Cost Accounting, Unit Economics and Pricing

Interview preparation summary · FP track

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INT.FC.1.a · Costs

Separate fixed and variable costs, calculate contribution, break-even volume and margin of safety, and explain what they say about operating leverage.

Costs are called fixed or variable according to whether they move with activity inside a relevant range. Variable cost per unit is roughly constant, while fixed cost is constant in total, so fixed cost per unit falls as volume rises. Contribution is the selling price minus the variable cost per unit, and the contribution margin is that amount as a percentage of price. Break-even volume is fixed costs divided by contribution per unit, and for a target profit you add the profit to the fixed costs first. The margin of safety is how far expected sales sit above break-even. Interviewers ask this to see whether you understand operating leverage: a business with high fixed costs sees profit swing sharply when volume moves. Usual mistakes are treating a step or semi-variable cost as purely fixed, confusing contribution with gross margin, quoting a break-even outside the relevant range, and forgetting that a multi-product break-even depends on the sales mix.

WORKED EXAMPLE: TARNBY CANDLES: BREAK-EVEN AND WHAT A 10% VOLUME RISE DOES

Tarnby Candles is an invented maker of scented candles. A candle sells for 12.00 and has a variable cost of 7.20. Fixed costs are 84,000 a year. Expected sales are 22,000 candles. Find contribution per unit and margin, break-even units and revenue, the margin of safety, the volume needed for a profit of 30,000, and the effect on profit of a 10% rise in volume. Ignore tax.

Answer: Contribution is 4.80 a candle (40%), break-even is 17,500 candles or 210,000 of revenue, the margin of safety is 20.5%, a 30,000 profit needs 23,750 candles, and a 10% rise in volume lifts profit by 48.9%.

> **Interview tip:** Say the contribution first, then the break-even, then the so-what: we have a cushion of about a fifth, and because fixed costs are high a small volume change moves profit a lot. State that the answer holds only inside the current relevant range of fixed costs.

INT.FC.1.b · Costs

Explain why absorption and marginal costing report different profits when inventory changes, and reconcile the difference.

Absorption costing includes a share of fixed production overhead in the cost of each unit, so those costs sit in inventory until the units are sold. Marginal (variable) costing values inventory at variable production cost only and charges all fixed production overhead to the period in which it is incurred. When production equals sales the two methods give the same profit. When production exceeds sales, inventory rises and absorption profit is higher, because some fixed overhead is carried forward in the balance sheet. When sales exceed production, absorption profit is lower, because overhead from earlier periods is released. The difference equals the change in inventory units multiplied by the fixed overhead absorbed per unit. Interviewers ask this because external reporting under the main frameworks typically uses absorption costing while internal decisions use contribution. Usual mistakes are applying the rate to the wrong units, getting the direction wrong, and forgetting that reward schemes based on absorption profit can encourage building inventory.

WORKED EXAMPLE: BRINDLE COMPONENTS: WHY PROFIT DIFFERS BY 12,000

Brindle Components is an invented maker of valves. Normal output is 10,000 units a year. Fixed production overhead is 60,000 and is absorbed at 6.00 per unit. Variable production cost is 14.00 per unit and the selling price is 30.00. In the year the firm made 10,000 units and sold 8,000, with no opening inventory and no other costs. Calculate profit under both methods and reconcile.

Answer: Absorption profit is 80,000 and marginal profit is 68,000. The 12,000 difference is the fixed overhead of 6.00 a unit held in 2,000 units of closing inventory.

Interview tip: Say: production was above sales, so absorption profit is higher by the inventory build times the overhead rate. Then add the so-what: the extra 12,000 is not cash, and a manager paid on absorption profit could be tempted to over-produce.

INT.FC.1.c · Costs

Allocate overhead with activity-based costing, compare the result with a single-rate allocation, and identify the relevant costs in a make-or-buy decision.

Traditional allocation spreads overhead over products with one driver, often machine or labour hours. Activity-based costing (ABC) groups overhead into pools such as set-ups, inspections and machine running, finds a driver for each, divides each pool by its driver volume to get a rate, and charges products by the activity they use. Low-volume, complex products usually need many set-ups and checks per unit, so a single hourly rate tends to under-cost them and over-cost simple high-volume lines. The result informs pricing and product decisions, but allocated overhead is not automatically avoidable. For make-or-buy, use relevant costs only: future cash flows that differ between the options, such as variable cost, avoidable fixed cost and the contribution lost on any capacity used. Allocated overhead that continues either way is irrelevant. Usual mistakes are comparing the supplier price with full absorbed cost, ignoring the opportunity cost of capacity, and treating ABC costs as savings that will actually appear.

WORKED EXAMPLE: WEXCOMBE PACKAGING: WHAT ABC DOES TO A BESPOKE LINE

Wexcombe Packaging is an invented firm with two lines. Overhead of 360,000 splits into set-ups 120,000, inspection 90,000 and machine running 150,000. Line A makes 30,000 units using 4,500 machine hours, 40 set-ups and 150 inspections. Line B makes 6,000 units using 3,000 machine hours, 160 set-ups and 450 inspections. Total machine hours are 7,500, set-ups 200 and inspections 600. Compare overhead per unit under a single machine-hour rate and under ABC.

Answer: The single rate gives 7.20 a unit for Line A and 24.00 for Line B. ABC gives 4.55 and 37.25. Line B is under-costed by 13.25 a unit because it uses most of the set-ups and inspections.

Interview tip: Say that ABC charges for the activity that causes the cost, show the biggest change, and then give the caution: ABC shows who causes cost, not which cost can be cut. For a make-or-buy, say you would compare only the costs that change.

