

Cambridge AS & A Level · Accounting 9706 · Notes

Traditional costing methods AS

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Read first: [Costs and cost behaviour](#)

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What you need to know

By the end of this topic you should be able to:

1. **Cost a unit, a job, a batch or a service:** prepare costing statements for one unit, for a one-off job, for a batch of identical items, and for service businesses (an hour of an accountant's time, a hotel room).
2. **Tell a cost centre from a cost unit.**
3. **Allocate and apportion overheads** between production and service departments, then pass the service departments' costs on to the production departments.
4. **Calculate an overhead absorption rate (OAR)** on a sensible basis (labour hours, machine hours or units).
5. **Explain and calculate under- and over-absorption** of overheads.
6. **Prepare costing and profit statements with absorption costing.**
7. **Calculate contribution**, per unit and in total.
8. **Read a break-even chart** (you will never be asked to draw one).
9. **Calculate the break-even point, the contribution to sales (C/S) ratio, the output or sales needed for a target profit, and the margin of safety.**
10. **Prepare costing and profit statements with marginal costing**, and a **statement reconciling** the marginal and absorption profits.
11. **Use marginal costing to make decisions:** make or buy, special orders, closing part of a business, a scarce resource (limiting factor) and a target profit.
12. **Give the uses and limitations** of absorption costing, marginal costing, break-even analysis and cost-volume-profit (CVP) analysis, and how useful each is for managers' decisions.
13. **Weigh non-financial factors** and make a recommendation backed by the figures.

Understand it

Two questions every business asks

A business needs to know **what a product costs**, so it can set a price and value its inventory, and **what happens to profit if it sells more or fewer**, so it can make decisions. Traditional costing answers these in two ways:

- **Absorption costing** gives each unit a share of **all** production costs, fixed and variable. It answers "what does one unit cost?".

- **Marginal costing** charges units with **variable** costs only and treats fixed costs as a cost of the **period**. It answers "what extra profit does one more unit bring?".

This topic builds on fixed, variable, direct and indirect costs from Costs and cost behaviour.

Cost centres and cost units

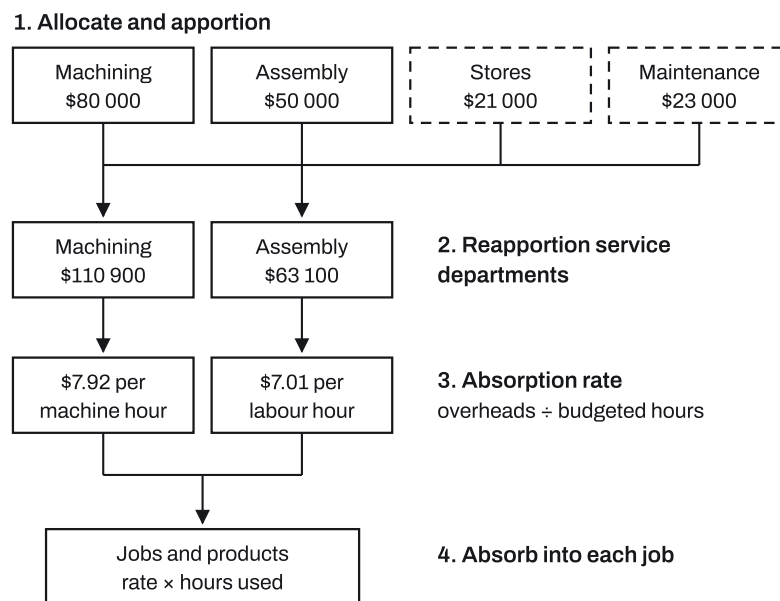
A **cost unit** is the thing you want the cost of: one chair, a batch of 500 cans, one job, one hour of a consultant's time, one room-night. A **cost centre** is a place or function where costs are collected: the machining department, the stores, the canteen.

The way you cost depends on what the business makes:

- **Unit costing**: many identical items in a continuous process (cement, bottled water). Total cost ÷ units.
- **Job costing**: each order is different and made to the customer's specification (a building, a wedding dress, a repair). Each job gets its own **job cost sheet** listing its materials, labour and overheads, and the business uses it to work out the price to quote.
- **Batch costing**: a quantity of identical items made together (5 000 bricks, 1 000 muffins). Cost the whole batch, including set-up costs, then divide by the number in it.
- **Service costing**: the cost unit is a service measure, such as a chargeable hour or an occupied bed per night.

Absorption costing: getting overheads into products

Direct materials and direct labour can be traced to each unit. Production **overheads** (factory rent, supervisors, power, depreciation) cannot, so they reach the product in four stages.



1. **Allocate**: a cost that belongs wholly to one department goes straight to it (the machining supervisor's salary goes to machining).
2. **Apportion**: a shared cost is split between departments on a fair basis, one that reflects what drives the cost.

Overhead	Fair basis
Rent, rates, heating, lighting, building insurance	Floor area
Depreciation and insurance of machinery	Cost or carrying value of machinery
Power	Machine hours or kWh used
Canteen, personnel, supervision shared by all	Number of employees
Stores	Number of requisitions (issues)
Maintenance	Number of call-outs, maintenance hours or machines

3. **Reapportion** the **service departments** (stores, maintenance, canteen) to the **production departments**.

Products only pass through production departments, so all overheads must end up there. If one service department also serves the other, reapportion that one first, including its share to the second service department, then reapportion the second.

4. **Absorb**: divide each production department's budgeted overheads by its budgeted activity to get an **overhead absorption rate**, and charge every product with the rate times the hours it uses.

$$\text{OAR} = \frac{\text{budgeted overheads of the department}}{\text{budgeted activity (hours or units)}}$$

Choose the basis that drives the department's costs: **machine hours** for a machine-intensive (capital-intensive) department, **labour hours** for a labour-intensive one. In practice, the department's larger hours figure tells you which it is. Per unit is only fair if every unit is identical. The rate is set **in advance from budgets**, because prices must be quoted before the year's actual costs are known.

