Sector Analysis

Interview preparation summary · PE track

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INT.SA.4.a · Consumer and Retail

Break consumer growth into price, volume and mix and judge brand strength, gross margin, promotion intensity and like-for-like growth.

Consumer growth must be split into price, volume and mix, because each part says something different about the quality of the business. Volume is units sold, measured in kilos or litres, so that a smaller pack at the same shelf price shows up as a price rise. Price is the net price per unit after promotions, retailer rebates and discounts, not the list price. Mix is the shift between cheaper and dearer products or channels, which lifts revenue per unit although no single price has changed. Volume growth means more people are buying, so it is the highest quality of growth. Price growth is either real pricing power or inflation passed on, and growth that is all price while volume falls is fragile, because private label and discounters can erode it. Test pricing power with the volume response to past price increases. Elasticity = percentage change in volume ÷ percentage change in price. Compare volume with the category, since a fall in line with the category is not a loss of share. Gross margin shows whether price covered input costs, but cost increases reach cost of sales with a lag, so margin can look healthy before the squeeze arrives. Promotion intensity is the share of volume sold on deal, and promoted volume earns a lower margin and teaches customers to wait for offers, so watch the trend in base volume sold without a deal. Cutting advertising lifts profit for a year or two while brand strength quietly erodes. For retailers, like-for-like or same-store growth strips out new and closed stores. Split it into transactions, items per basket and price per item, because growth from price alone is weaker than growth from more customers. Brand strength shows in stable market share, repeat purchase and margin held through inflation, more than in awareness surveys. The usual mistake is to read headline growth without separating price from volume, or to count new space and acquisitions as underlying growth. A nuance generalists miss is that a widening price gap to private label is a warning even while sales still look healthy, because shoppers tend to switch with a delay. Do the decomposition first, then give a view, and say which test you would run next.

WORKED EXAMPLE: PRICE, VOLUME AND MIX AT A SNACK MAKER

Oakhurst Snacks is an invented snack brand with two lines. Last year it sold 30m units of Core at 2.00 and 10m units of Premium at 3.00. This year it sold 28m Core at 2.10 and 12m Premium at 3.15. Unit costs were 1.20 for Core and 1.50 for Premium last year and rose 4% this year. Decompose the revenue change and comment on quality. Convention: price effect is measured on this year's volumes, volume effect at last year's average price, and mix is the remainder. Money is in millions.

Answer: Revenue rose 6.6 (7.3%): price 4.6, volume 0.0, mix 2.0. Gross margin improved to 44.4% from 43.3%. Growth is price and mix, not volume, and the Core price rise earned no extra gross profit, so test Core elasticity against private label.

> **Interview tip:** Always lead with the split and then say what it means: price-led growth with flat volume is only as good as the pricing power behind it. Name the test you would run next.

INT.SA.4.b · Consumer and Retail

Assess store economics, rollout payback, seasonal working capital in the debt package, channel shift and trading-down risk for a retail or restaurant target.

Retail and restaurant value rests on the economics of the individual site. Four-wall profit is a site's profit after its own direct costs, which are goods, staff, rent and local costs, but before central overhead. In a restaurant, look first at prime cost, which is food and labour as a share of sales, and then at occupancy cost, which is rent and rates as a share of sales. Sales per site come from covers, the average cheque and how often tables turn, so ask which of them moved. Net investment is fit-out, opening stock net of supplier credit and pre-opening costs. Payback = net investment ÷ four-wall profit. Use the maturity curve from recent openings and not the mature figure, because new sites usually take two to three years to reach full sales. Rollout value then depends on three further things: the sales a new site takes from a nearby site of the same chain, whether central costs scale, and how long the lease runs. Cannibalisation is costed at the gross margin lost on the transferred sales, because the neighbour's fixed costs do not fall. The debt package must fit the seasonal pattern. Working capital peaks before the main trading season, as stock is bought ahead of sales, so the revolving facility is sized to the peak draw plus headroom. Leverage and covenants are tested at the seasonal peak as well as at the year end, because the year-end balance sheet flatters the position. Channel shift to online can erode store economics, because leases are fixed while sales migrate, and store profit falls even when group sales rise. Compare break dates and lease length with the payback of each store. Trading-down risk is highest where customers can easily substitute cheaper or private label alternatives, and tends to be lower where the visit is for an experience or a need. The usual mistake is to underwrite the rollout on the best stores and the leverage on the year-end balance sheet. A nuance generalists miss is that the average hides the spread, so rank stores by four-wall profit and count how many fall below the payback you would accept. In an interview, give the metric, the ramp and the downside together.

WORKED EXAMPLE: PAYBACK ON A NEW HOMEWARES STORE

Wexley Home is an invented homewares chain. A mature store has sales of 3.00, gross margin of 40%, variable store costs of 12% of sales and fixed store costs of 0.42. A new store costs 0.80 to fit out, 0.20 of opening stock net of supplier credit and 0.10 of pre-opening costs. Sales are 60% of mature in year 1, 85% in year 2 and 100% from year 3. What is the payback, and what does a 10-store annual rollout need? Convention: four-wall profit is before central costs, year-end cash flows, money in millions.

Answer: Net investment is 1.10 and mature four-wall profit is 0.42, but with the ramp the payback is about 3.7 years rather than 2.6. Ten stores a year need 11.0 a year.

> **Interview tip:** Say that you would use the ramp from recent cohorts, not the mature level, and that you would check cannibalisation and lease length before approving the rollout.

INT.SA.4.c · Consumer and Retail

Distinguish the consumer sub-sectors by their economics and read each model's unit economics: brand margin and advertising, royalty against owned-site profit, and acquisition cost, retention and payback.

Consumer is really six businesses with different economics, so the first move is to say which one you are looking at. Branded goods companies own the brand and rely on others for shelf space, so they typically earn high gross margins, spend heavily on advertising and need little capital. Food and beverage makers run their own plants, so margins are typically lower and move with commodity costs, and scale, plant utilisation and the price gap to private label matter most. Restaurant groups either own their sites or franchise them. A franchisor collects a royalty, typically a few percent of franchisee sales, with almost no capital employed, so its profit follows system sales and not its own revenue. An owner-operator keeps all of the site profit but carries the fit-out, the leases and the operating risk. Store-based retail is capital heavy, so it lives on four-wall returns and stock turn, as covered earlier in this module. E-commerce and subscription businesses are judged on the customer rather than the site. Customer acquisition cost is the marketing spend needed to win a customer, and contribution is what each order earns after product, delivery and payment costs. Payback = customer acquisition cost ÷ monthly contribution per customer. That payback is flattering, because customers leave, so build it from the observed cohort curve of how many remain in each month. Lifetime value = monthly contribution ÷ monthly churn. This assumes constant churn, which is rarely true since early churn is often highest, and a ratio of lifetime value to acquisition cost of about three is only a rule of thumb. Consumer services such as gyms, salons and car washes sell capacity, so utilisation, membership churn and the local catchment decide profit. Check blended and paid acquisition cost separately, because organic customers flatter the average. The usual mistake is to use one lens for every consumer company, such as judging a franchisor on store returns or a brand on cohort payback. A nuance generalists miss is that franchise revenue and system sales are different numbers, and a franchisor's growth is driven by franchisee sales and openings. Buying back franchised sites raises reported revenue with no change in system sales. Open any consumer answer by naming the model, then give the two or three numbers that model lives on.

