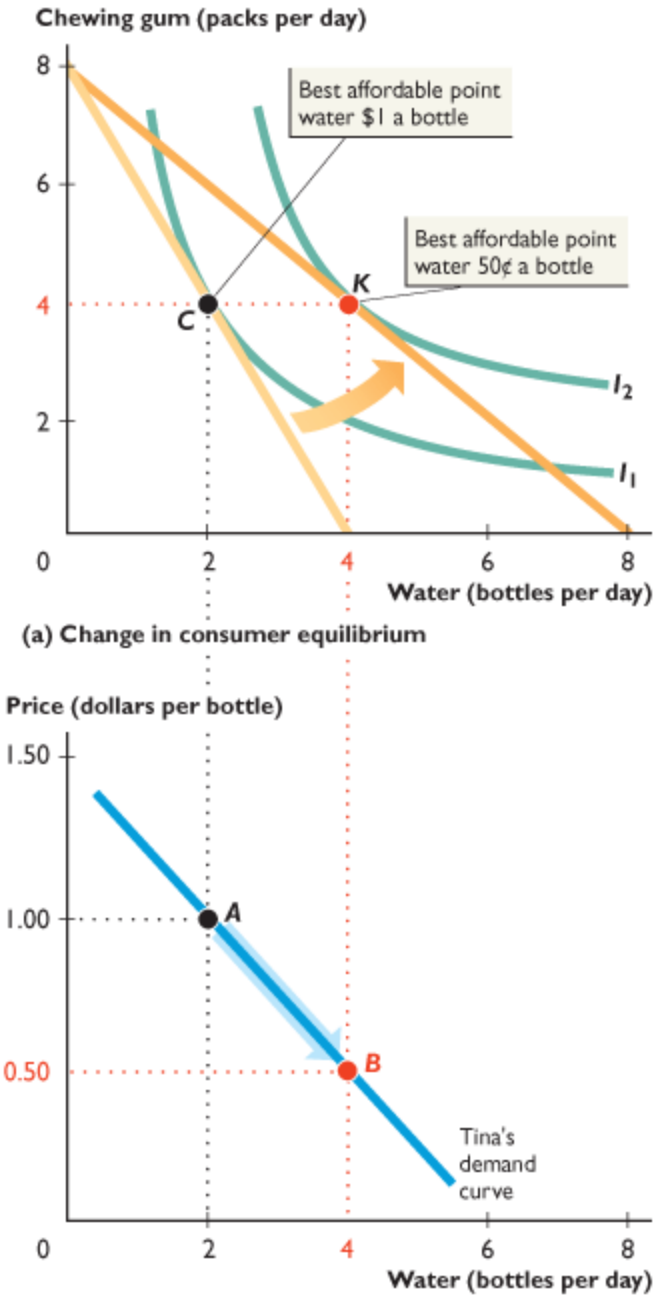
The Demand Curve

Using best affordable (equilibrium) points

When the price of water is $1 a bottle, best affordable point is *C* in part (a) and at point *A* on the demand curve in part (b).

When the price of water is 50¢ a bottle, best affordable point is *K* in part (a) and at point *B* on the demand curve in part (b).




Chewing gum (packs per day)
8
6
4
2
0
Best affordable point
water $1 a bottle
Best affordable point
water 50¢ a bottle
K
C
I_2
I_1
2
4
6
8
Water (bottles per day)
(a) Change in consumer equilibrium
Price (dollars per bottle)
1.50
1.00
0.50
A
B
Tina's
demand
curve
0
2
4
6
8
Water (bottles per day)
(b) Demand curve

Where we are

- Have now derived the demand curve from the complete theoretical story – from indifference curves
- Know two decision rules for consumer equilibrium, equal MU/$ and the graphical equivalent of the point of tangency of the budget line and an indifference curve

- Both give point of maximum affordable utility


in a last-ditch effort to win back public goodwill,
BP names a new CEO
IHASAHOTDOG.COM BY

On to the theory of the firm: what do bosses do?

- What is the goal of the firm?