Under- and over-absorption

During the year, products absorb overheads at the **budgeted** rate times the **actual** hours worked. The overheads actually incurred are almost never exactly this.

$$\text{absorbed} = \text{OAR} \times \text{actual activity}$$

- **Under-absorbed**: absorbed is **less** than actual overheads. Causes: actual activity was **lower** than budgeted, or actual overheads were **higher** than budgeted. Products were undercharged, so the shortfall is **added** to cost of sales and profit falls.
- **Over-absorbed**: absorbed is **more** than actual overheads. Causes: activity was higher than budgeted, or overheads were lower. The excess is **deducted** from costs and profit rises.

For example, a department budgets \$90 000 of overheads over 6 000 labour hours, so the OAR is \$15 per labour hour. It actually works 6 300 hours and spends \$97 000. Absorbed = $15 \times 6\,300 = 94\,500$, which is \$2 500 **less** than was spent: \$2 500 under-absorbed.

Absorption costing statements

Under absorption costing, a unit's cost is direct materials + direct labour + variable production overheads + **fixed production overheads at the OAR**. Closing inventory is valued at this **full production cost**, and the fixed production overheads in it are carried forward to the next period. Selling, distribution and administration costs are not part of

production cost, so they never go into cost of sales or inventory; they are period expenses under both methods. But when a question asks for the **total cost** (or "total absorption cost per unit") of a product or job, add them too, if it gives them.

Uses: it is required for inventory in published financial statements (IAS 2), it follows the matching (accruals) principle, it makes sure the price covers **all** costs in the long run, so it suits pricing and long-term decisions, and it makes managers look at overheads.

Limitations: apportionment bases are arbitrary, so unit costs are only estimates; it needs a lot of calculation; fixed costs per unit change with output, so it misleads short-term decisions; profit can be raised simply by producing more than is sold; and budgeted rates lead to under- or over-absorption.

Marginal costing and contribution

The **marginal cost** of a unit is its variable cost: direct materials, direct labour, variable production overheads and any variable selling costs such as sales commission. **Contribution** is what is left from the selling price to pay the fixed costs and then make profit:

$$\text{contribution per unit} = \text{selling price} - \text{variable cost per unit}$$

$$\text{profit} = \text{total contribution} - \text{total fixed costs}$$

Total fixed costs stay the same whatever the output (within the relevant range), so every extra unit sold adds its contribution to profit. Fixed costs, **including fixed production overheads**, are charged in full to the period, and closing inventory is valued at **variable production cost** only.

Uses: it suits short-term decisions (special orders, make or buy, closure, limiting factors), fixed costs are not spread arbitrarily, profit moves with **sales** and cannot be raised just by building inventory, and it feeds break-even analysis.

Limitations: it is not allowed for inventory in published financial statements, splitting semi-variable costs into fixed and variable parts may be hard, and prices set on marginal cost may not cover fixed costs in the long run.

Why the two profits differ

The only difference is the **fixed production overhead in inventory**. When inventory **rises** (production > sales), absorption costing carries some of this period's fixed overheads forward in closing inventory, so absorption profit is **higher**. When inventory falls, absorption profit is lower. When production equals sales, the profits are the same.

$$\text{absorption profit} - \text{marginal profit} = (\text{closing} - \text{opening inventory in units}) \times \text{fixed production OAR per unit}$$

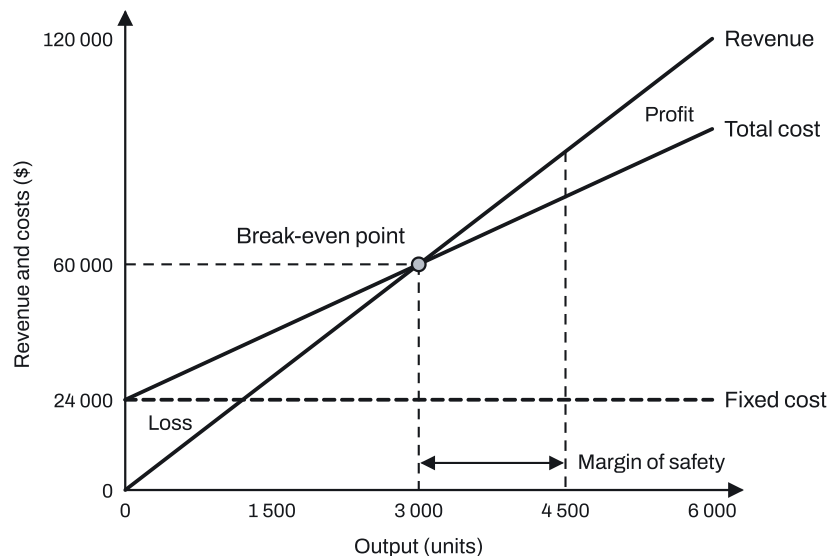
Break-even and CVP analysis

Cost-volume-profit (CVP) analysis looks at how profit changes with output. The **break-even point** is where total contribution just covers fixed costs, so profit is zero:

$$\text{break-even (units)} = \frac{\text{total fixed costs}}{\text{contribution per unit}} \quad \text{break-even (revenue)} = \frac{\text{total fixed costs}}{\text{C/S ratio}}$$

where the **contribution to sales ratio** is $\text{C/S} = \frac{\text{contribution}}{\text{sales}}$ (per unit or in total; it is the same). Use C/S when you only have totals in dollars, or several products sold in a fixed mix.

The **margin of safety** is how far budgeted (or actual) sales could fall before the business makes a loss: budgeted sales – break-even sales, in units, dollars, or as a percentage of budgeted sales.



Reading the chart: the **fixed cost line** is flat; the **total cost line** starts where the fixed cost line meets the vertical axis and rises by the variable cost per unit; the **revenue line** starts at the origin. Where revenue crosses total cost is the break-even point. The vertical gap between the two lines is the profit (right of break-even) or the loss (left). With these numbers: contribution is \$8 a unit ($20 - 12$), break-even is 3 000 units ($24\,000 \div 8$) or \$60 000, and at the budgeted 4 500 units the margin of safety is 1 500 units (33.3%) and profit is \$12 000 ($1\,500 \times 8$).

