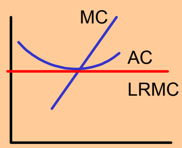
Competition and Monopoly I



The Problem – Part I

- The industry demand curve for widgets is

$$Q = 600 - 10P.$$

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- Forty plants produce widgets with costs

$$27 + 3q^2$$

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- **Find P, Q and π**

Demand and Supply

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Finding Firm Supply

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$$6q = P$$

Finding Firm Supply

- We know industry demand

$$Q = 600 - 10P$$

- We must find industry supply. The cost function is

$$27 + 3q^2 \Rightarrow MC = 6q$$

q=P/6

- Each firm produces where MC = P

$$6q = P$$

Finding Industry Supply

$$q = P/6$$

Finding Industry Supply

$$q = P/6$$

- Industry Supply is then forty times that or

$$Q = 40P/6$$

Finding Industry Supply

$$q = P/6$$

- Industry Supply is then forty times that or

$$Q = 40P/6$$

- Equate Demand and Supply

$$D=S=40P/6$$

Finding Price

$$D=S=40P/6$$

$$600-10P=40P/6$$

Finding Price

$600-10P = 40P/6$

Finding Price

$600-10P = 40P/6$

$3600–60P = 40P$

Finding Price

$600-10P = 40P/6$

$3600–60P = 40P$

$3600 = 100 P$

Finding Price

$600-10P = 40P/6$

$3600–60P = 40P$

$3600 = 100 P$

$100 P = 3600$

$P = 36$

Finding Quantity

$600-10P = 40P/6$
$3600–60P = 40P$
$3600 = 100\,P$
$100\,P = 3600$
$P = 36$

$Q = 600-10P$

Finding Quantity

$600-10P = 40P/6$
$3600–60P = 40P$
$3600 = 100\,P$
$100\,P = 3600$
$P = 36$

$Q = 600-10P$
$Q = 600 – 10(36)$

Finding Quantity

$600-10P = 40P/6$
$3600–60P = 40P$
$3600 = 100\,P$
$100\,P = 3600$
$P = 36$

$Q = 600-10P$
$Q = 600 – 10(36)$
$Q = 600 – 360$
$Q = 240$

Finding Each Firm's Output

$600-10P = 40P/6$
$3600–60P = 40P$
$3600 = 100\,P$
$100\,P = 3600$
$P = 36$

$Q = 600-10P$
$Q = 600 – 10(36)$
$Q = 600 – 360$
$Q = 240$
$q = Q/40$
$q = 6$

Profits

$P = 36$
$q = 6$

Profits

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$q = 6$

$\pi = PQ - C$

Profits

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$PQ=(36)(6)= 216$

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$C=27+3q^2$

Profits

$P = 36$

$q = 6$

$\pi = PQ - C$

$PQ=(36)(6)= 216$

$C=27+3q^2$

$C= 27 + 3(6)^2$

$C=135$

Profits

$P = 36$

$q = 6$

$\pi = PQ - C$

$PQ=(36)(6)= 216$

$\pi = 216 - 136 = 81$

$7+3q^2$

$+ 3(6)^2$

$C=135$

The Problem – Part II

- Suppose other firms may open a (single) plant. Same cost function.

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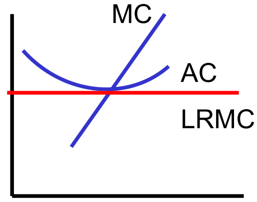
- Find, P, Q, N, q, and π.

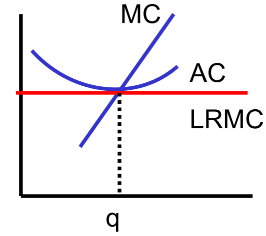
Finding Long Run Marginal Cost

- We know that in the long run, the price will be at the minimum of the firm's AC curve. Lets find that.



Finding Long Run Marginal Cost

- Two Steps
  - Find q
  - Find the minimum of AC at that level



Finding Long Run Marginal Cost

- We know that in the long run, the price will be at the minimum of the firm's AC curve. Lets find that.
- There are two steps.
  - Finding the value of q that minimizes AC
  - Finding MC or AC at that value.

Finding Long Run Marginal Cost

- The cost function is

$$C = 27+3q^2$$

Finding Long Run Marginal Cost

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$$C = 27+3q^2$$

$$AC = C/q$$

Finding Long Run Marginal Cost

- The cost function is

$$C = 27+3q^2$$

$$AC = C/q$$

$$AC = \frac{27+3q^2}{q}$$

Finding Long Run Marginal Cost

- The cost function is

$$C = 27+3q^2$$

$$AC = C/q$$

$$AC = \frac{27+3q^2}{q}$$

$$AC = \frac{27}{q} + 3q$$

Finding Long Run Marginal Cost

$$AC = \frac{27}{q} + 3q$$

$$MC = AC$$

Finding Long Run Marginal Cost

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Finding Long Run Marginal Cost

$$AC = \frac{27}{q} + 3q$$

$$MC = AC$$

$$C = 27 + 3q^2$$

$$MC = 6q$$

Finding Long Run Marginal Cost

$$AC = \frac{27}{q} + 3q$$

$$MC = AC$$

$$C = 27 + 3q^2$$

$$MC = 6q$$

$$6q = \frac{27}{q} + 3q$$

Finding Long Run Marginal Cost

$$6q = \frac{27}{q} + 3q$$

$$3q = \frac{27}{q}$$

Finding Long Run Marginal Cost

$$6q = \frac{27}{q} + 3q$$

$$3q^2 = 27$$

$$3q = \frac{27}{q}$$

Finding Long Run Marginal Cost

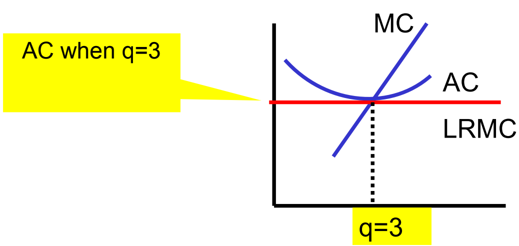
$$q^2 = 9$$

$$q = 3$$

$$3q^2 = 27$$

$$3q = \frac{27}{q}$$

Finding Long Run Marginal Cost



Finding Long Run Marginal Cost

$$q = 3$$

$$AC = \frac{27}{q} + 3q$$

Finding Long Run Marginal Cost

$$q = 3$$

$$AC = \frac{27}{q} + 3q$$

$$AC = \frac{27}{3} + 3(3) = 18$$

Total Output

$$AC = 18$$

$$P = 18$$

Total Output

$AC = 18$

$P = 18$

$$Q = 600 - 10P$$

Total Output

$AC = 18$

$P = 18$

$Q = 600 - 10P$

$$Q = 600 - 10(18) = 600 - 180 = 420$$

Total Output

$AC = 18$

$P = 18$

$Q = 420$

$$q = 3$$

Total Output

$AC = 18$

$P = 18$

$Q = 420$

$q = 3$

$$N = 140$$

End