

Papers 2 and 3 set calculations and then ask what the firm should do about them. The arithmetic is rarely hard; the marks are in the method being visible and in the sentence that follows the number. Each solution below shows the formula, the substitution, the answer with its unit, and a note on where the examiner is actually looking. 9609 的计算题不难, 分数在 “过程可见” 与 “结论解读” 上。

Break-even and contribution

Fixed costs are \$90,000 a year, the selling price is \$25 and the variable cost is \$16 a unit. Calculate the break-even output. The supplier then raises the variable cost to \$18. Recalculate and comment.

Break-even rises from 10,000 units to 12,858 units (12,857.1 rounded UP, because a part-unit does not break even). A \$2 rise in variable cost has pushed break-even up by nearly 29% – the firm must either raise its price, find a cheaper supplier, or cut fixed costs.

Contribution per unit = $25 - 16 = \$9$

Break-even = $90\,000 \div 9 = 10\,000$ units

New contribution = $25 - 18 = \$7$

New break-even = $90\,000 \div 7 = 12\,857.1$, so 12,858 units

Round UP, always: 12,857 units still makes a small loss.

The comment is the application mark. Notice how sensitive break-even is to contribution – a 12.5% rise in unit cost moved break-even by 29%.

The denominator of break-even is CONTRIBUTION, never the selling price. Dividing by the price gives 3600 units here – a third of the truth, and a recommendation built on it is worthless.

盈亏平衡产量的分母是单位贡献, 不是售价。

Break-even assumes every unit made is sold, that fixed costs really are fixed over the range, and that the price does not change with volume. Naming one of those assumptions is an evaluation mark in almost every break-even question.

盈亏平衡分析的三个假设: 全部售出、固定成本不变、售价不变。

Investment appraisal – when the methods disagree

Two projects each cost \$400,000. Project X returns \$200,000, \$150,000, \$100,000, \$50,000 and \$50,000 over five years. Project Y returns \$80,000, \$100,000, \$140,000, \$180,000 and \$220,000. Calculate the payback period and the ARR for each and recommend one.

X pays back in 2 years 6 months with an ARR of 7.5%; Y pays back in 3 years 5 months with an ARR of 16%. The two methods disagree, so the recommendation depends on the firm's position: a business short of cash or in a fast-changing market should take X, but on profitability over the whole life Y is much the better project.

Project X, cumulative: \$200,000, \$350,000, then \$450,000 in year 3

After 2 years \$50,000 is still outstanding, so months = $50\,000 \div 100\,000 \times 12 = 6$: *payback* = 2 years 6 months

Total inflow = \$550,000, *so total profit* = 150,000 *and average annual profit* = \$30,000

ARR = $30\,000 \div 400\,000 \times 100 = 7.5\%$

Project Y, cumulative: \$80,000, \$180,000, \$320,000, then \$500,000 in year 4

After 3 years \$80,000 is outstanding, so months = $80\,000 \div 180\,000 \times 12 = 5.3$: *payback* = 3 years 5 months

Total inflow = \$720,000, *so average annual profit* = $320\,000 \div 5 = \$64\,000$ *and ARR* = 16%

The conflict IS the question. A recommendation that ignores one of the two results cannot reach the top band.

ARR uses average annual PROFIT, so the initial cost must be subtracted from the total inflows before dividing by the number of years. Forgetting that step roughly doubles the answer – Project Y would come out at 36% instead of 16%.

ARR 的分子是平均年利润, 必须先减去初始投资。

Neither payback nor ARR allows for the time value of money. If the question supplies discount factors, it wants NPV, and saying why NPV is better – it discounts later cash flows – is itself a mark.

回收期与 ARR 都未考虑货币时间价值。

Ratio analysis – the number is half the answer

A firm's ROCE has fallen from 15% to 11% while its gearing has risen from 30% to 55%. Analyse what has happened and what the firm should do.

The firm has borrowed heavily and the money is not yet earning as much as the capital it replaced. ROCE falling means each dollar of capital is working less hard; gearing at 55% means it is now highly geared, so interest must be paid whatever happens to trading. It should either show that the borrowed money is funding investment that will raise ROCE in the future, or reduce debt – raising equity or retaining more profit – before a rise in interest rates makes the position dangerous.

