Monopoly

AP Microeconomics | Unit 4 | marginal revenue, profit maximization, deadweight loss

1. Why marginal revenue is below price

A monopoly is the only seller, so it faces the whole market demand curve: to sell more it must lower the price *on every unit*.

quantity	price	total revenue	marginal revenue
1	\$11	\$11	\$11
2	\$10	\$20	\$9
3	\$9	\$27	\$7
4	\$8	\$32	\$5
5	\$7	\$35	\$3

The 4th unit sells for \$8, but the first three now sell for \$1 less each: $MR = 8 - 3 \times 1 = \$5$.

Monopoly marginal revenue

$MR < P$ at every quantity after the first. On the graph the MR curve lies **below** the demand curve and (for a straight-line demand) falls twice as fast.

2. The monopoly graph

Example. Demand $P = 12 - Q$, so $MR = 12 - 2Q$; marginal cost $MC = Q$.

Two steps, in this order

1. **Quantity:** where $MR = MC$. Here $12 - 2Q = Q$, so $Q = 4$.
2. **Price:** go *up* from that quantity to the **demand curve**. $P = 12 - 4 = \$8$.

The price is *not* read at the point where MR and MC cross (\$4).

3. Profit and deadweight loss

With $ATC = \$3.50$ at $Q = 4$:

$$\text{profit} = (P - ATC) \times Q = (8 - 3.5) \times 4 = \$18$$

The efficient quantity is where demand crosses marginal cost: $12 - Q = Q$, $Q = 6$. The monopoly produces only 4.

$$DWL = \tfrac{1}{2} \times (8 - 4) \times (6 - 4) = \$4$$

The triangle lies between the monopoly quantity and the efficient quantity, with demand above and MC below.

Inefficiency of monopoly

$P > MC$: **not allocatively efficient** (too little is produced). The monopoly does not produce at minimum ATC either: **not productively efficient**.

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4. Why the profit lasts

Barriers to entry keep competitors out: control of a key resource; patents, licenses and other legal protection; and very large economies of scale. A *natural monopoly* is an industry in which one firm can serve the whole market at a lower cost than two (water pipes, power lines).

Because of these barriers, a monopoly can earn economic profit in the **long run**.

5. Regulation, and MR versus elasticity

Regulating a natural monopoly (ATC falls across the whole market). With $D : P = 100 - Q$, $MC = 20$, $ATC = 20 + \frac{1200}{Q}$: unregulated, $MR = MC$ gives 40 units at \$60. Price $= MC$ (socially optimal): 80 units at \$20, but $ATC =$ \$35 there, a loss that needs a subsidy. Price $= ATC$ (fair return): 60 units at \$40, zero economic profit. Either way: a lower price and more output. Once the price is set, buyers choose the quantity on D.

MR and elasticity. On a straight demand line $MR = 0$ at the midpoint (unit elastic); above it demand is elastic and $MR > 0$, below it inelastic and $MR < 0$, so a monopolist never produces on the inelastic part. Revenue is largest where $MR = 0$ ($Q = 50$), profit where $MR = MC$ ($Q = 40$): with $MC > 0$ the profit-maximizing output is smaller.

Where students lose points

1. Reading the price at the $MR = MC$ crossing: go up to demand.
2. Drawing MR on top of demand: for a monopoly MR is below demand.
3. Deadweight loss shaded to the wrong quantity: it ends where D crosses MC.
4. Saying the monopolist charges “the highest price possible”.
5. Saying profit disappears in the long run: barriers keep it.

Now practise it

Theory sticks once you use it. On **sad-academy.com** you’ll find practice questions for this exact subtopic in the AP format, and an AI that grades your free-response answers against the scoring guidelines, the way an AP reader would.

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