MAX Π $\Pi(K)$

- What do they do to reach this goal?

EFFICIENT (#L)

SELL HIGH

"That'll be £57.50, Potter."

ON TO ECONOMIC COST AND PROFIT

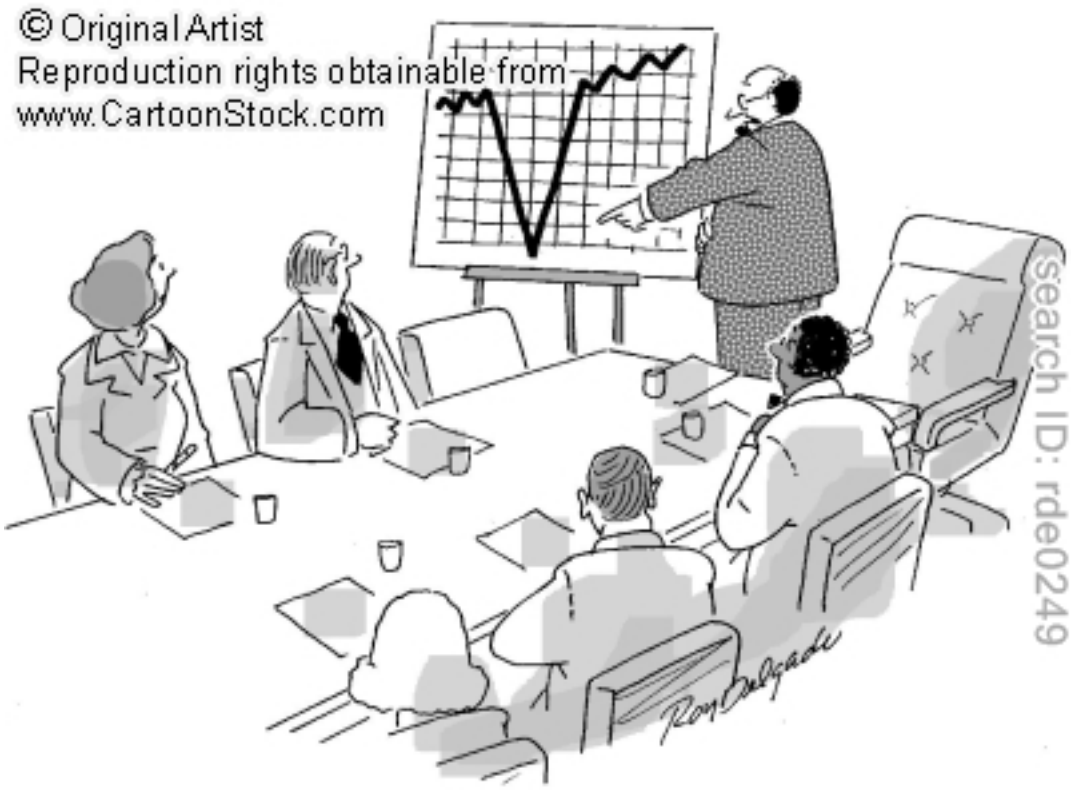
- **The Firm's Goal** MAX Π

- **Tricky Bit: Accounting Cost and Profit**

  An **accountant** measures cost and profit to ensure that the firm pays the correct amount of income tax and to show the bank how the firm has used its bank loan.

  Economists predict the decisions that a firm makes to maximize its profit. These decisions respond to ***opportunity cost*** and ***economic profit***.

So many jokes, so little time



" And here is where we stooped to the level of the competition. "

Opportunity Cost in Production

The amount that the firm must pay the owners of the factors of production it employs to attract them from their **best alternative** use.

So a firm's opportunity cost of production is the **cost of the factors of production** it employs.

Another Tricky Bit: Explicit and Implicit Costs

Explicit cost is a cost paid in money.

Implicit cost is an opportunity cost incurred by a firm when it uses a factor of production for which it does not make a direct money payment.

The two main implicit costs are **economic depreciation** and the cost of using the firm **owner's resources**.

