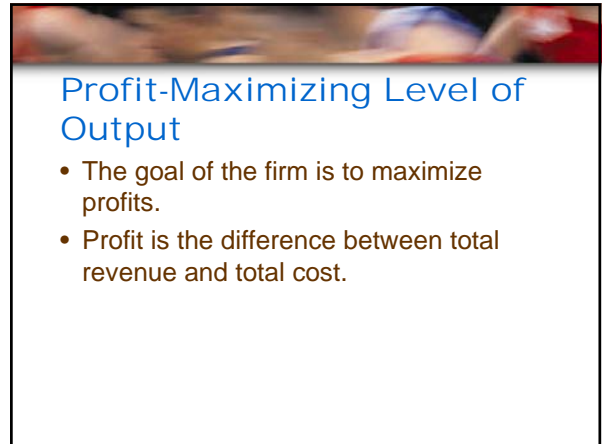


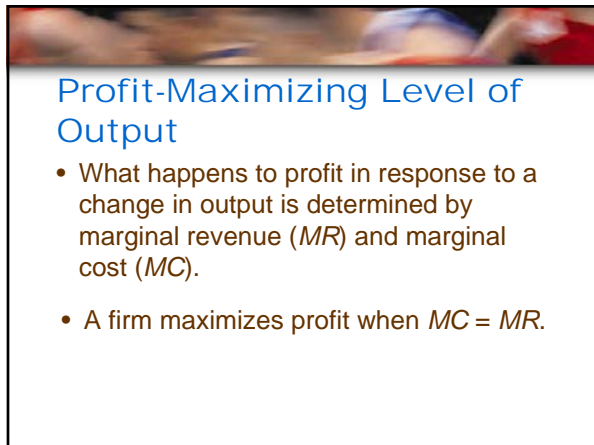


Perfect Competition
Chapter 14-2.
Profit Maximizing and Shutting Down



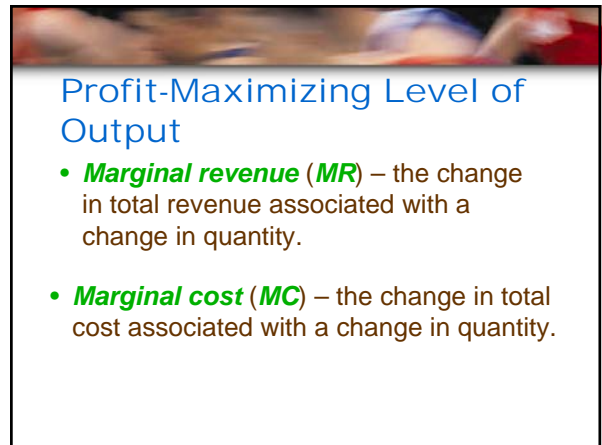
Profit-Maximizing Level of Output

- The goal of the firm is to maximize profits.
- Profit is the difference between total revenue and total cost.



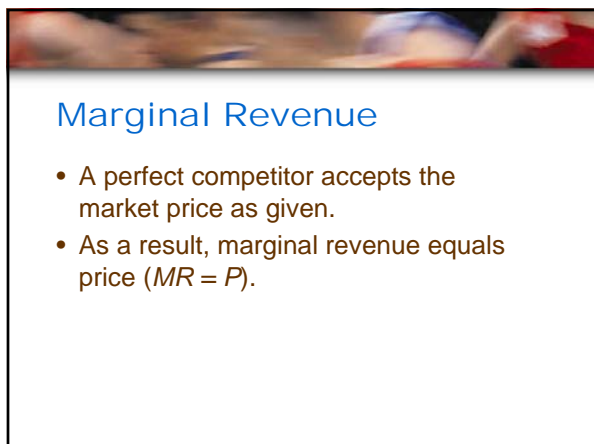
Profit-Maximizing Level of Output

- What happens to profit in response to a change in output is determined by marginal revenue (*MR*) and marginal cost (*MC*).
- A firm maximizes profit when $MC = MR$.



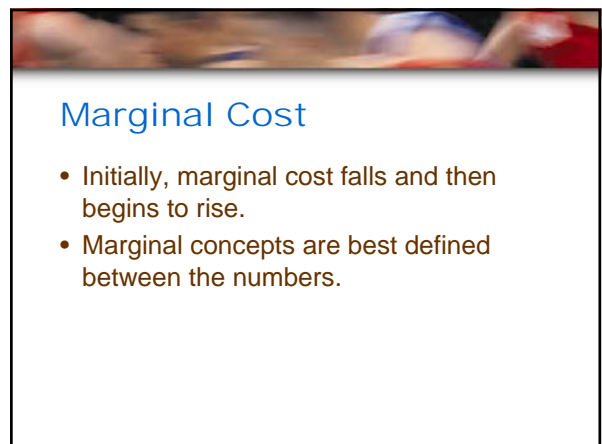
Profit-Maximizing Level of Output

- **Marginal revenue (*MR*)** – the change in total revenue associated with a change in quantity.
- **Marginal cost (*MC*)** – the change in total cost associated with a change in quantity.



