

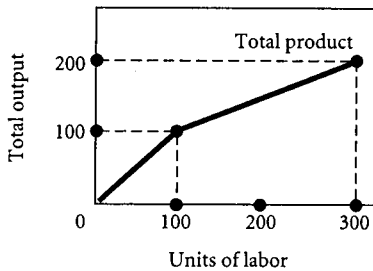
Assume further that Mom signed a long-term contract (50 years) with a service company to keep the machines in good repair for a fixed fee of \$100 per month.

- (1) Derive the firm's marginal cost curve.
- (2) Derive the firm's total cost curve.

b. At a price of \$2.50, how many books would the company produce? What would total revenues, total costs, and total profits be?

7. The following curve is a production function for a firm that uses just one variable factor of production, labor. It shows total output, or product, for every level of inputs:

- a. Derive and graph the marginal product curve.
- b. Suppose that the wage rate is \$4. Derive and graph the firm's marginal cost curve.
- c. If output sells for \$6, what is the profit-maximizing level of output? How much labor will the firm hire?



8. Elena and Emmanuel live on the Black Sea in Bulgaria and own a small fishing boat. A crew of four is required to take the boat out fishing. The current wage paid to the four crew members is a total of 5,000 leva per day (a lev is the Bulgarian unit of currency). Assume that the cost of operating and maintaining the boat is 1,000 leva per day when fishing, and zero otherwise. The following schedule gives the appropriate catch for each period during the year:

Period	Catch Per Day (kilograms)
Prime fishing: 180 days	100
Month 7: 30 days	80
Month 8: 30 days	60
Rest of the year	40

The price of fish in Bulgaria is no longer regulated by the government, and is now determined in competitive markets. Suppose that the price has been stable all year at 80 leva per kilogram.

- a. What is the marginal product of a day's worth of fishing during prime fishing season? During month 7? During month 8?

- b. What is the marginal cost of a kilogram of fish during prime fishing season? During month 7, during month 8, and during the rest of the year?
- c. If you were Elena and Emmanuel, how many months per year would you hire the crew and go out fishing? Explain your answer using marginal logic.

9. For each of the following businesses, what is the likely fixed factor of production that defines the short run?

- a. Potato farm of 160 acres
- b. Chinese restaurant
- c. Dentist in private practice
- d. Car dealership
- e. Bank

10. A producer of hard disk drives for notebook computers currently has a factory with two disk-pressing machines, which it cannot change in the short run. Each of the machines costs \$100 per day (the opportunity cost of the funds used to buy them). Each hired worker costs \$50 per day. The relationship between output and the number of workers is as follows:

Q	L	TFC	TVC	TC	AFC	AVC	ATC	MC
0	0	—	—	—	—	—	—	—
1	10	—	—	—	—	—	—	—
2	15	—	—	—	—	—	—	—
3	18	—	—	—	—	—	—	—
4	22	—	—	—	—	—	—	—
5	28	—	—	—	—	—	—	—
6	36	—	—	—	—	—	—	—
7	48	—	—	—	—	—	—	—

- a. Fill in the columns for total fixed cost (*TFC*), total variable cost (*TVC*), total cost (*TC*), average fixed cost (*AFC*), average variable cost (*AVC*), average total cost (*ATC*), and marginal cost (*MC*).
- b. Verify that the two alternative methods of figuring *ATC* (TC/q and $AVC + AFC$) give the same answer (except for rounding).
- c. Over what range of output are there decreasing marginal costs, increasing marginal costs, increasing returns to labor, and diminishing returns to labor?
- d. At which level of output is *AVC* minimized? At which level is *ATC* minimized?
- e. Suppose this firm operates in a perfectly competitive output market and can sell as many disk drives as it wants for \$410 each. In the short run, what is the profit-maximizing level of output for this firm?
- f. Does the profit-maximizing output level you found in e. minimize average total costs? If not, how could the firm be maximizing profits if it is not minimizing costs?

WEB EXERCISES



1. Suppose you live in San Francisco and are planning a business trip to Chicago. As you are making your reservation you have an idea. How much would it cost to visit your old college roommate in Columbus, Ohio? Go to <http://www.yahoo.com> and click on "Travel" and again on "Air." Price out a round-trip ticket from San Francisco (SFO) to Chicago (ORD) more than a month in advance with a Saturday night stay over. Next, go back

and click on multi-city and price out a ticket from San Francisco to Chicago on to Columbus (CMH) and back to San Francisco, spending three days in Columbus. What is the marginal cost of visiting your friend in Columbus?

2. Have you ever wondered how much it would cost to own your own McDonald's restaurant? Imagine that you are thinking of