So what is profit? The economists' view

Core concept is normal profit: the return to entrepreneurship.

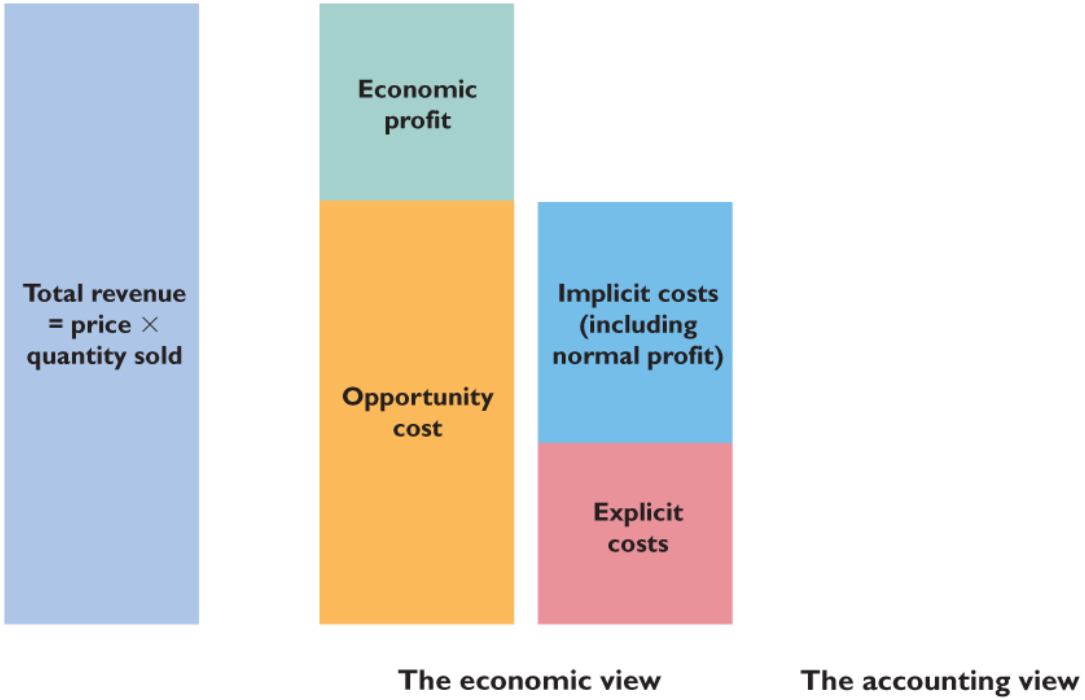
Normal profit is part of a firm's **opportunity cost** because it is the cost of the entrepreneur not running another firm.

How this all works

Opportunity cost is

Also need new cost distinction

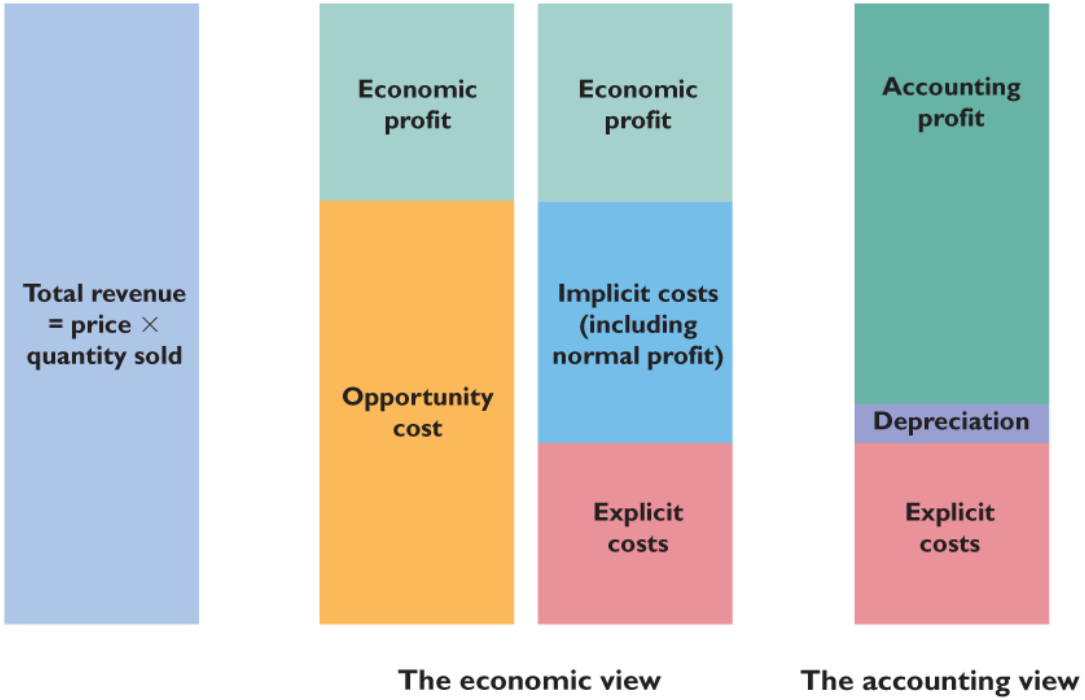
1. Explicit costs and
2. Implicit cost (including normal profit).