ROCE = *operating profit* $\div$ *capital employed* $\times 100$; *gearing* = *non-current liabilities* $\div$ *capital employed* $\times 100$

The two share a denominator, so borrowing raises capital employed and lowers ROCE unless profit rises with it.

Say WHY each moved, not just that it moved. “ROCE fell” is one mark; the cause and the consequence are the rest.

Highly geared is usually taken as above about 50% – cheaper than equity while trading is good, dangerous when it is not.

Every ratio needs a comparison – last year, a competitor, or the industry. A single figure on its own supports no judgement at all, and examiners say so in every report.

比率必须与往年、同行或行业标准比较。

Liquidity and profitability answer different questions. A profitable firm can still run out of cash; a firm with a comfortable current ratio can still be making losses. Do not use one to argue the other.

盈利能力与流动性是两回事, 不能互相替代论证。

Decision trees and critical path

Option A costs \$200,000 and has a 0.6 chance of returning \$800,000 and a 0.4 chance of \$300,000. Option B costs \$120,000 with a 0.5 chance of \$600,000 and a 0.5 chance of \$250,000. Calculate the expected net gain of each and recommend one.

A has an expected net gain of \$400,000 and B of \$305,000, so on expected value A is chosen. But A costs \$80,000 more to enter and carries a 0.4 chance of a much weaker return, so a firm with limited cash may still prefer B.

Option A: expected value = $0.6 \times 800\,000 + 0.4 \times 300\,000 = 480\,000 + 120\,000 = \$600\,000$

Net gain = $600\,000 - 200\,000 = \$400\,000$

Option B: expected value = $0.5 \times 600\,000 + 0.5 \times 250\,000 = \$425\,000$

Net gain = $425\,000 - 120\,000 = \$305\,000$

Compare the NET figures. Comparing expected values before subtracting the costs is the commonest error and it can reverse the decision.

The probabilities are estimates. Saying so, and naming what would change them, is where the evaluation marks are.

| An activity has an earliest start time of day 6, a duration of 5 days and a latest finish time of day 14. Calculate its total float and explain what it means.

Total float = $14 - 5 - 6 = 3$ days. The activity can start up to 3 days late, or overrun by 3 days, without delaying the whole project – so it is NOT on the critical path, and resources could be moved from it to an activity that is.

Total float = $LFT - duration - EST$

= $14 - 5 - 6 = 3$ days

Zero float means the activity is critical. The explanation sentence is usually worth as much as the arithmetic.

Forecasting from a time series

| Quarterly sales are 120, 160, 200, 140 in year 1 and 130, 175, 215, 150 in year 2. Calculate the centred four-quarter moving average and hence the seasonal variation for quarter 3 of year 1.

The centred moving averages are 156.25, 159.375, 163.125 and 166.25. The trend at quarter 3 of year 1 is 156.25, and the seasonal variation is $200 - 156.25 = +43.75$ – quarter 3 runs well above trend.

Four-quarter totals: 620, 630, 645, 660, 670

Four-quarter averages: 155, 157.5, 161.25, 165, 167.5

These sit BETWEEN quarters, so centre them by averaging each neighbouring pair: $(155 + 157.5) \div 2 = 156.25$, and so on

Seasonal variation = actual – trend = $200 - 156.25 = +43.75$

Centring is the step most often skipped. With an even number of periods the plain average lands between two quarters and cannot be compared with any actual figure.

A forecast is extrapolated trend + average seasonal variation. Always name one reason the forecast might be wrong – extrapolation assumes the past pattern continues, and a new competitor or a change in taste breaks it.

预测 = 趋势外推 + 平均季节变动; 必须说明预测可能失准的原因。

What the examiner is actually marking

Write the formula, then substitute, then answer with a unit. Method marks survive arithmetic slips; a bare wrong number earns nothing.

公式 – 代入 – 带单位的答案。

Round money to two decimal places and percentages to one, but round break-even output UP to the next whole unit. A fraction of a unit does not break even.

盈亏平衡产量要向上取整。

Answer the question that was asked. “Calculate and comment” is two tasks, and the comment is usually worth more than the calculation.

「计算并评论」是两问，评论往往分值更高。

Use the context. The same ROCE means different things for a supermarket and for a pharmaceutical firm, and referring to the case material is what separates analysis from a textbook answer.

必须结合案例背景作答。