Marginal Revenue

- A perfect competitor accepts the market price as given.
- As a result, marginal revenue equals price ($MR = P$).



Marginal Cost

- Initially, marginal cost falls and then begins to rise.
- Marginal concepts are best defined between the numbers.

Profit Maximization: $MC = MR$

- To maximize profits, a firm should produce where marginal cost equals marginal revenue.

How to Maximize Profit

- If marginal revenue does not equal marginal cost, a firm can increase profit by changing output.
- The supplier will continue to produce as long as marginal cost is less than marginal revenue.

How to Maximize Profit

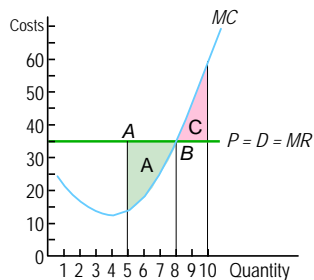
- The supplier will cut back on production if marginal cost is greater than marginal revenue.
- Thus, the profit-maximizing condition of a competitive firm is $MC = MR = P$.

Again! $MR=MC$

- Profit is maximized when $MR=MC$.
 - If the cost of producing one more unit is **less** than the revenue it generates, then a profit is available for the firm that increases production by one unit.
 - If the cost of producing one more unit is **more** than the revenue it generates, then increasing production reduces profit.

Marginal Cost, Marginal Revenue, and Price

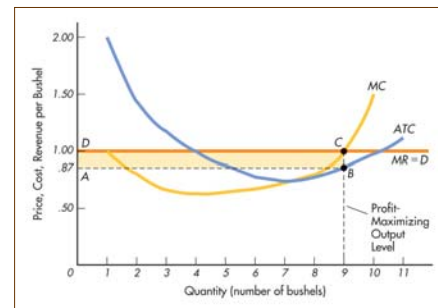
Price = MR	Quantity Produced	Marginal Cost
\$35.00	0	\$28.00
35.00	1	20.00
35.00	2	16.00
35.00	3	14.00
35.00	4	12.00
35.00	5	17.00
35.00	6	22.00
35.00	7	30.00
35.00	8	40.00
35.00	9	54.00
35.00	10	68.00



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Profit Maximization: Graphical Analysis



Profit Maximization: The Numbers

Q	P	TR	TC	TR-TC	MR	MC	ATC
0	\$1	\$0	\$1.00	-\$1.00	\$1		
1	\$1	\$1	\$2.00	-\$1.00	\$1	\$1.00	\$2.00
2	\$1	\$2	\$2.80	-\$0.80	\$1	\$0.80	\$1.40
3	\$1	\$3	\$3.50	-\$0.50	\$1	\$0.70	\$1.17
4	\$1	\$4	\$4.00	\$0.00	\$1	\$0.50	\$1.00
5	\$1	\$5	\$4.50	\$0.50	\$1	\$0.50	\$0.90
6	\$1	\$6	\$5.20	\$0.80	\$1	\$0.70	\$0.87
7	\$1	\$7	\$6.00	\$1.00	\$1	\$0.80	\$0.86
8	\$1	\$8	\$6.86	\$1.14	\$1	\$0.86	\$0.86
9	\$1	\$9	\$7.86	\$1.14	\$1	\$1.00	\$0.87
10	\$1	\$10	\$9.36	\$0.64	\$1	\$1.50	\$0.94
11	\$1	\$11	\$12.00	-\$1.00	\$1	\$2.64	\$1.20

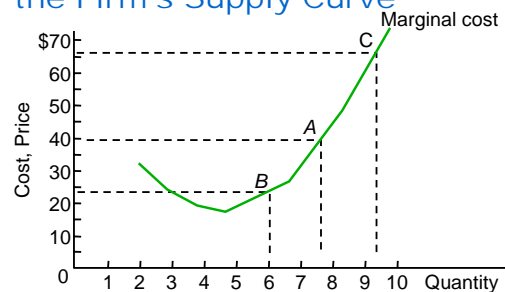
The Marginal Cost Curve Is the Supply Curve

- The marginal cost curve is the firm's supply curve above the point where price exceeds average variable cost.