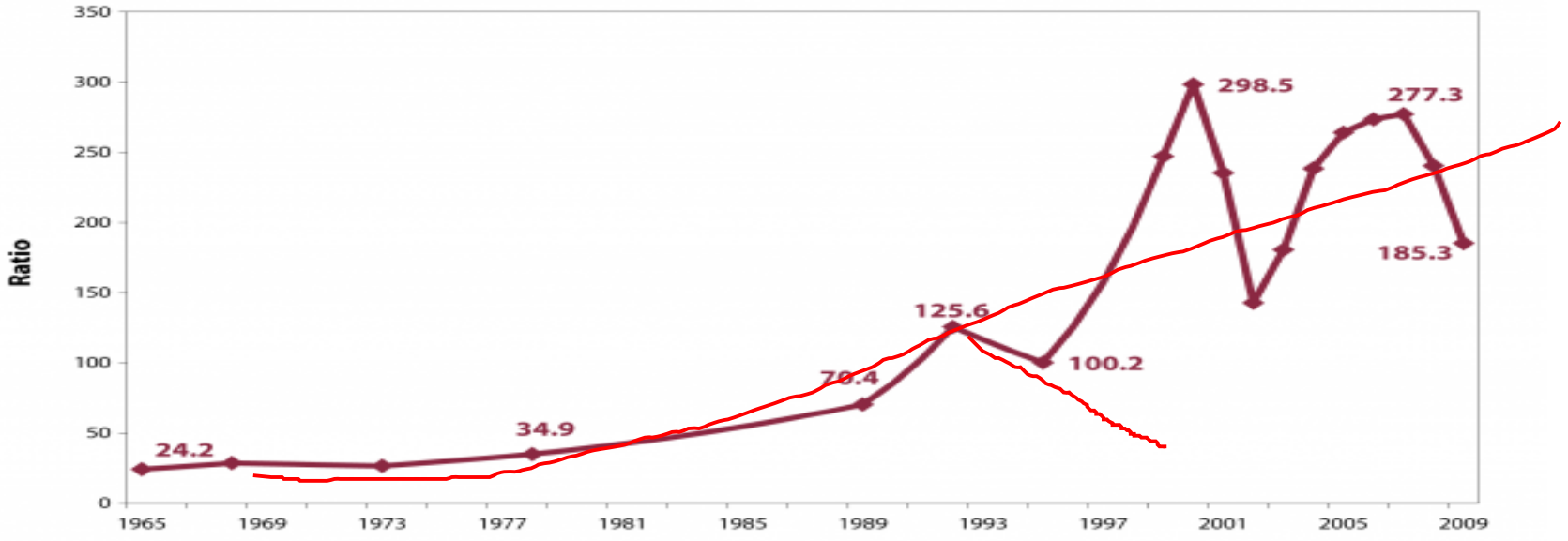
The whole story

Accountants measure cost as the sum of explicit costs and accounting depreciation.