CVP assumes: costs split cleanly into fixed and variable; total fixed costs stay constant over the range; selling price and variable cost **per unit** stay constant, so every line is straight; there is one product, or a constant mix of products; everything produced is sold (no change in inventory); and output is the only thing that changes costs and revenue.

Uses: quick "what if" answers (a price cut, a cost rise, a new machine), target profits, margin of safety as a measure of risk, and a picture that non-accountants understand.

Limitations: the assumptions rarely hold for long: bulk discounts or overtime bend the variable cost line, selling price usually has to fall to sell more, fixed costs step up at higher output, and most businesses sell many products in a changing mix. It is a short-term tool and ignores non-financial factors.

Decisions with marginal costing

The rule is: **only costs and revenues that change because of the decision count**. Fixed costs that will be paid anyway are ignored; extra fixed costs caused by the decision (a new machine, retraining, extra advertising) are included.

- **Special order at a lower price:** if there is spare capacity, accept when the order's contribution is more than any extra costs it causes.
- **Make or buy:** compare the buying price with the **variable** cost of making, plus any fixed costs that would be saved by buying.
- **Closing a product or department:** close only if its **contribution** is less than the fixed costs that closing would actually save. A product can show a "loss" after apportioned fixed costs and still add to total profit.

- **Limiting factor:** when a resource (material, labour hours, machine hours) is too scarce to meet all demand, rank products by **contribution per unit of the scarce resource**, not by contribution per unit.
- **Target profit:** units needed = $(\text{fixed costs} + \text{target profit}) \div \text{contribution per unit}$.

Non-financial factors often decide close cases: effects on employees (redundancy, morale, overtime willingness, retraining), customers (existing customers learning of a lower price, losing customers who buy several products), suppliers (reliability, quality, delivery times), reputation and brand, whether the extra output can really be sold, whether the forecasts are reliable, and for overseas deals, exchange rates and import taxes.

Key facts and formulas

There is no formula list in the 9706 exam, so learn all of these.

Formula	Status
$\text{OAR} = \text{budgeted department overheads} \div \text{budgeted activity (labour hours, machine hours or units)}$	Learn it
$\text{Overheads absorbed} = \text{OAR} \times \text{actual activity}$	Learn it
Under-absorbed if absorbed < actual overheads; over-absorbed if absorbed > actual overheads	Learn it
$\text{Apportioned share} = \text{cost} \times \text{department's share of the basis} \div \text{total of the basis}$	Learn it
$\text{Absorption production cost per unit} = \text{direct materials} + \text{direct labour} + \text{variable production overheads} + \text{fixed production overhead at the OAR}$	Learn it
$\text{Total cost per unit} = \text{production cost per unit} + \text{selling, distribution and administration costs per unit}$	Learn it
$\text{Contribution per unit} = \text{selling price} - \text{variable cost per unit}$	Learn it
$\text{Profit} = \text{total contribution} - \text{total fixed costs}$	Learn it
$\text{C/S ratio} = \text{contribution} \div \text{sales revenue}$	Learn it
$\text{Break-even point (units)} = \text{total fixed costs} \div \text{contribution per unit (round up)}$	Learn it
$\text{Break-even revenue} = \text{total fixed costs} \div \text{C/S ratio}$	Learn it
$\text{Target output} = (\text{total fixed costs} + \text{target profit}) \div \text{contribution per unit}$; $\text{target revenue} = (\text{fixed costs} + \text{target profit}) \div \text{C/S}$	Learn it
$\text{Margin of safety} = \text{budgeted sales} - \text{break-even sales}$; as a % = $\text{margin of safety} \div \text{budgeted sales} \times 100$	Learn it

Formula	Status
Absorption profit – marginal profit = increase in inventory (units) × fixed production OAR per unit	Learn it
Profit from a mark-up of $m\%$: $\text{cost} \times m\%$; from a margin of $m\%$: $\text{cost} \times \frac{m}{100 - m}$	Learn it
Limiting factor: rank by contribution ÷ units of the scarce resource per product	Learn it

How to do it

We have tagged 260 questions on this topic from 2021–2025 (253 different; 7 were repeated across paper variants). Papers 11–13 ask it in 1-mark multiple-choice questions (usually Q22–Q30). Papers 21–23 give it the whole 30-mark Question 4, which usually runs apportion → absorption rate → under/over-absorption → price an order, then a marginal costing statement for two options and a recommendation, or break-even first and then options. Those long questions mix types, so 37 questions count under more than one type and the counts add up to more than 260.

Question type	Questions
Break-even, C/S ratio, margin of safety and target profit	80
Under- and over-absorption of overheads	41
Contribution and marginal costing profit statements	38
Cost and price a job, batch, order or service	38
Explain absorption vs marginal costing (features, uses, limitations, cost centre and unit)	35
Calculate an overhead absorption rate	30
Evaluate options, special orders, make or buy or closure: calculate and advise	30
CVP assumptions, uses and limitations	28
Allocate, apportion and reapportion overheads	26
Limiting factor: rank products and find the best plan	16
Explain or reconcile absorption and marginal profits	11
Prepare an absorption costing profit statement or full unit cost	5

The sections below keep the most common types first but group related ones: break-even and CVP (1), the absorption costing chain (2–5), marginal costing and decisions (6–9), and comparing the two methods (10–12).

1. Break-even, C/S ratio, margin of safety and target profit (80 questions)

- Find contribution per unit:** selling price minus **every** variable cost, including variable selling costs such as commission. Leave out all fixed costs, even when a table shows a "fixed cost per unit".
- Find total fixed costs:** production **and** non-production (administration, selling) fixed costs.
- Divide:** break-even units = fixed costs ÷ contribution per unit, rounded **up** to a whole unit (3 333.3 units means 3 334: 3 333 would still make a loss). Break-even revenue = fixed costs ÷ C/S ratio, or break-even units × price.