WORKED EXAMPLE: UNIT ECONOMICS OF A SUBSCRIPTION BOX

Fernwick Boxes is an invented monthly fresh-food subscription. Each box sells for 40.00, with product cost of 22.00, delivery and packing of 7.00 and payment fees of 1.00. Last year it spent 1.2m on marketing and won 20,000 new customers, of whom 12,000 came through paid channels and 8,000 came organically. Of every 100 customers acquired, the number still ordering in boxes 1 to 12 is 100, 72, 62, 55, 50, 46, 43, 40, 38, 36, 34 and 33. Assess the unit economics. Conventions: one box a month, marketing is the only acquisition cost, no discounting, 3% monthly churn from box 13 onwards, money in £ per customer unless stated.

Answer: Contribution is 10.00 a box. Acquisition cost is 60.00 blended and 100.00 paid. Payback is about 11.7 months blended and 27 months paid, and lifetime value to cost is 2.8 and 1.7. Paid growth earns little.

Interview tip: Name the model first, then give contribution, acquisition cost on both bases and the cohort payback, and finish with the retention test you would run.

INT.SA.4.d · Consumer and Retail

Value and finance a consumer company by agreeing the EBITDA basis, treating leases consistently, and sizing leverage from cash conversion and rent cover.

Valuation and debt capacity in consumer start with agreeing what EBITDA means, because leases change it. Under IFRS 16 lease accounting, rent leaves operating costs and appears as depreciation and interest, so reported EBITDA is higher and lease liabilities sit beside the debt. Many lenders and buyers still quote EBITDA after rent, often called pre-IFRS 16, so always ask which basis a multiple or covenant uses. EBITDAR is earnings before rent, and enterprise value with leases counted as debt, divided by EBITDAR, lets you compare owners and renters of property. Rent cover compares EBITDAR with rent alone, so it is the simplest test of how much of earnings rent can take. Fixed charge cover = EBITDAR ÷ (rent + interest). Rent is a fixed claim ahead of the lenders and cannot be cut without closing sites, so a lease-heavy chain carries more risk than the same debt multiple suggests. Some lenders capitalise rent at a multiple such as eight times to compute lease-adjusted leverage, a convention that varies. Branded goods and food makers with steady cash flow and modest capital spending typically support the highest leverage, and discretionary or lease-heavy chains support less. Cash conversion = (EBITDA − maintenance capex − working capital outflow) ÷ EBITDA. Maintenance capex covers refits, equipment and plant, and it is lumpy, so a debt model should treat it as a real claim even if management can delay it for a year. Growth capex on new sites is discretionary, so a good package lets it be paused. On multiples, a franchisor often earns a higher multiple than an owner-operator because royalty profit is capital light, while a brand earns a premium for growth and for margin held through inflation. Fast-growing online businesses are often valued on revenue or gross profit, but only once contribution margin and retention hold. A sale and leaseback converts owned property into rent, so reported debt falls but rent replaces the interest, and cover barely changes. The usual mistake is to size leverage on the higher post-IFRS 16 EBITDA while lenders test cover after rent. A nuance generalists miss is that a modest debt multiple after rent can be a high multiple of EBITDAR once the leases are counted. Say the basis out loud, then give leverage on two bases and the cover.

WORKED EXAMPLE: VALUE AND DEBT CAPACITY FOR A GARDEN CENTRE CHAIN

Tolland Garden Centres is an invented chain of 40 sites. Under IFRS 16 its EBITDA is 55.0. Cash rent is 20.0 a year and lease liabilities are 150.0. A sponsor proposes to pay 8.0 times EBITDA after rent and to borrow 4.5 times EBITDA after rent at 8% interest. Maintenance capex is 9.0, growth capex is 6.0 and working capital absorbs 2.0 a year. Assess value, leverage and debt capacity. Conventions: EBITDA after rent is IFRS 16 EBITDA less cash rent; lease-adjusted debt capitalises rent at 8 times; ignore tax; money in millions.

Answer: On a consistent basis the price is 280.0 excluding leases, or 7.8 times IFRS 16 EBITDA with leases. 4.5 times is 5.8 times EBITDAR lease-adjusted, with fixed charge cover of 1.69 times and little cash to repay debt. Cut to about 4.0 times.

Interview tip: Say which EBITDA you mean before any multiple, then give leverage on two bases and the fixed charge cover, and tie the debt to the cash left after maintenance capex.

INT.SA.4.e · Consumer and Retail

Find consumer accounting traps, cycle and fad risks, then run a first-week diligence plan with value creation levers and exit routes for a target.

Consumer earnings can look better than the cash behind them, so diligence starts with quality of earnings. Look at stock first, because if inventory grows faster than sales or stock days lengthen, markdowns usually follow and cost of sales has not yet reflected them. Check supplier income such as rebates and marketing contributions, which can be booked before they are

earned, and check that the cash was actually received. Stretching supplier payment terms or using supplier finance flatters operating cash flow once and then reverses, so strip it out of cash conversion. Adjusted EBITDA needs the same scrutiny, because pre-opening costs, restructuring and one-off costs that recur every year are really running costs. Capitalised marketing or product development moves spending off the profit line, so compare capitalised spend with depreciation. Cycles differ by sub-sector: everyday food and household brands usually hold volume in a downturn, while apparel, dining out and home goods are discretionary and fall faster. Operating leverage then bites, because rent and base staffing are fixed, so profit falls by a multiple of the fall in sales. Fashion and fad risk is tested with cohort repeat rates, the share of sales from products under two years old, full-price sell-through and dependence on one hero product or one retailer. For franchisors, test franchisee health, which means sales per site, franchisee profit after royalty and the rate of closures, because unhappy franchisees stop opening sites. In the first week, ask for site or cohort level profit and loss, price volume and mix by product, the promotion calendar, customer concentration, stock ageing and the lease schedule. The value creation plan should name each lever, its size, its owner and the evidence, for example pricing and mix, procurement, closing weak sites, online growth and bolt-on acquisitions. Exit routes are strategic buyers who value brand and distribution, other sponsors, and a listing for scaled brands. Run a pre-mortem on what kills the deal, such as a lost listing, a failed range or a cost spike not passed on. The usual mistake is to trust the last year of profit, and a nuance generalists miss is to test cash over several years and stock at the same seasonal date. In an interview, finish with a view: the model, the earnings you would underwrite, the biggest risk, and the price that follows.

WORKED EXAMPLE: DILIGENCE ON A PREMIUM PET FOOD BRAND

Rowanbrook Pet Co is an invented premium pet food brand sold through grocers, pet specialists and its own website. Sales are 120.0 (110.0 a year earlier) and management's adjusted EBITDA is 24.0, for which the seller asks 8.0 times. Diligence finds three things in that EBITDA: 2.5 of relaunch costs added back as one-off that have appeared in each of the last three years, 1.5 of product development and marketing capitalised in the year, and 1.0 released from an accrual for retailer promotion payments that was over-provided earlier. Inventory rose from 24.0 to 30.0, cost of sales is 45% of sales in both years, and the biggest grocer is 20% of sales with distribution savings of 5% of sales if it were lost. Build the view. Conventions: ignore tax; stock days use a 365-day year; debt is 4.5 times EBITDA at 8% interest; money in millions.

Answer: Diligence EBITDA is 19.0, not 24.0, so the ask of 192.0 is 10.1 times and 8.0 times is 152.0. Stock is 3.8 over, and losing the top grocer would cut EBITDA to 7.0. Pay on 19.0, size the debt on 19.0 or less, and make grocer terms a condition.

> **Interview tip:** Finish with a view in one breath: the model, the earnings you would underwrite, the biggest risk, the price, and the condition you would set.

INT.SA.1.a · Financial Services

Tell fee-based, asset-light financial businesses apart from balance-sheet ones, and explain why a buyer can lever the first kind but not the second.

