

Exercise walk-through

4.2

Monopoly

AP Microeconomics

One monopoly: choose quantity, then price

A **monopoly** is one seller with no close substitutes, protected by entry barriers.

Try before the solution: one period, dollars and units

Demand $P = 110 - Q$; $MR = 110 - 2Q$; $MC = 20 + Q$.

Find the profit-maximizing quantity and the price buyers will pay. Which curve gives each answer?

For this model, rising MC crosses falling MR. First find $MR = MC$; then read price from demand at that quantity.

The monopoly cannot choose price and quantity freely

Quantity: compare extra revenue and cost

$$MR = MC$$

$$110 - 2Q = 20 + Q$$

$$Q_M = (110 - 20)/3$$

$$Q_M = 30 \text{ units}$$

Price: use buyers' demand

$$P_M = 110 - Q_M$$

$$P_M = 110 - 30$$

$$P_M = \$80 \text{ per unit}$$

$$MC_M = 20 + Q_M = \$50$$

At the chosen output, MR is \$50 and price is \$80. Reading price from MR would understate what buyers pay.

Profit needs ATC at the chosen quantity

Add the cost information

Same firm: $TC = 600 + 20Q + 0.5Q^2$; $ATC = 600/Q + 20 + 0.5Q$. Fixed cost is \$600. At $Q = 30$, $P = \$80$. Calculate economic profit.

Profit needs ATC at the chosen quantity

Add the cost information

Same firm: $TC = 600 + 20Q + 0.5Q^2$; $ATC = 600/Q + 20 + 0.5Q$. Fixed cost is \$600. At $Q = 30$, $P = \$80$. Calculate economic profit.