4. **Margin of safety:** budgeted sales — break-even sales, in the unit the question asks for; as a percentage, divide by budgeted sales.
5. **Target profit:** add the target profit to the fixed costs, then divide as in step 3.

Variations you will meet:

- **Only totals are given.** Total contribution = sales — variable costs, or = fixed costs + profit. For example, fixed costs of \$150 000 and profit of \$90 000 mean contribution of \$240 000. Then C/S = contribution ÷ sales, and break-even revenue = fixed costs ÷ C/S. If you know total costs, variable costs = total costs — fixed costs.
- **A statement laid out with gross profit.** Move the fixed production costs out of cost of sales: contribution = sales — variable costs only, and fixed costs = fixed production + fixed administration.
- **A change:** a price cut, a rise in variable cost or a new fixed cost. Work out the **new** contribution or fixed costs and redo the division. Price or variable cost changes move contribution per unit; a fixed cost change only moves the top line. A higher break-even point means a smaller margin of safety.
- **Profit at another output:** profit = (units — break-even units) × contribution per unit, or contribution — fixed costs.
- **Working backwards:** from break-even units and C/S, find the price and the fixed costs (fixed = break-even units × contribution per unit).
- **Services:** the unit is a chargeable hour, a student or a room. A consultancy charging \$80 an hour with variable costs of \$30 an hour and fixed costs of \$40 000 breaks even at 800 chargeable hours ($40\,000 \div 50$).
- **A price for a target C/S ratio:** with variable cost of \$24 and a target C/S of 40%, variable cost is 60% of the price, so the price is \$40 ($24 \div 0.6$).
- **Semi-variable costs:** split them with the high-low method first (Costs and cost behaviour).
- **Reading a chart:** see the break-even chart in "Understand it". Know which line is which, where the break-even point is, and that the profit is the gap between revenue and total cost.
- **Definitions:** contribution, break-even point (total contribution equals total fixed costs; revenue equals total cost), margin of safety.

2. Under- and over-absorption of overheads (41 questions)

1. **Find the OAR** from **budgeted** overheads and **budgeted** activity (or use the one given).
2. **Absorbed** = OAR × **actual** activity.
3. **Compare** with **actual** overheads and label it: absorbed less than actual is **under**-absorbed; absorbed more than actual is **over**-absorbed. Give the amount and the label; a figure without "under" or "over" loses a mark.

Variations you will meet:

- **Working backwards:** actual overheads = absorbed + under-absorption, or absorbed — over-absorption. For example, with an OAR of \$15, 5 800 actual hours and \$1 200 over-absorbed, absorbed is \$87 000 and actual overheads were \$88 200. Or find actual hours = (actual overheads ± the difference) ÷ OAR.
- **"State two causes":** under-absorption comes from actual activity (hours or output) **below** budget, or actual overheads **above** budget; over-absorption from the reverse. Be specific: "costs went up" earns less than "actual overheads were higher than budgeted".
- **Effect on profit:** under-absorption is charged as an extra expense and reduces profit; over-absorption is credited and increases it.
- **Two departments:** work each on its own basis (machine hours in one, labour hours in the other), using the actual hours on that basis.

3. Calculate an overhead absorption rate (30 questions)

1. Take each production department's total overheads **after** reapportionment.
2. **Choose the basis:** machine hours if the department is machine-intensive (more machine hours than labour hours), labour hours if labour-intensive. Say which you used.
3. Divide by the **budgeted** hours and give the rate to two decimal places, labelled "per machine hour" or "per labour hour".

Variations you will meet:

- **Overhead per unit of each product:** a factory-wide labour-hour rate, then hours per unit $\times$ rate. With \$52 000 of overheads, product P (4 000 units $\times$ 2 hours) and product Q (3 000 units $\times$ 1.5 hours) need 12 500 hours in total, so the OAR is \$4.16 per labour hour: \$8.32 for each P and \$6.24 for each Q. Total absorbed by a product = units $\times$ overhead per unit.
- **Actual figures are distractors:** the rate always uses budgeted overheads and budgeted hours.
- **Only production overheads** go into the OAR: leave out selling and administration costs.
- **Backing out the OAR** from a selling price: work back from price to total cost (Type 5), subtract direct costs to find the overhead, then divide by the hours.
- **Departmental or factory-wide rate?** Separate rates for each department are more accurate when departments use different amounts of machine and labour time; a single rate is simpler.

4. Allocate, apportion and reapportion overheads (26 questions)

1. **Start from the allocated overheads** already in each department. Keep them in; forgetting them is a common error.
2. **Apportion each shared cost** on its basis: share = cost $\times$ department's figure $\div$ total of the basis. Include service departments in the split if they use the resource.
3. **Total each department.**
4. **Reapportion the service departments** in the order given. If stores serves maintenance, reapportion stores first (with a share to maintenance), then reapportion maintenance's **new** total to the production departments only. Show each service department's total being removed in brackets, for example (22 500), so its column ends at zero.
5. **Check:** the production departments' final totals add up to the original total of all overheads.

Variations you will meet:

- **Choosing a basis** (multiple choice): match the cost to what drives it (the table in "Understand it"). Rent goes on floor area; stores on requisitions; canteen on employees.
- **Allocation vs apportionment:** allocation charges a whole cost to one cost centre; apportionment shares a common cost between several.
- **Why reapportion service departments:** products do not pass through them, so their costs must be moved to production departments for the OARs to recover **all** overheads in product costs and prices.
- **Percentage splits** (for example "maintenance: 60% machining, 30% assembly, 10% stores") work the same way.

5. Cost and price a job, batch, order or service (38 questions)

1. **Direct materials:** quantity $\times$ price, after any trade discount.