Financial services is six different businesses sold under one label, and the first job in an interview is to say which one you are looking at. Banks earn a spread between what they lend at and what deposits and other funding cost them. Insurers collect premiums first, pay claims later and invest the float in between. Specialty lenders earn a yield on loans that they fund mostly with borrowed money. These three are balance-sheet models, so interest or claims are part of the cost of goods, equity is a regulated resource, and EBITDA says very little. Brokers and distributors earn commission and fees for placing policies or products, and they hold almost no capital. Asset and wealth managers earn a fee in basis points on the assets they manage. Payment processors earn a small take rate on the value of the payments they handle. These three are fee-based and asset-light, so profit turns into cash and a buyer can size debt on EBITDA as in any services business. A quick test is cash conversion, which is often high for these businesses. Cash conversion = (EBITDA − capital expenditure) ÷ EBITDA. The common mistake is to apply an EBITDA multiple and a standard debt ratio to a lender, because for a lender the interest paid is the main operating cost, not a financing choice. A second mistake is to treat every fee business as safe, because each has its own driver. Asset and wealth managers move with markets and net flows, brokers with client retention and the insurance pricing cycle, and processors with payment volumes and merchant mix. In advice businesses the people are the asset, so adviser or broker attrition matters as much as the client list. Costs are largely fixed, so with a margin near 30% a 10% fall in revenue can remove about a third of EBITDA. That is why debt is sized on stressed earnings rather than peak earnings. For a balance-sheet business the debt question is replaced by two others, which are how much capital the regulator requires and how much

profit can legally be paid up to the holding company. Ask first what the product is, who holds the risk, and what would break the cash flow. Good answers also test organic growth, client retention and market sensitivity, and name which of the six models the target is before quoting any multiple.

WORKED EXAMPLE: WHY THE BROKER TAKES DEBT AND THE LENDER DOES NOT

A fund is comparing two targets. Teasel Brokers is an insurance broker with revenue of 80m, EBITDA of 24m (30%), capital expenditure of 1m and a cost base of 56m that is largely fixed. Marl Lending is a consumer lender with loans of 600m, equity of 60m and normal loan losses of 1.5% of loans a year. How much debt can each carry? Convention: ignore tax and working capital, use annual cash flows, and assume acquisition debt costs 8%.

Answer: The broker can carry about 5.0x EBITDA (120m of debt, 2.5x cover, 7.5x on stressed EBITDA). The lender cannot be treated this way: a 2.5 point rise in loan losses costs a quarter of its equity before any holding-company interest.

Interview tip: Say it in this order: classify the model, size debt on stressed earnings for the fee-based business, then explain that for the lender the debt capacity is set by capital and distributable profit, not EBITDA.

INT.SA.1.b · Financial Services

Analyse an insurer or a specialty lender and design the diligence that tests reserves, credit quality, capital and the limits regulation puts on distributions.

For an insurer, start with the combined ratio. Combined ratio = loss ratio + expense ratio. The loss ratio is claims incurred divided by earned premium, and the expense ratio is acquisition costs and operating expenses divided by premium. Below 100% the underwriting makes money before investment income on the float, and above 100% investment income is covering an underwriting loss. A flattering ratio can come from favourable reserve releases from earlier years or from a quiet catastrophe year, so normalise both against a through-the-cycle catastrophe load. Reserve risk is largest in long-tail lines such as liability, where claims take years to settle and estimates move with courts and inflation. Diligence reserves with an independent actuary who compares booked reserves with a range by accident year. Several years of favourable prior-year development in a row can mean the insurer is releasing reserves to support earnings. Reinsurance cuts volatility but costs margin and adds counterparty risk, so check what is ceded and to whom. Capital comes next, and it is the ratio the regulator watches. Solvency ratio = available capital ÷ required capital. The headroom above the regulatory requirement, and above the level the insurer's own board wants, is what limits dividends. For a lender, look at net interest margin, cost of risk, arrears by loan vintage, funding and capital. Cost of risk is the impairment charge divided by average loans, and it is cyclical, so a low figure in a good year is not a through-the-cycle figure. Return on tangible equity is compared with the cost of equity, and a lender that earns less than its cost of equity does not create value however fast it grows. In both cases regulators limit what can be paid up, so holding-company debt service is sized on distributable cash and not on reported profit. A growing lender must keep capital for its growth. Maximum dividend = equity + profit − required ratio × next year's risk-weighted assets. The common mistake is to value reported earnings without adjusting for reserves, catastrophes or the credit cycle. A nuance generalists miss is that a life insurer is judged on embedded value, which is adjusted net assets plus the present value of profits from policies already written, so persistency matters more than a combined ratio.

WORKED EXAMPLE: TESTING AN INSURER'S EARNINGS AND CAPITAL

Marsden Specialty Insurance writes premiums of 200m a year with a loss ratio of 62% and an expense ratio of 31%. It holds float of 300m earning 3.5%, has equity of 150m, and its regulator requires 130m of capital. Net reserves are 400m. A fund is told that earnings are 24.5m before tax. Test that claim. Convention: ignore tax and treat a reserve increase as a straight reduction in capital.

Answer: Reported pre-tax profit is 24.5m on a 93% combined ratio, but a 4% reserve shortfall of 16m would turn the year into a loss and leave only 4m of capital headroom, so distributable cash is far lower than reported profit.

Interview tip: Say that reported profit tells you little until reserves are tested, and that for a regulated target the real question is how much cash can legally be paid up.

INT.SA.1.c · Financial Services

Analyse a bank through its net interest margin, deposit costs, efficiency, cost of risk and capital, and judge what its equity is worth against the return it earns on tangible equity.

A bank borrows short, lends long and keeps a thin layer of equity between its depositors and its borrowers, so every question starts with the spread it earns. The headline measure is net interest margin. Net interest margin = net interest income ÷ average interest-earning assets. Margins typically sit between about 1.5% and 4%, higher in consumer and small business

lending and lower in mortgage-heavy or wholesale banks. When policy rates rise, loans reprice at once but depositors then ask for a share. Deposit beta = change in deposit rate ÷ change in policy rate. A bank with sticky, low-cost current accounts has a low deposit beta and keeps more of a rate rise, while one that relies on large online or uninsured deposits has a high one. Efficiency is the next test, and for a retail bank it is often in the range of 50% to 65%. Cost-to-income ratio = operating costs ÷ total income. Cost of risk is the impairment charge divided by average loans, and it is the swing factor through the cycle. Look at arrears, loans moved to a watch stage and the provisions held, not the charge alone. Capital is the binding constraint on a bank. CET1 = common equity tier one capital ÷ risk-weighted assets. Growth in risk-weighted assets rather than in loans is what uses capital, and a bank can lift its ratio by shrinking or re-weighting assets as well as by adding equity. The surplus above the regulatory minimum plus buffers, and above the level management targets, is what can be paid out or lent. Profitability is judged on tangible equity because goodwill cannot absorb losses. RoTE = profit to ordinary shareholders ÷ average tangible equity. Value follows the gap between return and cost of equity, with long-run growth g. P/TBV = (RoTE − g) ÷ (cost of equity − g). So a bank earning exactly its cost of equity is worth about one times tangible book, and one earning less deserves a discount. A private equity buyer therefore typically uses minority stakes, recapitalisations or carve-outs, not a leveraged buyout, and earns returns by buying below tangible book, lifting return through costs and capital release, and exiting at a higher multiple. Generalists often miss that unrealised losses on a bond portfolio held at amortised cost, and a funding base of large uninsured deposits, can turn a profitable bank into a stressed one without any loan losses.

WORKED EXAMPLE: IS HARBOURNE SAVINGS BANK WORTH THE SELLER'S PRICE?