The Marginal Cost Curve Is the Supply Curve

- The MC curve tells the competitive firm how much it should produce at a given price.
- The firm can do no better than produce the quantity at which marginal cost equals marginal revenue which in turn equals price.

The Marginal Cost Curve Is the Firm's Supply Curve



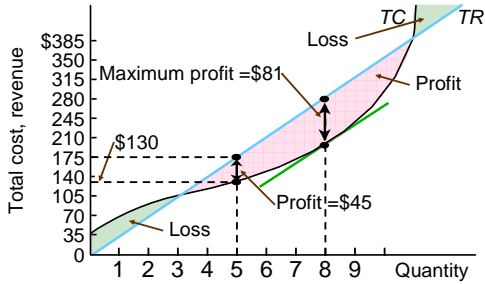
Firms Maximize Total Profit

- Firms seek to maximize total profit, not profit per unit.
 - Firms do not care about profit per unit.
 - As long as increasing output increases total profits, a profit-maximizing firm should produce more.

Profit Maximization Using Total Revenue and Total Cost

- Profit is maximized where the vertical distance between total revenue and total cost is greatest.
- At that output, MR (the slope of the total revenue curve) and MC (the slope of the total cost curve) are equal.

Profit Determination Using Total Cost and Revenue Curves



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Total Profit at the Profit-Maximizing Level of Output

- The $P = MR = MC$ condition tells us how much output a competitive firm should produce to maximize profit.
- It does not tell us how much profit the firm makes.

Determining Profit and Loss From a Table of Costs

- Profit can be calculated from a table of costs and revenues.
- Profit is determined by total revenue minus total cost.

Costs Relevant to a Firm

P = MR	Output	Total Cost	Marginal Cost	Average Total Cost	Total Revenue	Profit TR-TC
—	0	40.00	—	—	0	-40.00
35.00	1	68.00	28.00	68.00	35.00	-33.00
35.00	2	88.00	20.00	44.00	70.00	-18.00
35.00	3	104.00	16.00	34.67	105.00	1.00
35.00	4	118.00	14.00	29.50	140.00	22.00
35.00	5	130.00	12.00	26.00	175.00	45.00
35.00	6	147.00	17.00	24.50	210.00	63.00

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Costs Relevant to a Firm

P = MR	Output	Total Cost	Marginal Cost	Average Total Cost	Total Revenue	Profit TR-TC
35.00	4	118.00	14.00	29.50	140.00	22.00
35.00	5	130.00	12.00	26.00	175.00	45.00
35.00	6	147.00	17.00	24.50	210.00	63.00
35.00	7	169.00	22.00	24.14	245.00	76.00
35.00	8	199.00	30.00	24.88	280.00	81.00
35.00	9	239.00	40.00	26.56	315.00	76.00
35.00	10	293.00	54.00	29.30	350.00	57.00

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Determining Profit and Loss From a Graph

- Find output where $MC = MR$.
 - The intersection of $MC = MR (P)$ determines the quantity the firm will produce if it wishes to maximize profits.

Determining Profit and Loss From a Graph

- Find profit per unit where $MC = MR$.
 - Drop a line down from where MC equals MR , and then to the ATC curve.
 - This is the profit per unit.
 - Extend a line back to the vertical axis to identify total profit.

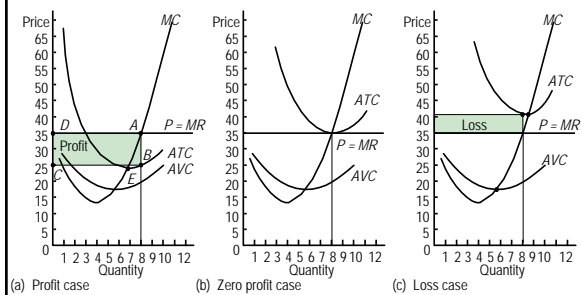
Determining Profit and Loss From a Graph

- The firm makes a profit when the ATC curve is below the MR curve.
- The firm incurs a loss when the ATC curve is above the MR curve.

Determining Profit and Loss From a Graph

- Zero profit or loss where $MC = MR$.
 - Firms can earn zero profit or even a loss where $MC = MR$.
 - Even though economic profit is zero, all resources, including entrepreneurs, are being paid their opportunity costs.

