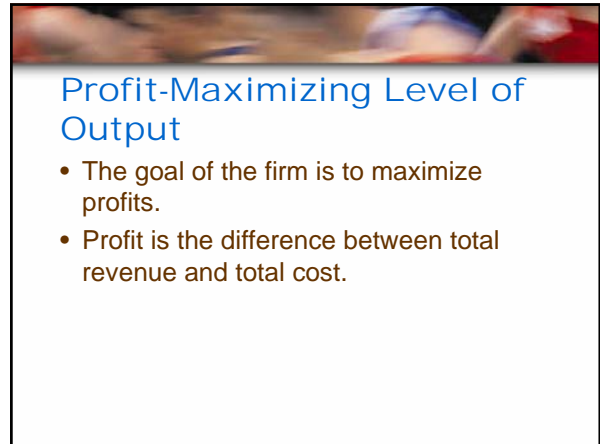




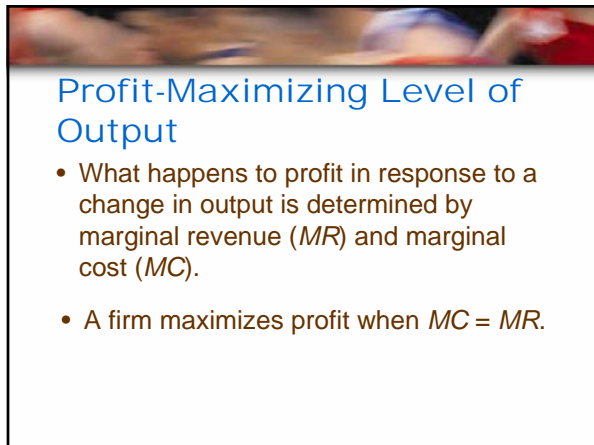
Perfect  
Competition

Chapter 10-1.c.  
**Profit Maximizing and  
Shutting Down**



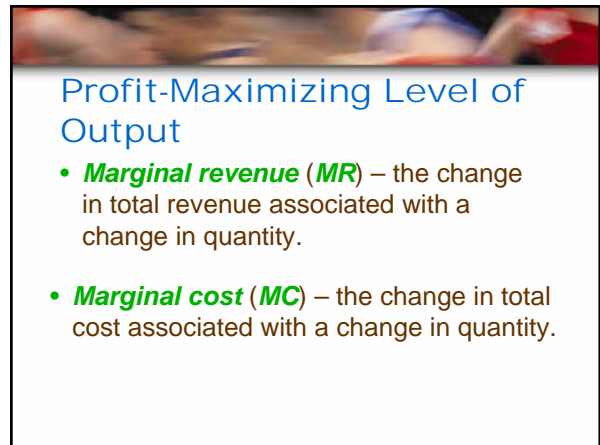
Profit-Maximizing Level of  
Output

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



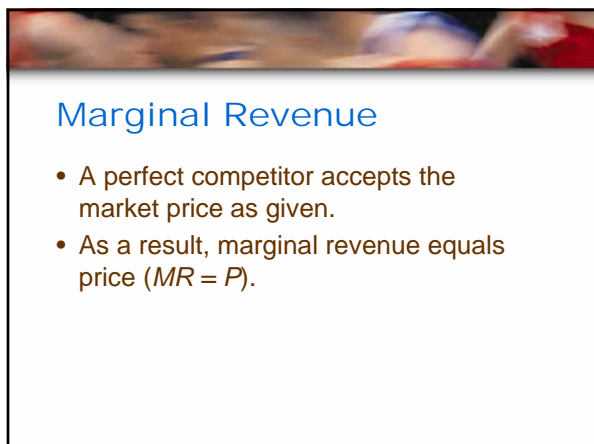
Profit-Maximizing Level of  
Output

- 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  $MC = MR$ .



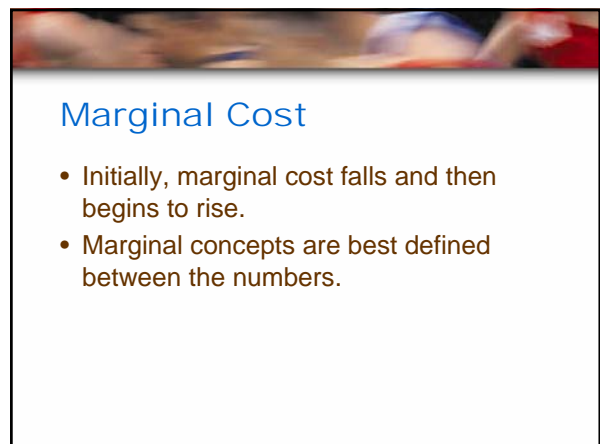
Profit-Maximizing Level of  
Output

- **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.