2. **Direct labour:** hours in each department × that department's rate. Add any overtime premium caused by the job.
3. **Overheads:** for each department, that job's hours **on that department's basis** × its OAR (machine hours in a machine-hour department).
4. **Total cost** = 1 + 2 + 3.
5. **Profit and price.** Read the wording:
 - a **mark-up** of 25% is on **cost**: profit = 25% of cost;
 - a **margin** of 25% is on **selling price**: cost is 75% of the price, so price = cost ÷ 0.75 and profit = cost × $\frac{25}{75}$.
 For a cost of \$600, a 25% mark-up gives \$750 and a 25% margin gives \$800.

Variations you will meet:

- **Batch costing:** cost the whole batch including set-up, then divide. A batch of 500 units with materials \$1 200, labour \$400, set-up \$150 and overheads \$250 costs \$2 000, which is \$4 a unit.
- **Service costing:** hours × hourly rate + overheads per hour + mark-up; or total cost ÷ the service units (for a hotel, occupied room-nights = rooms × occupancy % × nights).
- **Deriving a labour rate** from a budget: budgeted wages ÷ budgeted labour hours.
- **Extra costs of the job:** travel (distance × rate for **each** journey), delivery, special fittings.
- **Selling and distribution overheads:** if the question gives a rate for them (for example a % of production cost), add them to reach the job's **total cost** before the mark-up or margin.
- **Actual profit** on a job that overran its hours: the price is fixed, so extra hours cut profit.
- **Which method** (multiple choice): job for one-off, made-to-order work (a ship, a building, a bridal dress); batch for groups of identical items (shoes, car parts, bread); unit for continuous identical output (paint, oil). A job cost sheet is used to find the price to quote.

6. Contribution and marginal costing profit statements (38 questions)

Lay the statement out under clear headings:

	\$
Revenue (units sold × price)	...
Less direct materials	(...)
Less direct labour	(...)
Less variable overheads and variable selling costs (commission)	(...)
Contribution	...
Less fixed costs	(...)
Profit	...

1. Work out every variable cost per unit, applying any change in the question (a % price rise, a new material price, a labour rate increase).
2. Multiply each by the units **sold** (or by the units produced, less closing inventory at variable cost, if there is inventory).

3. Take all fixed costs off **after** contribution. Commission and other variable selling costs go **before** contribution.

Variations you will meet:

- **Per-unit layout:** selling price – variable costs = contribution per unit, × units, – fixed costs. Both layouts earn the marks.
- **Two products side by side:** a column each, then a total column.
- **"Fixed costs are absorbed at \$x per batch based on normal activity of n batches":** total fixed costs are $x \times n$ whatever the actual activity. Under marginal costing, charge that total in full.
- **What is in marginal cost** (multiple choice): direct materials, direct labour and variable overheads; never fixed production costs.
- **Closing inventory** under marginal costing is valued at variable production cost per unit.

7. Evaluate options, special orders, make or buy or closure (30 questions)

This is the end of almost every Paper 2 Question 4.

1. **Build a marginal costing statement for each option** (or for the change), for one month or whatever period is asked. Include only what changes, and every change:
 - price changes in % (\$64 up 5% is \$67.20);
 - trade discounts: find the **list price** first. A price of \$36 after a 10% discount means a list price of \$40 ($36 \div 0.9$); a 15% discount then gives \$34;
 - overtime premium only on hours or units **above** normal capacity;
 - commission in tiers (one rate up to a level, another above it);
 - new fixed costs caused by the option: monthly depreciation of new machines, loan interest, retraining, extra advertising; fixed costs saved (a cancelled contract, fewer deliveries);
 - capacity as a percentage: if 14 000 units is 70% of capacity, capacity is 20 000 units;
 - a **settlement (cash) discount** offered to customers for paying early: take the discount % off the revenue of the customers expected to use it (sales of \$50 000 with a 2% discount taken by half the customers lose \$500). In the advice, weigh the faster cash inflow and fewer irrecoverable debts against the lost revenue, and compare the credit terms;
 - **one-off costs** such as retraining, or writing off the carrying value of old machinery that will no longer be used: charge them **in full in the first month** only, so the first month's profit is lower than later months'.
2. **Compare the profits** (or the extra profit from the change).
3. **Advise:** give points **for** and **against** (financial and non-financial), then a clear decision with a reason.

Special order: with spare capacity, the extra profit is the order's contribution less its extra costs. An order for 2 000 units at \$22 when variable cost is \$18 and delivery costs \$1 500 adds \$6 500 ($2\,000 \times 4 - 1\,500$). Existing fixed costs are ignored.

A special order below variable cost (negative contribution) may still be accepted: to keep skilled workers employed through a quiet spell, to win a new customer or market and later orders at a better price, to keep an important customer who also buys other products, or to use up materials that would otherwise be wasted.

Closure: a product with contribution of \$12 000 and apportioned fixed costs of \$15 000 shows a "loss" of \$3 000. If the fixed costs stay when it closes, closing it **reduces** total profit by \$12 000.

Make or buy: buy only if the price is below the variable cost of making (plus any fixed cost saved), and consider quality, reliability and what the freed capacity could do.

Points to use in advice (choose the ones that fit the facts): higher or lower profit (use your figures); spare capacity used, keeping machines and workers busy and avoiding redundancy; further orders or a new market; existing customers may demand the same lower price; can the extra output be sold? will workers accept overtime or retraining? supplier reliability, quality and delivery; storage costs; exchange rates and import taxes; are the forecasts reliable? effect on reputation, morale and brand.

8. CVP assumptions, uses and limitations (28 questions)

Nearly every multiple-choice paper ends with one. Learn the list in "Understand it". The traps:

- **True assumptions:** total fixed costs constant; selling price per unit constant; variable cost per unit constant; single product or constant sales mix; costs can be split into fixed and variable; production equals sales.
- **Not assumptions:** "fixed cost **per unit** is constant" (it falls as output rises), "sales volume is constant" (volume is the thing that varies), "costs are split into fixed, semi-variable and variable" (semi-variable costs must be split first).
- **Limitation examples:** bulk-buying discounts mean the variable cost line is not straight; a multi-product business with a changing mix.
- **Uses:** short-term planning and what-if questions such as a price cut; setting a target; measuring risk with the margin of safety. It does **not** value inventory or give long-term plans.