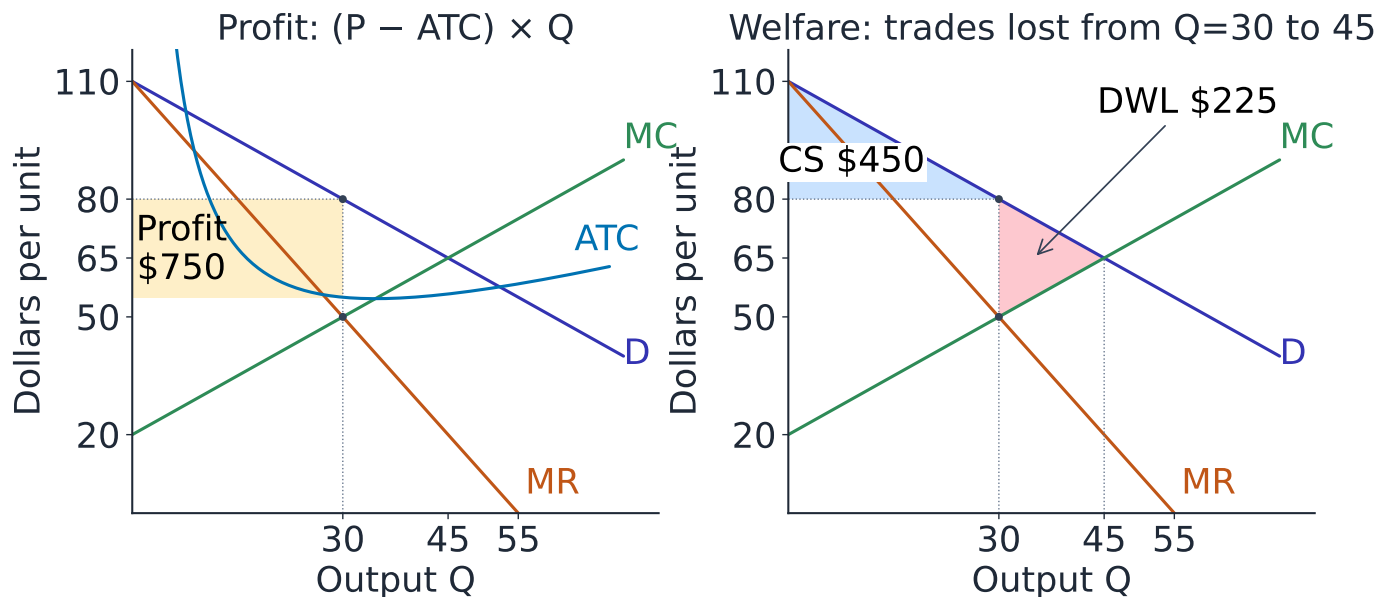
$$ATC = 600/Q + 20 + 0.5Q$$

$$ATC = 600/30 + 20 + 0.5(30) = \$55 \text{ per unit}$$

$$\pi = (P - ATC)Q = (80 - 55) \times 30 = \$750$$

$P - ATC = \$25$ is profit per unit. $P - MC = \$30$ is a different gap. Neither gap alone is total profit.

Profit and welfare: identify the separate areas



Left: profit uses ATC at $Q_M = 30$. Right: consumer surplus uses demand above $P = 80$; deadweight loss uses trades lost between 30 and 45.

Exercises 2.1-2.3

2.1 State why a monopolist's marginal revenue lies below its demand curve. [1]

2.2 State the rule a monopolist uses to choose its quantity. [1]

2.3 State why a monopoly is allocatively inefficient. [1]

Exercises 2.1-2.3

2.1 State why a monopolist's marginal revenue lies below its demand curve. [1]

2.1

- to sell an extra unit it must lower the price on all units, so the added revenue is less than the price

2.2 State the rule a monopolist uses to choose its quantity. [1]

2.2

- produce where marginal revenue equals marginal cost

2.3 State why a monopoly is allocatively inefficient. [1]

2.3

- it produces where price exceeds marginal cost, so some beneficial units are not made

Exercises 3.1-3.2

3.1 A monopoly maximizes profit where

[1]

☐

A $P = MC$

B $MR = MC$

C $P = ATC$

D $MR = 0$

3.2 A monopoly is allocatively inefficient because it produces where

[1]

☐

A $P = MC$

B $P > MC$

C $P < MC$

D $P = 0$

Exercises 3.1-3.2

3.1 A monopoly maximizes profit where

[1]

☐

A $P = MC$

B $MR = MC$

C $P = ATC$

D $MR = 0$

3.1 B

- $MR = MC$.

3.2 A monopoly is allocatively inefficient because it produces where

[1]

☐

A $P = MC$

B $P > MC$

C $P < MC$

D $P = 0$

3.2 B

- $P > MC$.

Exercise 3.3 (a)

3.3 A monopolist produces where $MR = MC$ at $Q = 40$, charging $P = \$25$ (from demand), with $ATC = \$18$.

(a) Find the economic profit per unit.

[1]

Exercise 3.3 (a)

3.3 A monopolist produces where $MR = MC$ at $Q = 40$, charging $P = \$25$ (from demand), with $ATC = \$18$.

(a) Find the economic profit per unit.

[1]

(a)

- $25 - 18 = \$7$

Exercise 3.3 (b)

3.3 A monopolist produces where $MR = MC$ at $Q = 40$, charging $P = \$25$ (from demand), with $ATC = \$18$.

(b) Find the total economic profit.

[1]

Exercise 3.3 (b)

3.3 A monopolist produces where $MR = MC$ at $Q = 40$, charging $P = \$25$ (from demand), with $ATC = \$18$.

(b) Find the total economic profit.

[1]

(b)

- $7 \times 40 = \$280$

Exercise 3.3 (c)

3.3 A monopolist produces where $MR = MC$ at $Q = 40$, charging $P = \$25$ (from demand), with $ATC = \$18$.

(c) State why the monopoly creates a deadweight loss.

[1]

Exercise 3.3 (c)

3.3 A monopolist produces where $MR = MC$ at $Q = 40$, charging $P = \$25$ (from demand), with $ATC = \$18$.

(c) State why the monopoly creates a deadweight loss. [1]

(c)

- it underproduces (relative to $P = MC$), so mutually beneficial trades are lost