Exercise walk-through

Short-Run Production Costs ▪ 3.2

eXercise

You must be able to

- distinguish **fixed costs** 固定成本 from **variable costs** 可变成本
- calculate **total cost**, **average fixed cost**, **average variable cost**, and **average total cost**
- calculate **marginal cost** 边际成本 as the change in total cost per extra unit
- explain why MC cuts AVC and ATC at their minimum points

Method — Cost types

Fixed costs do not change with output; **variable costs** do. $TC = FC + VC$.

Method — Average costs

$$AFC = \frac{FC}{Q},\ AVC = \frac{VC}{Q},\ ATC = \frac{TC}{Q}.$$

Method — Marginal cost

$MC = \dfrac{\Delta TC}{\Delta Q}$. The MC curve cuts both AVC and ATC at their **minimum** points: while MC is below an average, the average falls; above it, it rises.

Practice 2.1 ▪ 2 marks

State the difference between fixed and variable costs.

Solution 2.1

Method: Cost types

Worked steps

fixed costs do not change with output; variable costs rise as output rises B1 B1.

Practice 2.2 ▪ 2 marks

At $Q = 10$, fixed cost is $\$100$ and variable cost is $\$150$. Find the average total cost.

Solution 2.2

Method: Cost types

Worked steps

$TC = 100 + 150 = 250$; $ATC = \dfrac{250}{10} = \$25$ M1 A1.

Practice 2.3 ▪ 1 mark

State the point on the ATC curve where the MC curve crosses it.

Solution 2.3

Worked steps

at its minimum point B1.

Exam-style 3.1 ▪ 1 mark

Average total cost is

A $TC \times Q$

B TC/Q

C $MC \times Q$

D FC/Q

Solution 3.1

Method: Marginal cost

A $TC \times Q$

B TC/Q ✓

C $MC \times Q$

D FC/Q

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

The MC curve crosses the ATC curve at ATC's

A maximum

B minimum

C starting point

D end point

Solution 3.2

A maximum

B minimum ✓

C starting point

D end point

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

A firm's total cost rises from $\$200$ (at $Q = 20$) to $\$215$ (at $Q = 21$).
(a) Find the marginal cost of the 21st unit.
(b) Find the average total cost at $Q = 20$.
(c) Since MC exceeds ATC here, state whether ATC is rising or falling.

Solution 3.3

Method: Marginal cost

Worked steps

(a) $MC = \dfrac{215 - 200}{1} = \$15$ B1. (b) $ATC = \dfrac{200}{20} = \$10$ B1. (c) rising (MC is above ATC) B1.