Accounting profit is total revenue minus accounting costs.



CEO pay as ratio to production workers



Source: Authors' analysis of *Wall Street Journal*/Mercer, Hay Group (2010).
Note: Point markers denote where ratio is known.

A new distinction: short vs long run

The Short Run: Fixed Plant

The **short run** is a time frame in which the quantities of some resources are fixed.

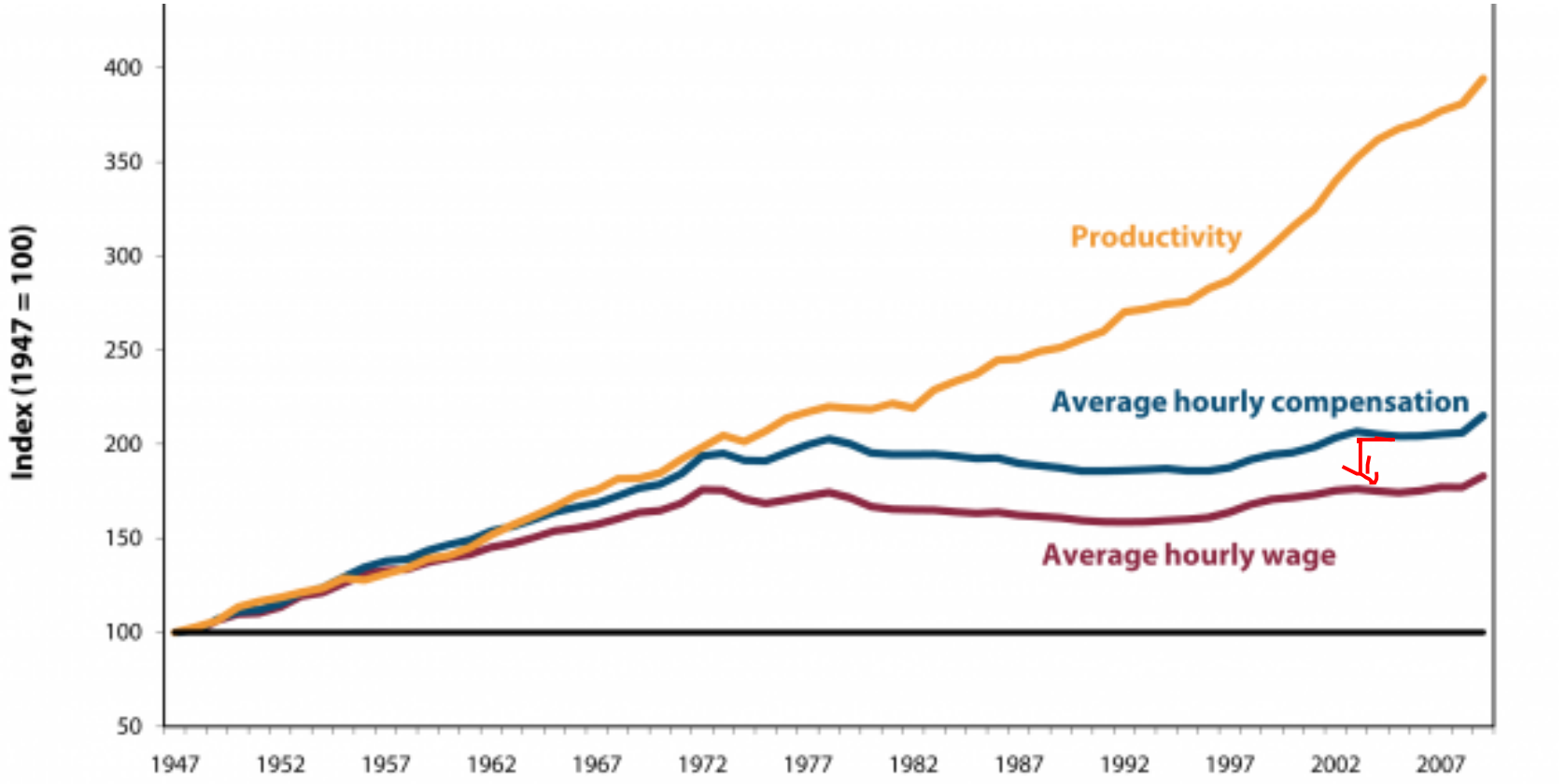
Can usually change the quantity of labor it uses but not the quantity of capital.