Harbourne Savings Bank has average interest-earning assets of 10,000m, net interest income of 340m, fee income of 100m, operating costs of 264m and loans of 7,500m. Cost of risk was 0.40% this year. Tangible equity of 900m is treated as equal to common equity tier one capital, risk-weighted assets are 6,000m, and the requirement including buffers is 11.5%. Its securities of 2,500m are held at amortised cost with a duration of 4. The cost of equity is 11% and long-run growth 3%. The seller asks for 1.2 times tangible book. Convention: tax of 25%, year-end figures, ignore dividends in the year, and take no tax relief on a loss from selling securities.

Answer: Harbourne earns 12.2% on tangible equity in a benign year but about 9.7% through the cycle, which is below an 11% cost of equity and justifies about 0.83 times tangible book (750m) against the seller's 1.2 times (1,080m). A combined bond sale and credit stress would take the capital surplus from 210m to about 28m.

> **Interview tip:** Say that you would not use EBITDA or leverage for a bank. Give margin, efficiency, cost of risk and capital in turn, normalise the credit cycle, name the hidden bond loss, and finish with the price that the through-the-cycle return justifies.

INT.SA.1.d · Financial Services

Judge the quality of a broker's, asset manager's or payments processor's revenue and earnings, and build a valuation and debt package that still works when markets, rates or volumes turn.

Fee-based financial businesses look alike on a screen and differ in the quality of their revenue, so the work is to separate the recurring from the volatile before choosing a multiple. For a broker, start with organic growth. Organic growth = (current revenue − prior revenue − acquired revenue) ÷ prior revenue. Then split revenue into base commission and fees, which renew, contingent commissions, which swing with insurer results, and interest earned on client money, which falls when rates fall. Rising insurance prices lift commission without any new clients, so growth in a hard market is price and not volume, and it reverses when the cycle softens. Retention and the loss of producers are the other tests, because a broker's book follows its people. Start an asset manager with the assets under management bridge. Closing AUM = opening AUM + net flows + market movement. Revenue margin, quoted in basis points of average assets, falls when mix shifts toward cheaper passive products and larger mandates, so flows can be positive while revenue is flat. Performance fees are volatile, so value the manager on fee-related earnings and treat performance fees as upside. Operating margin, the compensation ratio, key-person dependence and client concentration decide how much of a revenue fall reaches profit. A payments business is analysed on net revenue, because interchange and scheme fees are passed through and make gross revenue look much larger. Net revenue is what the processor keeps. Net revenue = gross revenue − interchange and scheme fees. Check the net take rate by merchant size, merchant churn, volume concentration, chargeback exposure and the share of earnings that is interest on client balances. Large merchants bring volume but negotiate lower rates, while small merchants pay more and leave more often. Check every definition, because adjusted EBITDA often adds back pro forma acquisitions, cost synergies and one-offs, and each add-back needs evidence. Value on EBITDA after capitalised software, and use a multiple of net revenue only where margins are

stable. Debt is sized on stressed EBITDA with costs held fixed, interest cover is tested at higher rates, and cash held for clients or regulators is excluded from net debt. Roll-ups of brokers add value by buying small books at lower multiples, but only if attrition after purchase is low and earn-outs can be paid from cash flow.

WORKED EXAMPLE: WHAT EBITDA SHOULD THE LENDER TRUST AT WEXCOMBE BROKERS?

Wexcombe Brokers is an invented insurance broker with revenue of 100m: base commission and fees of 88m, contingent commissions of 6m (a normal year is about 3.5m) and interest of 6m on 150m of client money earned at 4.0%. The seller presents adjusted EBITDA of 30.0m, made up of reported EBITDA of 25.0m, plus 2.5m for an acquisition completed after the year end, plus 2.5m of cost savings not yet delivered. The seller wants 11.0 times adjusted EBITDA and lenders offer 5.5 times. Short rates are expected to settle at 2.5%. Convention: ignore tax, treat costs as fixed in the short term, and use an 8% interest rate on debt.

Answer: Underlying EBITDA is about 22.75m, not 30.0m. At the same multiple that is 250m instead of 330m, and sensible debt is about 4.0 times underlying EBITDA (91m), not the 165m the headline would support.

> **Interview tip:** Say that you would start from definitions: ask what is in adjusted EBITDA, bridge it item by item, then price and size the debt on the underlying number after a stress.

INT.SA.1.e · Financial Services

Analyse a specialty lender's unit economics and funding, and plan the diligence, value creation and exit for a financial services target.

Specialty finance covers consumer and vehicle lending, equipment leasing, small business lending, premium finance and similar niches, and it is analysed as a spread business funded by borrowing. The unit economics start with the risk-adjusted margin. Risk-adjusted margin = portfolio yield − cost of funds − net charge-offs. Operating costs come next, and return on equity is what is left of that margin spread over a thin layer of equity, often 10% to 20% of the loan book. Losses lag lending, because defaults usually peak after the first year or two, so a fast-growing book flatters its loss rate until the loans season. Ask for vintage curves, which show cumulative losses by months since origination for each batch of loans, and compare each vintage with what underwriting expected. A newer vintage that loses faster than older ones at the same age usually means standards were loosened to grow. Funding is the other half of the analysis. Warehouse lines advance a percentage of eligible loans, the rest is equity, and the facility carries triggers on arrears and losses. If a trigger is hit, the advance rate can fall or cash can be trapped, so rising losses become a call for equity at the worst moment. Check how funding maturities match the loans, whether fixed-rate loans are hedged, and how much comes from one lender. Because the loan book is already financed, a buyer's leverage sits in the funding lines, and holding-company debt is sized on cash that can be paid up after funding growth. In the first week, ask what the company sells, who bears the loss, how it is funded and what the regulator permits. The data request is a loan-level tape, vintage and roll-rate tables, collections performance, funding agreements with their triggers, and regulatory correspondence and complaints. For an insurer add reserve triangles, for a broker retention by cohort, and for a manager an assets bridge. The value creation plan is growth within a fixed risk appetite, cheaper funding, better collections and pricing, and add-ons, and each lever needs a number and an owner. Exits are a sale to a strategic buyer or a larger lender, a listing or a portfolio sale, and all depend on a loss history that held through a cycle. Red flags are rewritten or extended loans that hide arrears, one funder supplying most of the funding, unexplained complaints or redress, and growth that outruns collections staff.

WORKED EXAMPLE: CAN BRINDLE VEHICLE FINANCE CARRY A BUYER'S DEBT?

Brindle Vehicle Finance is an invented used-car lender with a loan book of 400m yielding 14%. A warehouse facility advances 85% of the book at an interest cost of 6.0%, with a step-down in the advance rate to 80% if arrears of over 60 days exceed 6% of the book. Operating costs are 3.0% of loans and net charge-offs are 3.5%. The buyer would like to add holding-company debt at 8%. The business plans to grow its book by 10% and must hold equity of 15% of new loans. Convention: tax of 25%, year-end figures, all profit available to pay up apart from the equity kept for growth.

Answer: Brindle earns a 16.0% pre-tax return on 60m of equity, but doubled charge-offs would turn profit negative and trip the funding trigger, calling for 24.4m of new equity, while free cash after growth supports only about 15m of holding-company debt at most.

> **Interview tip:** Say that the loan book is already financed. Show the risk-adjusted margin, stress the losses, follow them into the funding trigger, and conclude that the buyer should leave leverage in the warehouse and create value through funding cost, collections and pricing.

INT.SA.2.a · Healthcare

Analyse a healthcare services buy-and-build, testing same-site growth, payer mix, clinician retention and the roll-up multiple arbitrage.