9. Limiting factor: rank products and find the best plan (16 questions)

1. **Check it is limiting:** resource needed for full demand (units × resource per unit, summed) against resource available.
2. **Contribution per unit** for each product.
3. **Resource per unit:** if only its cost is given, divide by the price (\$18 of material at \$6 per kg is 3 kg).
4. **Contribution per unit of the scarce resource** = contribution ÷ resource per unit. Rank from highest.
5. **Fill demand in rank order** until the resource runs out; the last product gets what is left.
6. **Total contribution – fixed costs** = profit.

Ignore any "profit per unit" after fixed overheads: fixed costs do not change with the mix. A follow-up often offers more of the resource at a higher price or through overtime: the extra units are of the **lowest-ranked** product, and each earns its contribution less the extra cost. Example 4 works one through.

10. Explain absorption vs marginal costing (35 questions)

For a 2- or 4-mark "explain two differences", make each point a pair: what one method does, **whereas** what the other does.

- Absorption charges **fixed and variable** production costs to units; marginal charges **variable** costs only and treats fixed costs as period costs.
- Absorption classifies costs by **function** (direct and indirect, production and non-production); marginal by **behaviour** (fixed and variable).
- Absorption values inventory at full production cost, as IAS 2 requires for published accounts; marginal at variable cost, for internal use.

- Absorption suits **long-term** decisions and pricing; marginal suits **short-term** decisions (special orders, make or buy, limiting factor).
- Absorption needs allocation, apportionment and an OAR, so it can under- or over-absorb; marginal does not.

Define precisely: **cost centre** (a location or function where costs are collected) and **cost unit** (a unit of product or service that is costed). Multiple-choice items test which method gives higher profit when inventory rises (absorption) and which is required for financial statements (absorption).

11. Explain or reconcile absorption and marginal profits (11 questions)

1. **Fixed production OAR per unit** = budgeted fixed production overheads ÷ budgeted production units.
2. **Change in inventory** = closing – opening units.
3. **Difference** = change × OAR per unit. Absorption profit = marginal profit + that difference (a negative change makes absorption profit lower).
4. For a reconciliation statement: marginal profit, add fixed overheads in closing inventory, less fixed overheads in opening inventory, = absorption profit.

Working backwards: OAR per unit = difference in profits ÷ change in inventory units. To explain the difference in words: it is caused by the valuation of inventory, because absorption costing includes fixed production overheads in it and carries them into the next period.

12. Prepare an absorption costing profit statement or full unit cost (5 questions)

1. Revenue = units sold × price.
2. **Cost of production** = variable production costs of units **produced** + fixed production overheads.
3. **Less closing inventory** at full cost per unit (= cost of production ÷ units produced, if there is no opening inventory).
4. Cost of sales, then gross profit; then subtract non-production costs (selling, administration) to get profit. If there is under- or over-absorption, adjust cost of sales for it.

Read which cost is asked for:

- **Production cost per unit** (used for cost of sales and inventory): direct materials, direct labour and production overheads only.
- **Total cost** or **total absorption cost per unit**: production cost **plus** selling, distribution and administration costs (fixed and variable) when the question gives them. For example, 1 000 units with production costs of \$20 000 and selling costs of \$3 000 have a production cost of \$20 a unit but a total cost of \$23 a unit.

Worked examples

The bold codes show where marks are earned, as in Cambridge mark schemes. The number is how many marks.

- **M1** method mark: for a correct method, even if the numbers slip.
 - **A1** accuracy mark: for a correct answer; it needs the M mark before it.
 - **B1** mark for a correct result on its own, with no method needed.
-

Example 1

Kemi makes a single product. The budget for next month is:

per unit	\$
Selling price	45
Direct materials	12
Direct labour	9
Variable production overheads	3
Sales commission	3

Fixed production overheads are \$54 000 and fixed administration costs are \$18 000 a month. Budgeted sales are 5 000 units.

(a) Calculate the contribution per unit and the contribution to sales ratio. **[2]**

(b) Calculate the break-even point in units and in dollars. **[3]**

(c) Calculate the margin of safety in units and as a percentage of budgeted sales. **[2]**

(d) Calculate the number of units Kemi must sell to make a profit of \$27 000. **[2]**

(e) Kemi plans to cut the selling price by 10% to win customers. Calculate the new break-even point in units, and comment on it. **[3]**

(a) Variable cost = $12 + 9 + 3 + 3 = 27$, so contribution = $45 - 27 = 18$: \$18 per unit (**B1**). C/S = $18 \div 45 = 40\%$ (**B1**).

(b) Fixed costs = $54\,000 + 18\,000 = 72\,000$ (**B1**). Break-even = $72\,000 \div 18 = 4\,000$ units (**B1**), which is \$180 000 ($72\,000 \div 0.4$) (**B1** own figure).

(c) Margin of safety = $5\,000 - 4\,000 = 1\,000$ units (**B1**), or $1\,000 \div 5\,000 = 20\%$ (**B1** own figure).

(d) $(72\,000 + 27\,000) \div 18 = 5\,500$ units (**M1 A1**).

(e) New price = $45 \times 0.9 = 40.50$; contribution = $40.50 - 27 = 13.50$ (**B1**). Break-even = $72\,000 \div 13.50 = 5\,333.3$, so **5 334 units (M1 A1, rounded up)**. This is above the budgeted 5 000 units: at 5 000 units Kemi would make a loss of \$4 500 ($5\,000 \times 13.50 - 72\,000 = -4\,500$). Sales must rise by 334 units, about 6.7%, just to break even, and by a third, to 6 667 units, to keep the budgeted profit of \$18 000.

Example 2

T Limited has two production departments, Machining and Assembly, and two service departments, Stores and Maintenance. Budgeted information for the year:

	Machining	Assembly	Stores	Maintenance
Allocated overheads (\$)	64 000	38 000	15 000	21 000
Floor area (m ²)	400	300	150	50

	Machining	Assembly	Stores	Maintenance
Stores requisitions	500	300	–	200
Maintenance call-outs	60	20	–	–
Machine hours	14 000	2 500	–	–
Labour hours	5 000	9 000	–	–

Factory rent of \$36 000 has not yet been apportioned. Stores are reapportioned first.