The Long Run: Variable Plant

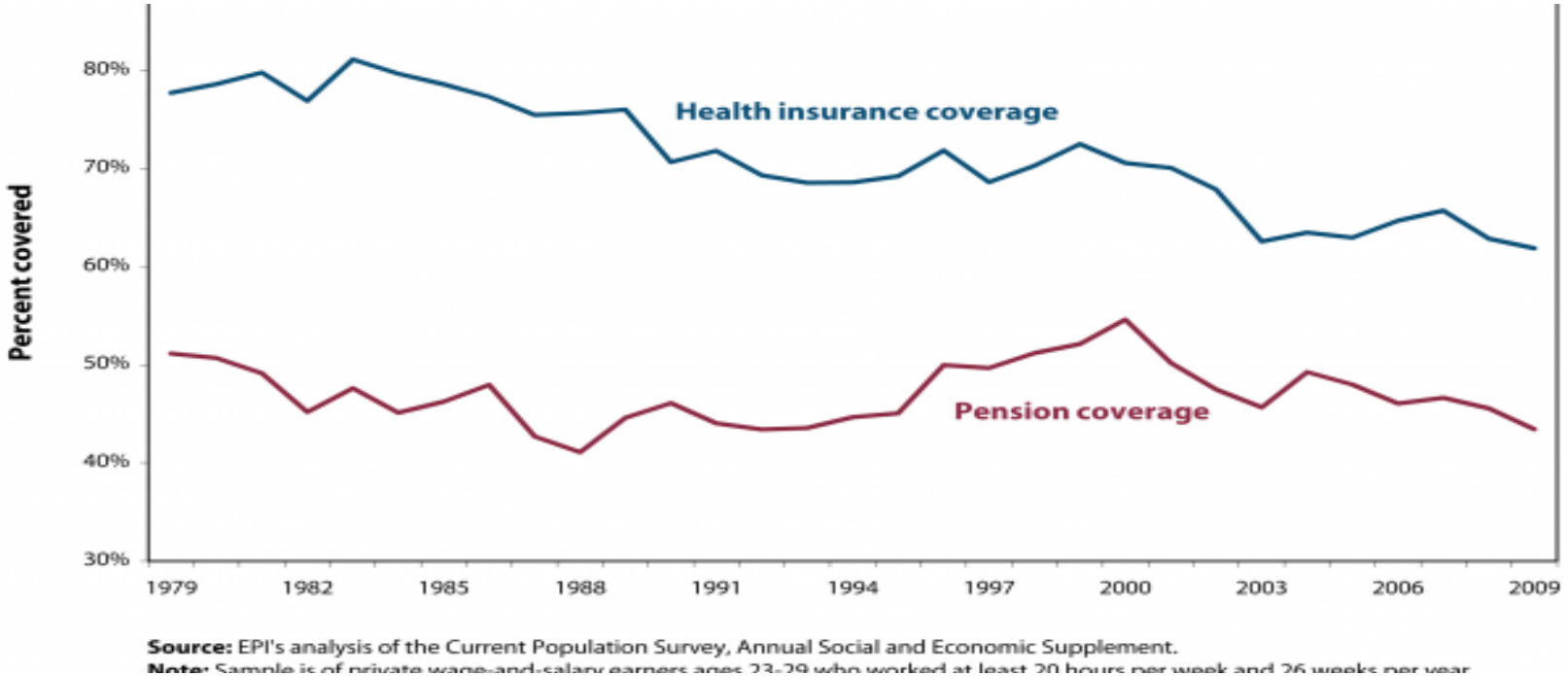
The **long run** is a time frame in which the quantities of all resources can be changed.