Clinic, dental, veterinary and care groups grow by buying small practices at low multiples and running them inside a platform valued at a higher one. The gain on each site is the gap between the two multiples applied to the site's earnings. Gain = (platform multiple − purchase multiple) × site EBITDA. That arithmetic only holds if the acquired earnings stay once the seller has been paid. Start with same-site growth, which counts only sites owned in both periods and so strips out acquisitions. Same-site growth = (1 + price) × (1 + volume) × (1 + mix) − 1. Price-led growth with flat or falling visits is fragile, because patients and commissioners eventually resist. Next look at payer mix. A group paid on public tariffs cannot set its own prices, so margin depends on tariff changes against clinician wage inflation. Private and self-pay revenue is more flexible but sensitive to patient affordability and local competition. Clinicians generate the revenue, so turnover, vacancy length and productivity per room, chair or consulting day matter more than the property. Where the seller is the main clinician, deferred consideration and rollover equity keep that person in the building. Site-level profit before central costs shows whether each practice earns its place, and central costs show whether scale is real. Check how adjusted EBITDA treats integration costs, opening losses and rent, because leverage should be struck after leases. Regulation covers ownership, clinical governance and inspection, and competition authorities may examine local concentration. Diligence acquired sites as cohorts against their underwriting cases at twelve and twenty-four months. A generalist often misses that buying faster than integrating can hide a weak cohort behind a stream of new ones. Common mistake: celebrating total growth that was bought, or counting synergies not yet delivered as earnings.

WORKED EXAMPLE: READING A VETERINARY GROUP'S ROLL-UP

Eastgate Veterinary Partners is an invented group. Practices owned in both years had revenue of 120.0m last year. This year their price rose 4.0%, visits fell 2.0% and mix added 1.5%. Six practices bought during the year contributed 9.0m of revenue. Last year clinician pay was 38% of revenue and other costs were 38%; this year clinician pay rose 6.0% and other costs rose 2.0% on the same-site base. The six practices cost 39.0m, which is 6.5x an underwritten EBITDA of 6.0m, and they now earn 5.1m: four earn 1.05m each and two earn 0.45m each after their owner vets left. The platform is valued at 11.0x. How healthy is the roll-up? Convention: ignore tax and integration costs, treat last year's practices as the base, and keep the costs of the six new practices outside the same-site check.

Answer: Same-site growth is 3.4% against 10.9% reported and is price-led. Same-site EBITDA grows only 1.7% as pay inflation outruns price, and the six acquisitions earn 15% below their case, so the arbitrage gain is 17.1m rather than the planned 27.0m.

> **Interview tip:** State reported and same-site growth side by side, then the cohort against its case, and finish with the two tests you would run next: why visits fell and how dependent each acquired practice was on its owner.

INT.SA.2.b · Healthcare

Analyse pharma services, medical devices and diagnostics, using backlog, installed base, reimbursement, evidence and customer concentration to judge earnings quality and risk.

These businesses look different but share one test: how recurring and how defensible is the revenue. For contract research and manufacturing, backlog is a stock and the flow is book-to-bill. Ratio = (gross orders − cancellations) ÷ revenue recognised. Above one the net backlog is building, and below one it is running down. Read it alongside cancellations, the funding position of small biotech customers and the share of backlog tied to one drug. Backlog also converts slowly, so ask how much becomes revenue within twelve months. Revenue that merely passes through third-party costs flatters growth and dilutes margin, so look at margin on net service revenue. Fixed-cost plants have high operating leverage, so a few points of utilisation move EBITDA by far more, in both directions. For devices, an installed base of instruments that need proprietary consumables and service creates recurring revenue. Check utilisation per instrument, consumable pull-through, contract length and decommissioning, because an idle instrument earns nothing. Equipment sales are lumpy and follow hospital capital budgets. For diagnostics, revenue is volume multiplied by the reimbursed price per test. One payer cut falls almost straight to profit, because the laboratory's costs do not change. Test payer mix, dependence on send-out work, the test menu and turnaround time. Reimbursement depends on clinical evidence, so check trial data and guideline status. Regulation brings recalls, inspections and quality risk, and one failed batch or recalled device can outweigh a year of growth. Common mistake: taking backlog or a razor-and-blade model at face value without testing concentration, cancellation, utilisation and payer decisions.

WORKED EXAMPLE: TESTING A CONTRACT MANUFACTURER'S ORDER BOOK

Hartwell Bioservices is an invented contract manufacturer of biologic medicines. It starts the year with a backlog of 420m, books gross orders of 480m, has 45m of cancellations and recognises 400m of revenue. It runs at 72% plant utilisation, fixed costs are 130m and variable costs are 55% of revenue, so EBITDA is 50m and debt is 250m. About 70% of the closing backlog converts to revenue within twelve months, and one small biotech customer holds 20% of the closing backlog. How strong is the order book, and what do a fall in utilisation and the loss of that customer do to leverage? Convention: ignore tax, let revenue move in proportion to utilisation, treat variable costs as proportional to revenue, hold fixed costs constant and assume the customer's backlog converts at the same 70% rate.

Answer: Net book-to-bill is 1.09 and backlog is 455m, or 1.14 years, with 80% of next year contracted. A 10-point fall in utilisation halves EBITDA to 25.0m and losing the 20% customer cuts it to 21.3m, taking leverage from 5.0x to 10.0x or 11.7x.

> **Interview tip:** Say that backlog is a stock and book-to-bill the flow, then immediately test conversion, concentration and operating leverage before you quote any leverage figure.

INT.SA.2.c · Healthcare

Map the healthcare sub-sectors by who pays, what repeats, what is scarce and what can change overnight, and read the unit economics and cash conversion that fit each one, including healthcare IT.

A healthcare company is not one thing, so the first job is to say which kind it is. Ask four questions of any business: who pays, what repeats, what is scarce and what can change overnight. Services such as clinics, care homes and veterinary groups sell labour. Revenue is visits or hours multiplied by a price, the scarce asset is the clinician, and a tariff or wage change is the overnight risk. Pharma and biotech sell intellectual property, so value sits in products and a pipeline, and a patent expiry or a trial result changes it at once. Medical devices sell evidence and an installed base, and reimbursement decides adoption. Diagnostics sell tests, so volume multiplied by price per test and payer decisions drive profit. Contract research and manufacturing sell capacity and expertise to drug developers, so backlog, utilisation and customer funding matter. Healthcare IT sells software and data to providers and payers, so subscription revenue, net revenue retention and implementation time matter. Its customers' budgets are slow to move but sticky once a system is embedded in clinical workflow. Then look at the unit economics that fit the type. Look at gross margin, EBITDA margin, capital expenditure and cash conversion. Cash conversion = (EBITDA − capital expenditure) ÷ EBITDA. Services and plants often convert less cash than software or royalty-like businesses, and that changes how much debt each can carry. Healthcare is often called defensive, but the label is loose. Emergency demand is steady, elective procedures follow incomes and waiting lists, and labour costs rise in every part of the sector. Common mistake: using one multiple and one leverage level for all of healthcare, when contracted recurring software can usually carry more debt than a business whose profit depends on one expiring product.

WORKED EXAMPLE: THREE HEALTHCARE BUSINESSES WITH THE SAME EBITDA

Three invented companies each earn EBITDA of 24.0m. Fenmoor Care is a care-home group with maintenance capital expenditure of 8.0m, and its stress case, in which fee rises lag pay and occupancy dips, cuts EBITDA by 25%. Medlinq Systems is healthcare software with 85% subscription revenue and capital expenditure, including capitalised development, of 10.0m, with a stress case that cuts EBITDA by 10%. Brannock Pharma earns 70% of its EBITDA from one drug that loses exclusivity in three years and keeps 20% of that profit afterwards, and it spends 2.0m on capital expenditure. Rank the three by cash conversion and by debt capacity if a lender allows 6.0x stressed EBITDA, and say why the rankings differ. Convention: ignore tax, working capital and the timing of the cliff.