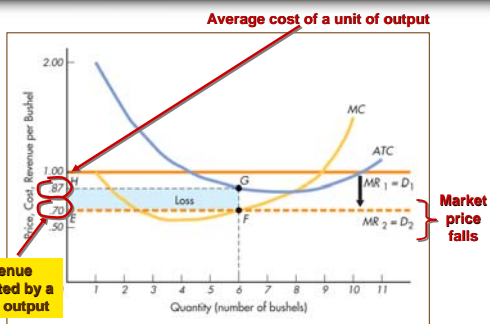
Determining Profits Graphically



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Loss Minimization



The Shutdown Point

- The firm will shut down if it cannot cover average variable costs.
 - A firm should continue to produce as long as price is greater than average variable cost.
 - If price falls below that point it makes sense to shut down temporarily and save the variable costs.

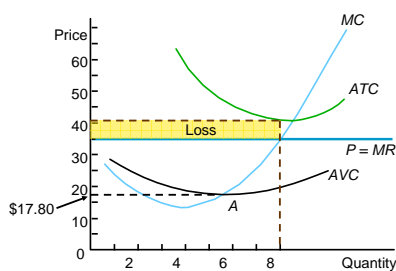
The Shutdown Point

- The **shutdown point** is the point at which the firm will be better off if it shuts down than it will if it stays in business.

The Shutdown Point

- If total revenue is more than total variable cost, the firm's best strategy is to temporarily produce at a loss.
- It is taking less of a loss than it would by shutting down.

The Shutdown Decision



Minimizing Loss

- Shutdown price:** the minimum point of the average-variable-cost (AVC) curve.
- Break-even price:** A price that is equal to the minimum point of the average-total-cost (ATC) curve.
 - At this price, economic profit is zero.

Profit Maximizing Level of Output

- The goal of the firm is to maximize profits, the difference between total revenue and total cost
- A firm maximizes profit when marginal revenue equals marginal cost
- Marginal revenue (MR)** is the change in total revenue associated with a change in quantity
- Marginal cost (MC)** is the change in total cost associated with a change in quantity

14-35

Profit Maximizing Level of Output

- The profit-maximizing condition of a competitive firm is:

$$MR = MC$$

- For a competitive firm, $MR = P$
- A firm maximizes total profit, not profit per unit