A sunk cost is irrelevant to the firm's decisions.

Wage costs


Index (1947 = 100)
400
350
300
250
200
150
100
50
1947
1952
1957
1962
1967
1972
1977
1982
1987
1992
1997
2002
2007
Productivity
Average hourly compensation
Average hourly wage

Non-wage labor costs



Source: EPI's analysis of the Current Population Survey, Annual Social and Economic Supplement.
Note: Sample is of private wage-and-salary earners ages 23-29 who worked at least 20 hours per week and 26 weeks per year.

http://stateofworkingamerica.org/charts/health-and-pension-coverage-college-graduates/

Short-run production: only labor variable

To increase output with a **fixed** plant, a firm must increase the **quantity of labor** it uses.

We describe the relationship between output and the quantity of labor by using three related concepts:

- Total product
- Marginal product
- Average product

Total product

Total product (*TP*) is the total quantity of a good produced in a given period.

Total product is an output *rate*—the number of units produced per unit of time.

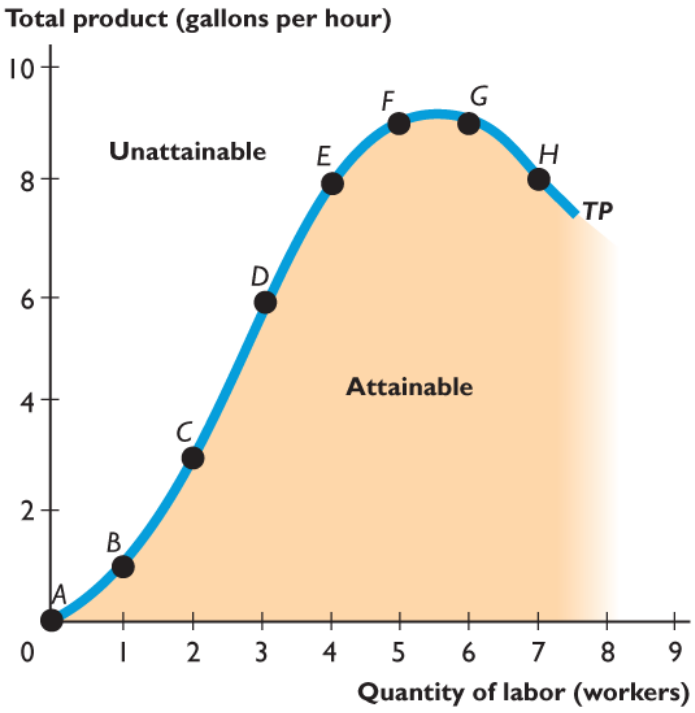
Total product increases as the quantity of labor employed increases.

Graphing total product

Note similarity to total utility!

Points *A* through *H* on the curve correspond to the columns of the table.

The *TP* curve is like the budget line: separates attainable points and unattainable points.



Quantity of labor (workers)	0	1	2	3	4	5	6	7
Total product (gallons per hour)	0	1	3	6	8	9	9	8
	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*

Marginal product: note role of labor!

Marginal product is the change in total product from a **one-unit increase** in the quantity of labor employed.

Marginal product tells us the contribution to total product of adding one more worker.

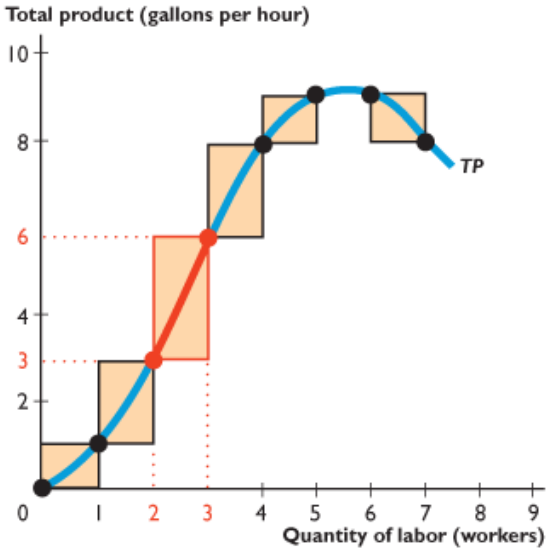
When the quantity of labor increases by more (or less) than one worker, **calculate** marginal product as

$$\text{Marginal product} = \text{Change in total product} \div \text{Change in quantity of labor}$$

