

Exercise walk-through

Costs, scale of production and break-even analysis ■ 4.2

eXercise

You must be able to

- calculate total cost, average cost, revenue and profit
- calculate the **break-even output** and the **margin of safety**
- explain the limits of break-even analysis

Method — Costs, profit and break-even

total cost = fixed + variable

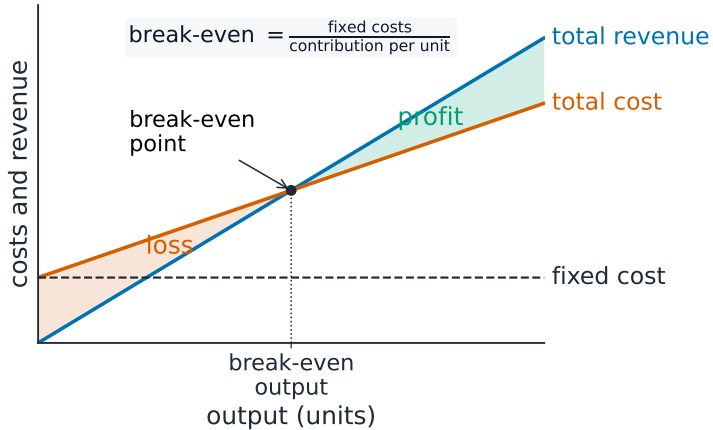
profit = total revenue – total cost

$$\text{break-even output} = \frac{\text{fixed costs}}{\text{price} - \text{variable cost per unit}}$$

- **Worked:** price \$15, variable cost \$5 → contribution \$10. Fixed costs \$8,000 → break-even = $\frac{8000}{10} = 800$ units.
- **Margin of safety** = actual output – break-even output (a big margin is safer).

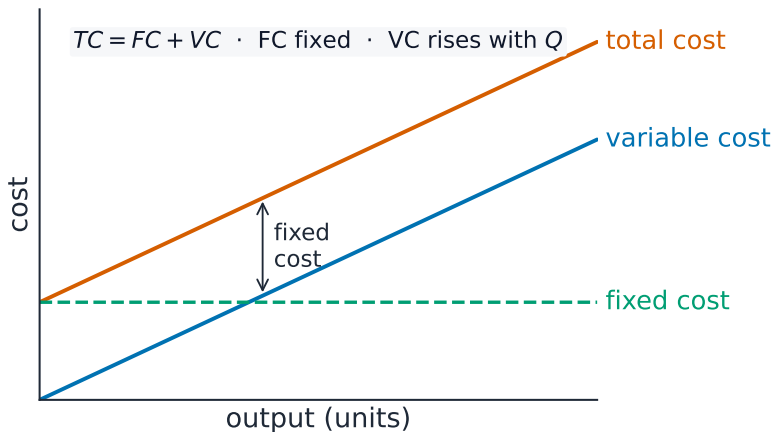
Answer shapes: K + App + An + Ev (a justified judgement, for “do you think” questions).

Method — Costs, profit and break-even



Break-even is where total revenue equals total cost

Method — Costs, profit and break-even



Fixed costs stay the same; variable costs rise with output; total cost is their sum

Practice 2.1 ■ 2 marks

Define the term *fixed cost*.

Solution 2.1

Method: Costs, profit and break-even

Worked steps

a cost that does not change with output, such as rent or salaries (2 for a clear definition; 1 for a partial idea).

Practice 2.2 ■ 2 marks

A firm has fixed costs of \$4,000 and variable costs of \$3 per unit, and makes 1,000 units. Calculate the total cost.

Solution 2.2

Method: Costs, profit and break-even

Worked steps

$\$4,000 + (1,000 \times \$3) = \$7,000$ (2; award 1 for a correct method with the wrong figure).

Practice 2.3 ■ 2 marks

State what the *break-even* point means.

Solution 2.3

Method: Costs, profit and break-even

Worked steps

the level of output where total revenue equals total cost, so the business makes no profit and no loss (2 for a clear definition; 1 for a partial idea).

Exam-style 3.1 ■ 1 mark

A product sells for \$20 with a variable cost of \$8 per unit. Fixed costs are \$6,000.

- (a) Calculate the contribution per unit.
- (b) Calculate the break-even output.
- (c) The firm makes 700 units. Calculate the margin of safety.

Solution 3.1

Method: Costs, profit and break-even

Worked steps

- (a) $\$20 - \$8 = \$12$ (1). (b) break-even = $\frac{6000}{12} = 500$ units (2; allow follow-through).
(c) margin of safety = $700 - 500 = 200$ units (2; allow follow-through).

Exam-style 3.2 ■ 6 marks

Explain one benefit and one limitation of break-even analysis.

Solution 3.2

Method: Costs, profit and break-even

Worked steps

[6] $K 1 + A$ n up to 2 each side — *benefit*: it shows how many units must be sold to avoid a loss → helps set a sales target. *Limitation*: it assumes all output is sold and that price and costs stay the same → in reality these change, so it is only a guide. Maximum 3 each.

Exam-style 3.3 ■ 6 marks

Do you think break-even analysis is useful to a small business? Justify your answer.

Solution 3.3

Method: Costs, profit and break-even

Worked steps

[6] Both sides + judgement. **For:** quick and simple, shows the break-even point and margin of safety, and supports a loan application — useful for a small firm at start-up. **Against:** its assumptions (all output sold; constant price and costs) are unrealistic. **Judgement (Ev):** break-even is a helpful planning guide for a small business, but it should guide decisions, not make them alone — its value depends on how stable prices and costs are.