Answer: Cash conversion ranks Brannock first at 91.7%, then Fenmoor at 66.7% and Medlinq at 58.3%. Debt capacity at 6.0x stressed EBITDA ranks Medlinq first at 129.6m, then Fenmoor at 108.0m and Brannock at 63.4m, because durability matters more than conversion.

> **Interview tip:** Open by saying which kind of healthcare business it is, then give its overnight risk, its cash conversion and the stress case you would lend against.

INT.SA.2.d · Healthcare

Value a pharma or biotech business from its marketed products, loss of exclusivity and risk-adjusted pipeline, and say what a private equity buyer can and cannot lever.

Pharma and biotech are valued on products and pipeline, not on this year's earnings alone. Start with the marketed portfolio. Look at net sales rather than gross sales, because rebates, discounts and returns can take a large share of the list price. Then check concentration, since one product often supplies most of the profit. Every drug has patents and regulatory exclusivity

that end, which is called loss of exclusivity. After it, generics or biosimilars typically take volume and price quickly, particularly for small-molecule drugs, so the revenue curve has a cliff. Look for the date, the strength of the patent estate and what replaces the lost profit. Next study the pipeline, sorted by phase. Early assets are cheap and uncertain, and the chance of reaching approval typically rises with each phase passed. Peak sales = patients treated × net price × share. Estimate it from the treatable population, the price payers will accept and the share against rival treatments, then shape the launch curve. Approval is not the end of risk, because payer access and prescriber uptake decide whether sales arrive. Value the pipeline on a risk-adjusted basis. Risk-adjusted value = probability of success × value if approved − cost to get there. Use the cumulative probability across the remaining phases and discount both costs and sales. A pipeline adds little or nothing to debt capacity, because it earns nothing yet and its failure is binary. A private equity buyer therefore tends to favour commercial-stage products, mature brands, consumer health, generics, royalty streams and contract manufacturing, and it sizes debt on earnings after the cliff. A biotech without sales is funded by equity and measured by its cash runway in months. Pricing policy and government negotiation are further risks. Common mistake: valuing peak sales undiscounted and unrisked, or sizing debt on earnings that disappear in three years.

WORKED EXAMPLE: A SPECIALTY PHARMA COMPANY AND ITS CLIFF

Tarnwick Therapeutics is an invented specialty pharma company. Its main product has gross sales of 300m a year, rebates and discounts of 40% of gross, and a contribution margin of 55% on net sales. Exclusivity ends at the end of year 3. Net sales then fall to 40% of the year-3 level in year 4 and 20% in year 5. Other products contribute 11.0m. Central costs are 40.0m, then 30.0m in year 4 and 25.0m in year 5. A phase 3 candidate has a 55% chance of approval in two years, would be worth 480m at approval, and needs 90m of trial spending in year 1. The discount rate is 10%. Estimate the earnings path, the debt the business can carry and the risk-adjusted value of the candidate. Convention: ignore tax and capital expenditure, charge 9% interest on the opening debt balance, apply all EBITDA to debt service in years 1 to 3, and require the debt left at the end of year 3 to be no more than 3.0x year-5 EBITDA.

Answer: Net sales are 180m, EBITDA falls from 70.0m to 5.8m by year 5, debt capacity is about 190.6m (2.7x current EBITDA), and the phase 3 candidate has a risk-adjusted value of 136.4m against 314.9m unrisked.

> **Interview tip:** Walk in order: net sales, the cliff date and what replaces it, debt sized on post-cliff earnings, and the pipeline risked and kept in the equity.

INT.SA.2.e · Healthcare

Stress healthcare earnings against reimbursement and regulatory events, test the adjustments, size the debt and plan the diligence, value creation and exit.

Healthcare deals are won or lost on reimbursement, regulation and earnings quality, so start with the events that can reset earnings. Examples are a tariff cut, a coverage decision, a price negotiation, a licence condition or a failed inspection. Size each one as a change in EBITDA and in leverage. Next test the adjustments. Acquired earnings deserve their full-year effect and no more. Planned synergies, owner pay normalised to a market clinician salary, capitalised development costs, rebate accruals and percentage-of-completion revenue all need a second look. Then size the debt on a stress case. Debt capacity = stressed EBITDA × maximum stressed leverage. Strike leverage after leases and show it on reported and adjusted earnings side by side. Value each part in its own way. Services, devices and diagnostics are usually priced on EBITDA multiples, software on recurring revenue and retention, and a pipeline on risk-adjusted value. Check cash conversion, because a multiple of EBITDA that never turns into cash is worth less than the headline. The first week of diligence should answer five questions. How is revenue split by payer and contract, and when does each reprice? How stable is the clinician roster? How did each acquired cohort perform against its case? What do inspection and quality data show? Which three events would cut EBITDA by ten percent? The data request follows from these answers. Ask for monthly revenue by payer, site and clinician, the cohort file, tariff and contract letters, complaint and incident logs, capital expenditure by site and regulator correspondence. The value creation plan lists price and mix, utilisation, procurement, bolt-ons and central costs, with an owner and a number for each. Plan the exit from the start. Strategic buyers such as larger operators, device groups and pharma companies pay for scale, evidence and pipeline, while other funds pay for a platform with a proven bolt-on engine. Ownership changes may also need regulator consent. Common mistake: underwriting the base case and forgetting that one payer decision can reset the whole model.

WORKED EXAMPLE: A HOME-CARE GROUP FROM ADJUSTMENT TO EXIT

Lindenfield Care is an invented home-care group with revenue of 36.0m, of which 75% comes from local authority contracts. Carer pay is 65% of revenue. Reported EBITDA is 4.8m. Two branches bought mid-year add 0.5m on a full-year basis, the owner is paid 0.3m below a market manager salary, and management claims 0.4m of synergies not yet delivered. Stress case: public fees are frozen, private fees rise 4.0%, carer pay rises 5.0%, and one council contract worth 10% of revenue is lost at a 20% contribution. A lender allows 5.5x stressed EBITDA. The price is 8.0x underwriting EBITDA. Exit is after five years at 8.0x, with 5.0m of debt repaid and base-case year-5 EBITDA of 6.5m. Is the deal attractive? Convention: ignore tax, fees and interest detail, and round debt to 19.0m.

Answer: Underwriting EBITDA is 5.0m, stressed EBITDA is 3.47m, debt capacity is about 19.0m, and the equity cheque is 21.0m. The base case returns 1.81x and 12.6%, and about 8.3m of year-5 EBITDA is needed for 20%.

Interview tip: Run the same sequence out loud: adjust, stress, size the debt, test the returns, and finish with what must be true and what you would diligence first.

INT.SA.3.a · Industrials

Assess an industrial company's cyclicality, operating leverage, backlog and cash conversion, and size leverage on trough rather than peak earnings.