- (a) Prepare a statement of overheads for each production department. [6]
- (b) Calculate, to two decimal places, a suitable overhead absorption rate for each production department. [4]
- (c) During the year Assembly worked 9 400 labour hours and its overheads were \$64 500. Calculate the under- or over-absorption for Assembly. [3]
- (d) A job needs materials of \$860, 12 labour hours in Machining at \$15 an hour, 20 labour hours in Assembly at \$14 an hour, and 30 machine hours in Machining. T Limited prices jobs to give a margin of 25% on the selling price. Calculate the price of the job. [5]

(a) Rent on floor area: $36\,000 \div 900 = 40$, so \$40 per m² (M1).

	Machining	Assembly	Stores	Maintenance
Allocated	64 000	38 000	15 000	21 000
Rent	16 000	12 000	6 000	2 000
Total	80 000	50 000	21 000	23 000
Stores (500 : 300 : 200)	10 500	6 300	(21 000)	4 200
			–	27 200
Maintenance (60 : 20)	20 400	6 800		(27 200)
Total	110 900	63 100	–	–

A1 rent row, **M1 A1** stores row including the share to Maintenance, **A1** maintenance row, **A1** totals. Check: $110\,900 + 63\,100 = 174\,000 = 138\,000 + 36\,000$.

(b) Machining is machine-intensive: $110\,900 \div 14\,000 = 7.92$, so \$7.92 per machine hour (**B1 B1**). Assembly is labour-intensive: $63\,100 \div 9\,000 = 7.01$, so \$7.01 per labour hour (**B1 B1**). One mark each for the rate, one for the right basis.

(c) Absorbed = $7.01 \times 9\,400 = 65\,894$ (**M1**). That is more than the \$64 500 spent, so **over-absorbed (B1)** by \$1 394 (**A1**).

(d)

	\$
Direct materials	860.00
Direct labour: Machining 12×15	180.00

	\$
Direct labour: Assembly 20×14	280.00
Overheads: Machining 30×7.92 (machine hours)	237.60
Overheads: Assembly 20×7.01 (labour hours)	140.20
Total cost	1 697.80
Profit $1\,697.80 \times \frac{25}{75}$	565.93
Selling price	2 263.73

B1 labour, **B1** each overhead line (own rates), **M1** for turning a margin into $\frac{25}{75}$ of cost, **A1** price. A 25% **mark-up** would wrongly give \$2 122.25.

Example 3

Leo's factory makes one product. In its first month it produced 6 000 units and sold 5 000 at \$30 each. Costs were:

- variable production cost \$14 per unit;
- variable selling cost \$1 per unit sold;
- fixed production overheads \$36 000 (absorbed on a budgeted output of 6 000 units);
- fixed administration costs \$20 000.

(a) Prepare a statement showing the profit for the month using marginal costing. [5]

(b) Prepare a statement showing the profit for the month using absorption costing. [5]

(c) Reconcile the two profits. [2]

(a) Marginal costing statement

	\$	\$
Revenue $5\,000 \times 30$		150 000
Variable production cost $6\,000 \times 14$	84 000	
Less closing inventory $1\,000 \times 14$	(14 000)	
Variable cost of sales		(70 000)
Variable selling cost $5\,000 \times 1$		(5 000)
Contribution		75 000
Fixed production overheads		(36 000)
Fixed administration		(20 000)
Profit		19 000

B1 revenue, **B1** closing inventory at variable cost, **B1** selling cost before contribution, **B1** contribution, **B1** profit.

(b) Fixed OAR = $36\,000 \div 6\,000 = 6$ per unit, so full production cost is $14 + 6 = 20$ per unit (**B1**).

	\$	\$
Revenue		150 000
Variable production cost	84 000	
Fixed production overheads	36 000	
	120 000	
Less closing inventory $1\,000 \times 20$	(20 000)	
Cost of sales		(100 000)
Gross profit		50 000
Variable selling cost		(5 000)
Fixed administration		(20 000)
Profit		25 000

B1 cost of production, **B1** closing inventory at full cost, **B1** cost of sales, **B1** profit (own figures).

(c) Marginal profit \$19 000, plus the fixed overheads carried forward in closing inventory, \$6 000 ($1\,000 \times 6$), gives absorption profit \$25 000 (**M1 A1**). Inventory rose, so absorption profit is higher.

Example 4

R Limited makes three products using the same material, which costs \$6 per kg. Fixed costs are \$50 000 a month.

per unit	P	Q	R
Selling price (\$)	70	90	55
Direct materials (\$)	18	30	12
Direct labour (\$)	16	20	18
Variable overheads (\$)	4	6	5
Monthly demand (units)	1 000	800	1 200

Only 8 000 kg of material is available next month.

(a) Show that material is a limiting factor. **[2]**

(b) Calculate the production plan that maximises profit, and that profit. **[7]**

(c) Another supplier offers 1 400 kg more at \$9 per kg. Calculate the effect on profit of buying it. **[3]**

(d) Advise the directors whether to buy from the second supplier. **[4]**

(a) Kilograms per unit: $P\ 18 \div 6 = 3$, $Q\ 30 \div 6 = 5$, $R\ 12 \div 6 = 2$ (**M1**). Needed: $3\,000 + 4\,000 + 2\,400 = 9\,400$ kg, more than the 8 000 kg available (**A1**).

(b)

	P	Q	R
Contribution per unit (\$)	32	34	20
Contribution per kg (\$)	10.67	6.80	10.00
Rank	1	3	2

B1 contributions, **M1 A1** per kg, **A1** ranking. Q has the largest contribution per unit but earns the least per kg of scarce material, so it comes last.

P: 1 000 units use 3 000 kg; R: 1 200 units use 2 400 kg; that leaves 2 600 kg for $2\,600 \div 5 = 520$ units of Q (**M1**).