INT.FC.2.a · Unit economics and pricing

Calculate gross margin and profit by product line and by customer after cost to serve, and explain why a large customer can be a weak one.

Gross margin by line is revenue minus direct cost of sales, divided by revenue, and a blended margin moves with mix even when no individual margin changes. Customer profitability goes further down the income statement. Two customers buying the same products can differ sharply once you charge them for what they cause: deliveries, returns, account management, bespoke packaging, rebates and the financing cost of long payment terms. The pocket price, which is list price less discounts and rebates, matters more than the headline price. A customer table that shows revenue, gross margin, cost to serve and profit often reveals that the biggest customer by revenue is not the biggest by profit. Interviewers ask this to see whether you look beyond gross margin and ask which costs are truly driven by the customer. Usual mistakes are allocating overhead by revenue and calling it cost to serve, ignoring working capital cost, and deciding to drop a customer without checking which costs would actually go.

WORKED EXAMPLE: CALDERFIELD WHOLESALE: THE LARGEST CUSTOMER IS THE LEAST PROFITABLE PER POUND

Calderfield Wholesale is an invented supplier with three customers. A: revenue 1,095,000, gross margin 26%, cost to serve of delivery 60,000, returns 24,000 and account management 36,000, payment terms of 60 days. B: revenue 730,000, gross margin 32%, delivery 22,000, returns 7,000, account management 18,000, 30 days. C: revenue 365,000, gross margin 40%, delivery 15,000, returns 3,000, account management 12,000, 90 days. Charge credit at 6% a year on revenue times days divided by 365. Rank customers by profit after cost to serve.

Answer: By profit: B 183,000, A 153,900, C 110,600. A is the largest by revenue but earns only 14.1% after cost to serve, against 25.1% for B and 30.3% for C.

Interview tip: Say that gross margin ranks them C, B, A but profit ranks them B, A, C, and that the largest customer has the lowest return per pound of revenue. Then say what you would test: which of A's delivery and returns costs could be changed by minimum order sizes or pallet deliveries.

INT.FC.2.b · Unit economics and pricing

Apply price elasticity to a price change, find the elasticity at which a rise stops paying, and compare cost-plus with value-based pricing.

Price elasticity of demand is the percentage change in volume divided by the percentage change in price. It is usually negative, and demand is called elastic when the size is above one and inelastic when below one. What matters for profit is not revenue but contribution, so a price rise pays if the volume you lose costs less contribution than the extra price earns on the units you keep. The break-even volume loss for a price rise equals the rise divided by the new unit contribution, and a low-margin product can tolerate little volume loss. Cost-plus pricing adds a markup to unit cost: it is simple and defensible but ignores what customers value and what rivals charge, and the full cost used contains fixed overhead that depends on volume. Value-based pricing starts from the customer's benefit and the best alternative, with cost as a floor. Usual mistakes are quoting elasticity from a single noisy test, mixing up markup on cost with margin on price, and treating elasticity as constant.

WORKED EXAMPLE: OAKHURST GARDEN TOOLS: HOW ELASTIC CAN DEMAND BE BEFORE A 10% RISE FAILS?

Oakhurst Garden Tools is an invented firm selling a lawn aerator at 50.00 with a variable cost of 30.00. It sells 20,000 a year. Management considers a 10% price rise to 55.00. Assume volume changes by elasticity times the price change and fixed costs do not move. Find contribution at elasticities of minus 1.5 and minus 3.0, and the elasticity at which the rise breaks even.

Answer: A 10% rise adds 25,000 of contribution at elasticity minus 1.5, loses 50,000 at minus 3.0, and breaks even at minus 2.0.

Interview tip: Say that you judge a price rise on contribution, not revenue, and give the break-even volume loss before quoting any elasticity. Add that the elasticity estimate itself needs testing, and that cost-plus would only set a floor here.

INT.FC.2.c · Unit economics and pricing

Show how a discount or a price rise changes the volume needed to hold contribution, and compare the profit effect of price with the profit effect of volume.

A price cut falls straight through to profit, because the cost to serve each unit does not change. If contribution is 40% of price, a 10% discount cuts contribution per unit by a quarter, so volume must rise by a third just to stand still. The volume needed to hold contribution after a discount is the old contribution divided by the new contribution, minus one. The reverse holds for price rises, which can lose a surprising share of volume before profit falls. For the same percentage, a price improvement usually adds more profit than a volume improvement, because price lifts every unit sold at no extra cost while volume earns only contribution on the extra units. Interviewers ask this to test commercial judgement: discounts given to win volume that never arrives, leakage between price lists and invoices, and a rival matching your move. Usual mistakes are quoting the discount percentage as the required volume gain and forgetting that a discount given to one customer may spread.

WORKED EXAMPLE: DUNMORE PAINTS: A 10% DISCOUNT NEEDS A THIRD MORE VOLUME

Dunmore Paints is an invented firm. A tin sells for 80.00 with a variable cost of 48.00. It sells 50,000 tins a year with fixed costs of 1,200,000. Sales proposes a 10% discount to win volume. Find the volume rise needed to hold contribution, and compare the profit effect of a 1% price gain with a 1% volume gain.

Answer: A 10% discount needs 33.3% more volume to break even. At a 1% move, price adds 40,000 of profit and volume adds 16,000.

Interview tip: Say: a discount is only worth giving if the extra volume is large and credible, and here it would have to be a third. Offer the rule of thumb that, at a 40% margin, a 10% discount needs a third more volume, then say you would ask what volume the customer has actually committed to.