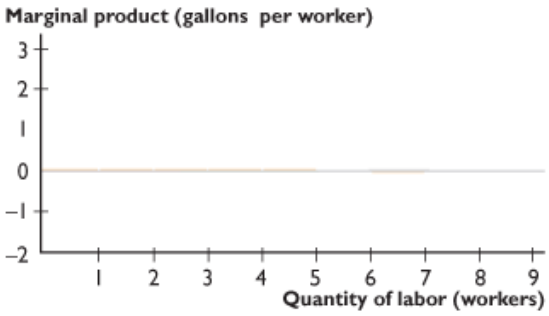
Total and marginal product

We can illustrate marginal product as the orange bars that form steps along the total product curve.

The height of each step represents marginal product

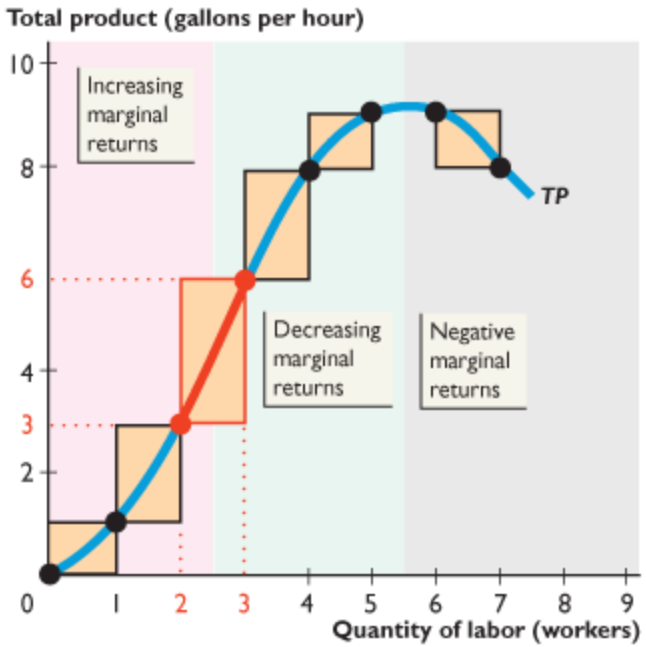


(a) Total product curve

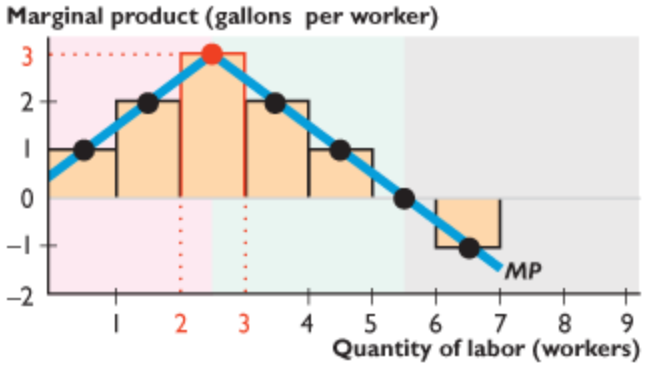


(b) Marginal product curve

Quantity of labor (workers)	0	1	2	3	4	5	6	7
Total product (gallons per hour)	0	1	3	6	8	9	9	8
Marginal product (gallons per worker)								



(a) Total product curve



(b) Marginal product curve

Quantity of labor (workers)	0	1	2	3	4	5	6	7
Total product (gallons per hour)	0	1	3	6	8	9	9	8
Marginal product (gallons per worker)		1	2	3	2	1	0	–1