Industrial companies sell machines, components and materials that customers buy when they invest or raise output, so revenue follows the cycle of their customers' confidence and capacity use. Short-cycle businesses such as components and distribution track industrial production within a few quarters. Long-cycle businesses such as large equipment, aircraft parts and shipbuilding ship from orders placed years earlier, so their revenue turns after orders do. Operating leverage turns a modest swing in revenue into a larger swing in profit. Plants, engineers and overheads are largely fixed, so a lost sale costs its full contribution margin rather than the average margin. Contribution margin = (revenue − variable costs) ÷ revenue. Measure decremental and incremental margins from the last cycle rather than quoting an average margin. Decremental margin = fall in EBITDA ÷ fall in revenue. Typically the first quarters of a downturn are the worst, before management cuts hours, temporary labour and discretionary spending. Backlog and book-to-bill give visibility. Book-to-bill = orders ÷ revenue. A ratio above one means the backlog is growing, and a ratio below one for several quarters means revenue will weaken unless orders recover. Backlog is only as good as its terms, so test cancellation rights, deposits, price against today's costs and delivery dates. Short-cycle companies have little backlog, so watch leading indicators instead, such as purchasing managers' surveys, capacity utilisation, distributor stock levels and monthly order intake. Cash behaves differently from profit. In a downturn inventory and receivables fall and release cash, which flatters the first year of a decline, while in a recovery growth absorbs cash. Cash flow available for debt service = EBITDA − capex − increase in working capital. Buyers size debt on trough or mid-cycle earnings, not peak, and test interest cover and covenants on the stressed number. The common mistake is to capitalise peak margins at a mid-cycle multiple and then borrow against them. A nuance generalists miss is that margins a few points above the long-run average usually mean the company is near its peak, however stable the last three years look. Interviewers want to hear you normalise earnings before you price or lever.

WORKED EXAMPLE: SIZING DEBT FOR A PUMP MAKER ON TROUGH EARNINGS

Brannock Pumps is an invented maker of industrial pumps with revenue of 200 and EBITDA of 40 at the top of the cycle. Variable costs are 60% of revenue and fixed costs are 40. Working capital is 20% of revenue. In the last downturn revenue fell 25%. A lender offers 6.0x current EBITDA at 8% interest. Capex at the trough is 6. How much debt should a buyer take? Conventions: ignore tax, assume the cost structure is unchanged, and use year-end flows.

Answer: Fixed costs give Brannock a 40% decremental margin, so a 25% revenue fall halves EBITDA to 20. The lender's 240 would be 12.0x at the trough; sizing at 4.0x trough EBITDA gives debt of about 80, 2.0x peak EBITDA, with cover of about 2.2x on cash flow after capex of 14, not the flattering 24 of the first year.

Interview tip: Say it in four beats: split fixed and variable costs, show EBITDA at the trough, point out that the working capital release flatters the first year, then size debt as a multiple of the trough and name the cover. Mention the cost: more equity and a lower base-case IRR.

INT.SA.3.b · Industrials

Evaluate aftermarket and installed-base revenue, raw material pass-through, and carve-out and operational improvement levers in an industrial target.

The best industrial businesses earn a large share of their profit from an installed base. Every machine sold needs spares, repair, consumables and service for years, and that demand depends on machines in operation rather than on new investment. Aftermarket revenue is therefore steadier, usually higher margin and less cyclical than new equipment, so it can deserve a higher multiple. Test the claim before paying for it. Start with the installed base, its size, its age and where each machine sits in its service cycle. Then measure the capture rate. Capture rate = our aftermarket revenue ÷ total aftermarket spend on our installed base. A low or falling rate means independent suppliers are taking the work. Ask how much is contracted and how much is ad hoc, because discretionary maintenance can be deferred in a downturn. Remember that equipment sales feed the base, so a weak equipment cycle shrinks the aftermarket several years later. Value the two streams separately rather than applying one premium multiple to everything. Margin also depends on pass-through. When steel, resin or copper rises, ask what share of revenue has index-linked prices, how long the lag is, and what must wait for the next list-price round. Even full recovery of the cost, pound for pound, lowers the percentage margin, because revenue and cost rise by the same amount. Carve-outs from conglomerates need standalone cost and perimeter work, because divisional EBITDA is flattered by central services, group purchasing terms, shared sites and intercompany prices. Standalone EBITDA = reported EBITDA + parent recharge − cost of replacing those services. Add the one-off separation costs and the length of the transitional services agreement. The improvement levers are procurement, lean, footprint and pricing. Underwrite the fast, controllable ones in the base case, with their cost to achieve, and treat plant closures that need customer requalification as upside until proved. The common mistake is to accept management's savings at face value. Interviewers want to hear which numbers you would test before you believe the story.

WORKED EXAMPLE: RAW MATERIAL PASS-THROUGH AT A VALVE MAKER

Tarnby Valves is an invented valve maker with revenue of 200, EBITDA of 30 and purchases of steel and castings of 60 a year. Steel prices rise 15% at the start of the year. 60% of revenue is on index-linked contracts that reprice one quarter after the cost moves. The other 40% (revenue 80) is fixed for the year, but a 3% list-price increase is applied from month seven. How much of the cost increase is recovered in year one, and what happens to EBITDA? Conventions: steel cost is spread in proportion to revenue, volumes are unchanged, ignore tax.

Answer: Tarnby recovers 5.25 of a 9.0 cost increase in year one (58.3%), so EBITDA falls 3.75, or 12.5%, to 26.25. At run-rate it recovers 7.8 (86.7%), leaving a 1.2 squeeze, and the margin settles at 13.9% against 15.0% because revenue is higher by the price rises.

> **Interview tip:** State the three diligence questions the arithmetic raises: what share of revenue is indexed, how long is the lag, and when is the next price round. Then say the year-one hit matters most if debt covenants are tested in it.

INT.SA.3.c · Industrials

Classify an industrial target into its sub-sector and use the metrics that fit it: orders and installed base, content and qualification, channel stock, programme rates, inventory turns and order slots.

Industrials is a label for several different businesses, so the first move in any answer is to say which kind of company you are looking at. Machinery and capital equipment makers sell into their customers' investment budgets, so ask for orders, backlog, the installed base and the share of profit from spares and service. Components and engineered products are designed into a customer's product and must be qualified before they are bought. Once qualified they are sticky, but price-downs are often agreed each year, so ask for content per unit, share of the customer's spend, programme lives and the cost savings needed to hold margin. Building products follow housing starts, repair and remodelling and non-residential building, so separate volume from price and look at merchant stock levels. A fall in sales to merchants can reflect destocking rather than weak end demand, and that usually reverses once their shelves are rebalanced. Aerospace and defence suppliers depend on programme build rates, certification and long-term agreements, so check the platform mix, the share of fixed-price development work and the aftermarket. Distributors buy and resell, so gross margin is thinner and the economics sit in inventory turns, branch productivity, supplier rebates and working capital. Inventory days = inventory ÷ cost of sales × 365. Transport equipment makers of trucks, trailers, rail vehicles and ships sell against production slots, so ask for the order book, delivery schedule, used-equipment prices and any financing arm. Whatever the sub-sector, a specialist reads a short list first: gross margin, EBITDA margin through the cycle, capex to sales, cash conversion, working capital days, return on invested capital and order cover. Return on invested capital = EBIT ÷ (net working capital + fixed assets). Typically distributors earn thin margins on light capital, while machinery and components earn higher margins on more fixed assets, so margins alone cannot rank them. Compare returns on capital and cash conversion instead. The common mistake is to use one lens for every industrial, such as

judging a distributor on margin or a capital equipment maker on stock turns. A nuance generalists miss is that components follow customers' output within quarters, while large equipment and aircraft parts lag orders by years. In an interview, name the sub-sector first, say what drives its demand, and then give the two or three numbers you would ask for.