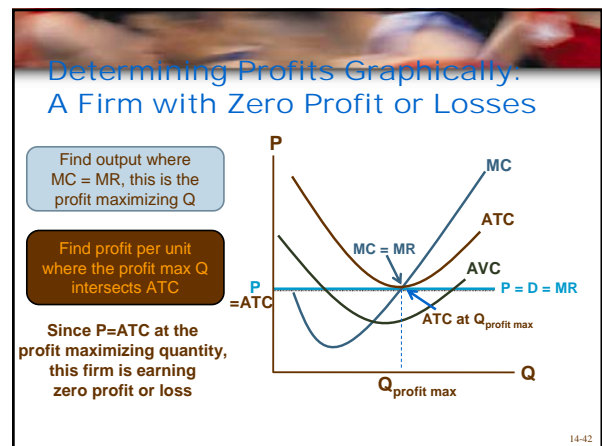
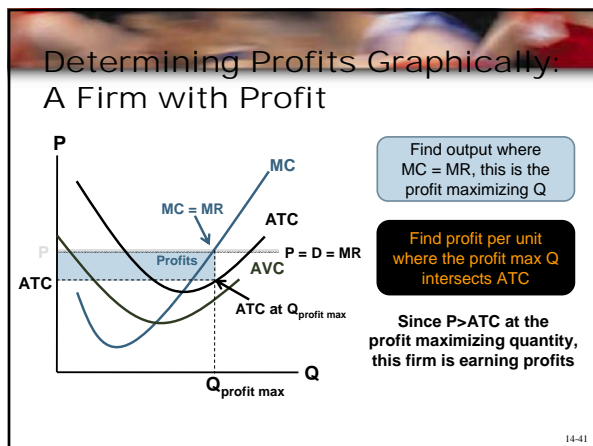
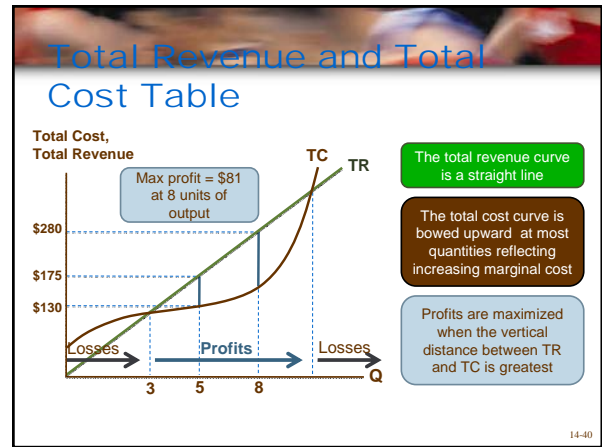
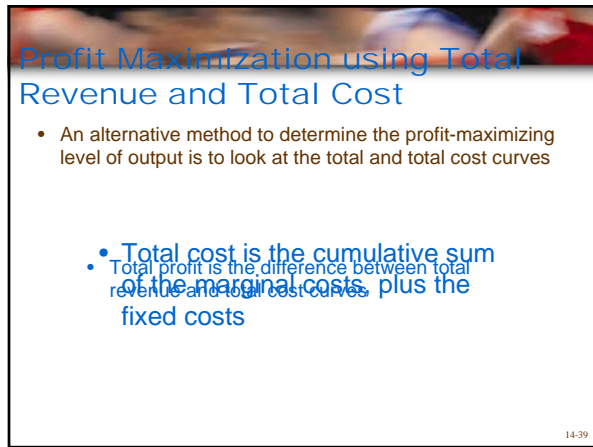
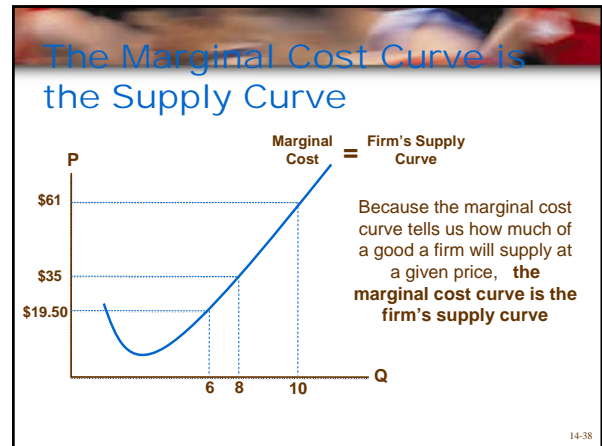
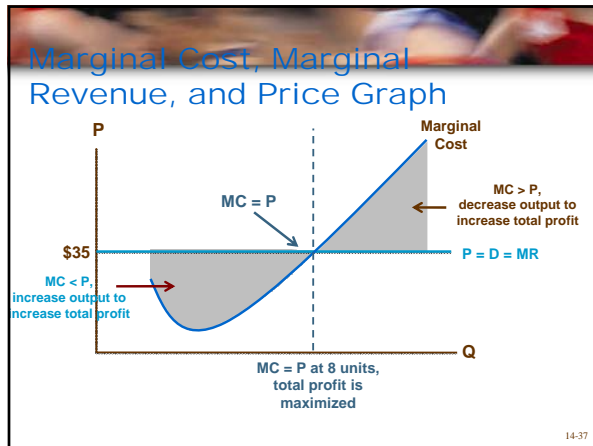
If $MR > MC$,

- a firm can increase profit by increasing output

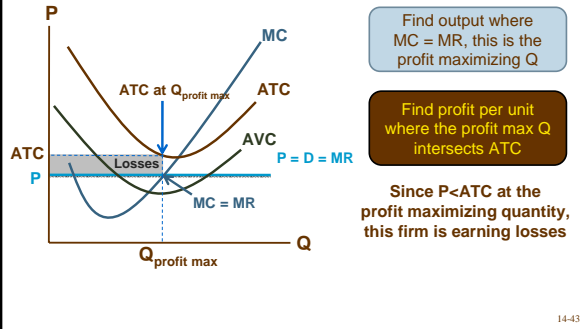
If $MR < MC$,

- a firm can increase profit by decreasing its output

14-36

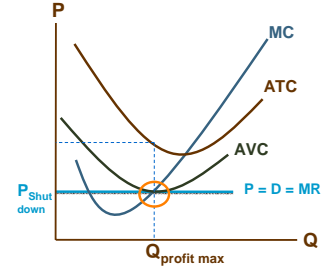


Determining Profits Graphically: A Firm with Losses



Determining Profits Graphically: The Shutdown Decision

- The shutdown point is the point below which the firm will be better off if it shuts down than it will if it stays in business
- If $P > \text{min of AVC}$, then the firm will still produce, but earn a loss
- If $P < \text{min of AVC}$, the firm will shut down
- If a firm shuts down, it still has to pay its fixed costs



Short-Run Market Supply and Demand

- While the firm's demand curve is perfectly elastic, the industry's demand curve is downward sloping
- The market supply curve takes into account any changes in input prices that might occur
- The market (industry) supply curve is the horizontal sum of all the firms' marginal cost curves

14-45

Short-Run Market Supply and Demand Graph