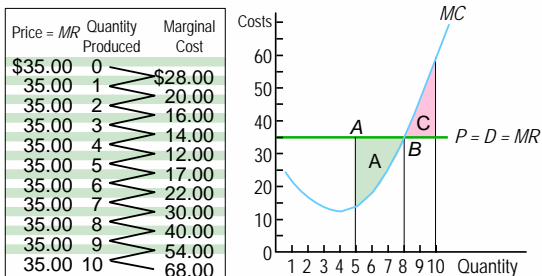
## How to Maximize Profit

- 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.

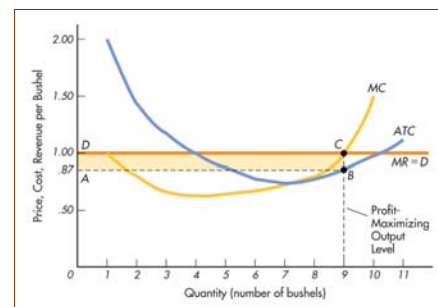
## Marginal Cost, Marginal Revenue, and Price



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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

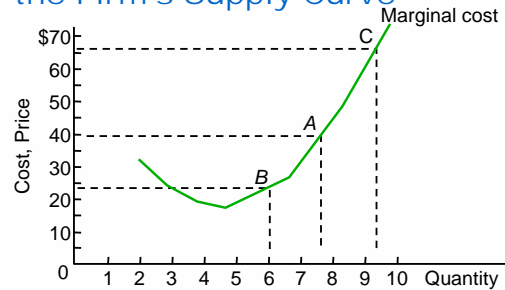
## The Marginal Cost Curve Is the Supply Curve

- 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



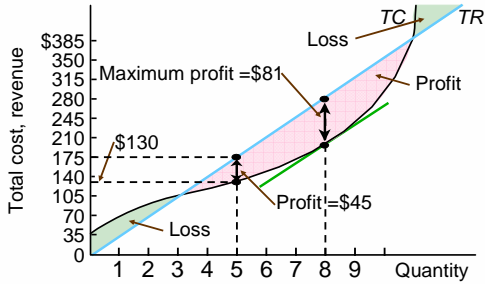
## Firms Maximize Total Profit

- 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.

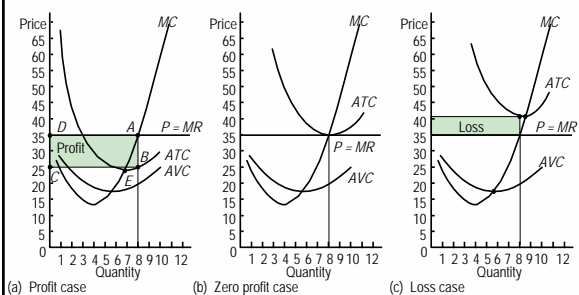
## Determining Profit and Loss From a Graph

- 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.

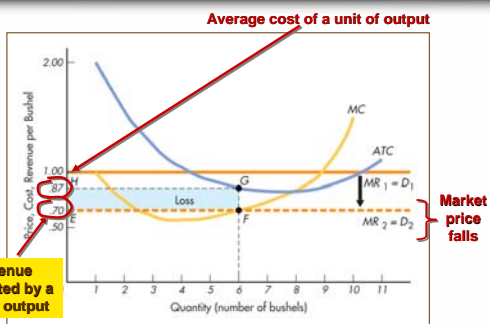
## Determining Profits Graphically



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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.

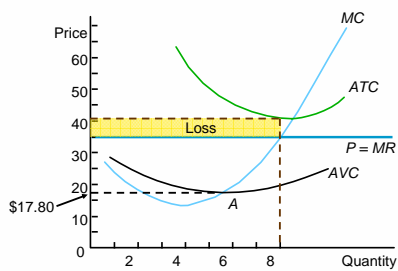
## The Shutdown Point

- 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.

## Shutdown Price

