3.4 Production and costs

Name: _____ Class: _____ Date: _____ **Total: 20 marks**

KEY WORDS marginal cost • average total cost • marginal product

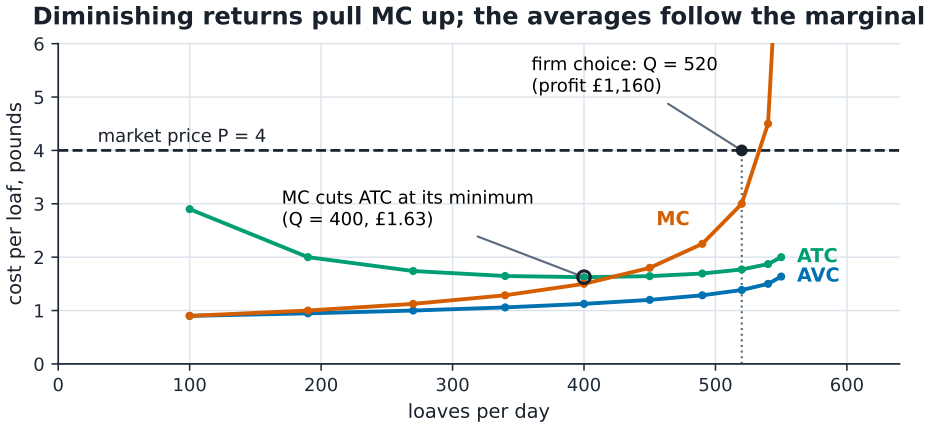
Objective

Derive marginal and average costs from a production table; locate minimum ATC and explain the crossing; run the produce/shutdown rules at a given price; keep the short run and the long run apart.

1 Key knowledge and worked examples

■ Production first, costs after

$MC = w/MPL$: the wage divided by the **marginal product** . As **diminishing returns** bite, MC rises; the averages chase it, and MC cuts **average total cost** at its minimum. **Fixed cost** never moves with output; **variable cost** does.



Diminishing returns pull MC up; the averages follow the marginal

■ Worked example. Nimbus's eighth and ninth bakers

Eighth baker: MPL 30, MC $90/30 = £3.00$ – below the £4 price, so hire ✓. Ninth: MPL 20, MC $90/20 = £4.50 > 4$ – do not. Output 520, profit $4 \times 520 - 920 = £1{,}160$ ✓. Produce while $P \geq MC$; shut below minimum AVC (£0.90).

2 Practice

A coffee cart pays each worker £60 a day; its espresso machine costs £150 a day however much it sells. Daily cups by workers:

L	1	2	3	4	5	6
cups	60	110	150	180	200	210

2.1 Compute MPL, MC, AVC and ATC for $L = 1, 2, 3$. [4]

2.2 Where does ATC bottom out on this table (compute it for the remaining rows), and why does MC pass through that minimum? [4]

2.3 The market price of a cup is £2.00. How many workers does the cart employ, and what profit or loss does the day show? Verify the loss is smaller than shutting down would be. [4]

2.4 A price war drops the cup to £0.95. What does the cart do, and why, with numbers? [3]

2.5 The owner says: "ATC falls from L = 1 to L = 4 – that's our economies of scale kicking in." Correct him in two lines. [2]

2.6 True or false with one line each: (a) the £150 machine is irrelevant to how many cups to sell; (b) MC can be computed from the change in ATC; (c) the shutdown rule compares price with ATC. [3]

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