Contribution = $1\,000 \times 32 + 1\,200 \times 20 + 520 \times 34 = 32\,000 + 24\,000 + 17\,680 = 73\,680$; profit = $73\,680 - 50\,000 = 23\,680$, that is \$23 680 (**A1 A1**).

(c) The extra material makes $1\,400 \div 5 = 280$ more units of Q, the lowest-ranked product with unmet demand (**M1**). Each uses 5 kg costing \$3 more than normal, so its contribution is $34 - 15 = 19$ dollars (**M1**). Profit rises by $280 \times 19 = 5\,320$, that is \$5 320, to \$29 000 (**A1**).

(d) For: profit rises by \$5 320; all demand for Q is met, so customers are not turned away or lost to competitors; spare labour and machine time is used. Against: a new supplier's quality and reliability are unknown; it may be a one-off, and the higher price could spread to the normal supplier; the \$9 price may rise. Decision: buy it, since it adds \$5 320 a month and keeps Q's customers, but check the quality first (**1** for each valid point, **1** for a decision with a reason).

Common mistakes

- **Leaving the allocated overheads out** of the apportionment table, or spreading a production department's own cost (its supervisor) over all departments. Allocated costs stay where they are; only shared costs are apportioned.
- **Taking service department costs away from production departments** instead of adding them in. Reapportionment moves cost **into** production departments; the service column goes to zero.
- **Rates not to two decimal places, or with no basis.** Examiners expect "\$7.92 per machine hour", not "7.9".
- **Using actual figures for the OAR.** The rate comes from budgets; actual hours are used only to work out the amount absorbed.
- **Vague causes of under-absorption.** "Costs changed" earns nothing. Say actual activity was below budget, or actual overheads were above budget.
- **Confusing margin and mark-up.** This is the most common error in pricing an order: a margin is a percentage of the **selling price**.
- **Putting commission or other variable selling costs after contribution.** They are variable, so they come **before** contribution.
- **Not rounding the break-even point up.** 5 333.3 units is 5 334: at 5 333 units the business still makes a small loss.
- **Leaving out non-production fixed costs** (administration) from break-even, or treating a "fixed cost per unit" as variable.
- **Ranking a limiting-factor problem by contribution per unit.** Rank by contribution per unit of the **scarce resource**. Examiners found many candidates could not work out profit with a limiting factor at all.
- **A list of numbers instead of a statement.** Marginal costing statements need headings (revenue, each variable cost, contribution, fixed costs, profit); weak answers lose marks for layout.
- **"Marginal costing helps decision-making".** Too general: the point that earns the mark is **short-term** decisions.

- **Repeating the same points for both options** when advising. Give reasons specific to each option, and use your calculated profits.

How to get the marks

- **Show workings, labelled.** Most calculation marks are "own figure" (OF): a wrong earlier figure used correctly still earns the later marks, but only if the examiner can see how you got it.
- **Label every answer:** "per machine hour", "under-absorbed", "units", "\$". A correct amount without its label often loses a mark.
- **Follow the accuracy asked:** "to two decimal places" for OARs and prices; whole units for break-even (rounded up).
- **Use statement layouts** with clear headings and brackets for deductions. A marginal statement must show contribution as its own line.
- **"Define":** one precise sentence, for example "contribution is selling price less variable cost per unit".
- **"State" or "identify":** a short point each; no explanation needed.
- **"Explain two differences":** two pairs, each saying what **both** methods do ("marginal ... whereas absorption ...").
- **"Advise" (6–8 marks):** usually up to 3 or 4 marks for points on each side (financial and non-financial), and 1 mark for a clear decision supported by a reason. The decision can go either way if it matches your points and figures. Use the facts in the question (overseas supplier: exchange rates; new market: further orders).
- **Multiple choice:** write the calculation down; many distractors are the answer you get by including a fixed cost in contribution, using actual instead of budgeted figures, or using mark-up instead of margin.

Quick check

1. A product sells for \$25 and has a variable cost of \$15. Fixed costs are \$40 000 and budgeted sales are 6 000 units. Calculate the break-even point in units and the margin of safety as a percentage.
2. A business has a C/S ratio of 35% and fixed costs of \$84 000. What sales revenue gives a profit of \$21 000?
3. Overheads are absorbed at \$12 per machine hour, based on budgeted overheads of \$60 000. Actual machine hours were 4 700 and actual overheads \$58 200. Calculate the under- or over-absorption.
4. Opening inventory was 800 units and closing inventory 1 300 units. Fixed production overheads are absorbed at \$5 per unit. Profit under marginal costing was \$42 000. What is the profit under absorption costing?
5. A job has a total cost of \$3 600. Calculate its price with (a) a 20% mark-up and (b) a 20% margin.

Answers

1. Contribution is \$10 ($25 - 15$); break-even = $40\,000 \div 10 = 4\,000$ units. Margin of safety = $6\,000 - 4\,000 = 2\,000$ units, which is $2\,000 \div 6\,000 = 33.3\%$.
2. $(84\,000 + 21\,000) \div 0.35 = 300\,000$, so \$300 000.
3. Absorbed = $12 \times 4\,700 = 56\,400$. This is less than the \$58 200 spent, so \$1 800 **under-absorbed**.
4. Inventory rose by 500 units, so absorption profit = $42\,000 + 500 \times 5 = 44\,500$, that is \$44 500.
5. (a) $3\,600 \times 1.2 = 4\,320$, so \$4 320. (b) Cost is 80% of the price: $3\,600 \div 0.8 = 4\,500$, so \$4 500.

Past questions to try

- 9706/22/F/M/25 Q4: apportioning overheads, absorption rates, then a limiting-factor decision.
- 9706/21/M/J/24 Q4: C/S ratio, break-even and target revenue, a special order, then a limiting factor.
- 9706/21/O/N/23 Q4: absorption and marginal profits for two months and a reconciliation.
- 9706/13/O/N/25 Q27: finding the absorption rate from the two profits and the inventory change.