WORKED EXAMPLE: READING A DISTRIBUTOR AGAINST A MACHINE MAKER

An interviewer asks you to compare two invented industrial targets and say what you would read first for each. Calderon Supply distributes fasteners and tools through branches: revenue 400, gross profit 100, EBITDA 32, depreciation 4, capex 4, inventory 80, receivables 60, payables 50 and fixed assets 30. Tressington Presses builds presses and sells spares: revenue 200, gross profit 70, EBITDA 34, depreciation 10, capex 12, inventory 40, receivables 35, payables 25 and fixed assets 110. Conventions: ignore tax, use year-end balances, and for the growth case hold EBITDA constant while revenue grows 10% and working capital stays in proportion to revenue.

Answer: Calderon earns a thinner margin (EBITDA 8.0% against 17.0%) but a higher return on invested capital (23.3% against 15.0%) and converts 87.5% of EBITDA to cash before growth, so its risks are gross margin slippage and working capital. Tressington's risks are cycle, capex and order quality.

> **Interview tip:** Name the sub-sector first, then give two or three numbers that fit it. Say that margin alone does not rank the two, because the distributor earns more per pound of capital, and that you would still stress test each one on its own driver.

INT.SA.3.d · Industrials

Value an industrial company on mid-cycle earnings and cash flow, test returns against the cost of capital, and design the debt package and returns case for a buyout.

Value an industrial company on earnings it can repeat through the cycle, not on the latest year. Enterprise value to EBITDA on mid-cycle EBITDA is the usual starting point, cross-checked against the multiples the sector has traded at across a full cycle. Cyclical multiples mislead in a specific way. The multiple on peak earnings looks lowest just when the market expects profits to fall, and the multiple on trough earnings looks highest just before they recover. So a low multiple on peak EBITDA is not evidence of a bargain. EBITDA also flatters capital-hungry businesses, because it ignores the capex needed to keep plants running. Compare targets on EBITDA less capex, or on EBIT, as well, and separate maintenance capex, which roughly tracks depreciation, from growth capex. Free cash flow = EBITDA − tax − capex − increase in working capital. A free cash flow yield on normalised cash flow shows what a buyer earns before any growth. Return on invested capital against the cost of capital explains why some industrials deserve higher multiples, since a business earning well above its cost of capital on each pound it reinvests creates value. Financing follows the same logic. Lenders and sponsors size term debt on trough or mid-cycle EBITDA and test interest cover and covenant headroom on a downside case. Headroom = 1 − actual leverage ÷ covenant leverage. Covenants are often set with a cushion of roughly a quarter to a third below the base case, but that varies by deal. Seasonal and distribution businesses use a revolving facility, often secured on inventory and receivables, so that borrowing flexes with sales. Build returns from three sources: EBITDA growth, change in multiple and debt paid down. In a cyclical industrial, deleveraging is often the largest source in a prudent base case, which assumes the exit multiple is no higher than the entry multiple. Then test a downside in which the trough lands in year two and the exit multiple falls by a turn. Exits run to trade buyers, other sponsors or a listing, and each pays most for a business that has shown stable margins through a downturn. The common mistake is to value on peak earnings, lever on peak earnings and then count on a high exit multiple. Interviewers want to hear the price set on mid-cycle, the debt on trough, and the return with and without help from the multiple.

WORKED EXAMPLE: PRICING AND LEVERING GARROWBY CONTROLS ON MID-CYCLE EARNINGS

Garrowby Controls is an invented maker of control equipment. Latest-year EBITDA is 50, near the top of the cycle. Mid-cycle EBITDA is 40 and trough EBITDA in the last downturn was 30. The seller asks 7.0x latest EBITDA. You would bid 8.0x mid-cycle EBITDA and borrow 4.5x trough EBITDA at 8% interest, with fees of 2.5% of the price. Capex is 10 a year and working capital investment is 2 a year. Base-case EBITDA rises evenly from 40 to 48 over five years and the exit multiple is 8.0x. Conventions: ignore tax, year-end flows, interest on opening debt, all free cash flow repays debt, no dividends.

Answer: Bid on mid-cycle EBITDA of 40, not the latest 50, and borrow 135 against a trough of 30. The base case returns 1.95x and 14.3%, the downside 1.22x and 4.0%. The deal reaches about 20% only at nearer 7.0x mid-cycle or with a credible improvement plan.

> **Interview tip:** Walk it in order: normalise, price, size the debt on the trough, show base and downside returns, then say what would close the gap to the hurdle. Say plainly that you would not raise leverage to hit the return.

INT.SA.3.e · Industrials

Identify the accounting traps, risks and red flags in an industrial target, and plan the first-week diligence, the value creation plan and the exit.

Industrial accounts have a few predictable places where profit is flattered, and a specialist checks them before trusting EBITDA. Start with long contracts. Under percentage-of-completion accounting, revenue and profit follow the estimated cost to complete, so a more optimistic estimate pulls profit forward in a catch-up. Check the history of estimate changes by contract, the growth in contract assets or unbilled revenue against revenue, and whether cash receipts keep pace. Next, examine the adjustments. Management EBITDA often adds back restructuring, launch costs or run-rate savings that have not yet been delivered. A cost labelled one-off that appears in three years out of four is part of running the business, and savings not yet achieved belong in the value creation plan, not in the earnings you pay for. Look also for costs moved off the income statement, such as development spending capitalised as an asset, maintenance capex deferred, or warranty provisions released to profit. Working capital deserves its own review, because inventory that grows faster than orders, receivables that grow faster than revenue, reverse factoring and a year-end push can all produce unusually good cash flow. Cash conversion = (EBITDA − capex − increase in working capital) ÷ EBITDA. Measure it over a full cycle, because a single downturn year can look excellent when inventory is released. Beyond accounting, the main risks are customer concentration on one platform, fixed-price contracts that carry cost overruns, pension deficits, product liability and warranty claims, environmental liabilities, single-source suppliers and technology shifts such as electrification. The first week of diligence asks a few questions that decide the deal. What happened to orders, margins and cash in the last downturn? How does the margin on backlog compare with the margin on revenue today? Which customers and products make most of the profit? The data request follows, with ten years of monthly orders, backlog, revenue and gross margin by product, contract-level margin history, inventory ageing, capex by project and warranty claims. The value creation plan then separates fast levers such as pricing and procurement from slower ones such as footprint changes and add-ons, with the cost and timing of each. Finally, ask who will buy the business at exit and what they will need to see, usually a clean margin record through a downturn and a documented aftermarket. The common mistake is to accept adjusted EBITDA as the base and build the model on it. Interviewers want a prioritised plan, not a long list.

WORKED EXAMPLE: FROM MANAGEMENT EBITDA TO DILIGENCE EBITDA AT TEASDALE DRIVE SYSTEMS

Teasdale Drive Systems is an invented maker of drive systems for industrial vehicles. Management presents adjusted EBITDA of 48.0. A lender offers 5.0x that figure and the seller wants 8.0x. The adjustments to test are: a restructuring add-back of 4.0 this year, after charges of 3.0 and 3.5 in the two years before; a warranty provision release of 2.0 credited to profit; 2.5 of profit from a catch-up after cost to complete was re-estimated on a long contract; 3.0 of run-rate savings not yet achieved; and development spending of 4.0 that was capitalised. Conventions: ignore tax, treat each adjustment as full-year, and judge the number a buyer should pay for.

Answer: Diligence EBITDA is 33.0, not 48.0. At the seller's 8.0x the price falls from 384 to 264, and the debt offer of 240 is 7.3x the figure that matters. Some of the 15.0 could be recovered by evidence, but the burden of proof is on the seller.

> **Interview tip:** Sort the adjustments into three bins, say which you would accept, and show the effect on price and leverage. Offer to ask for evidence rather than to reject everything.

INT.SA.5.a · Technology and Software

Assess the quality of a software company's recurring revenue from its ARR bridge, retention, acquisition cost and rule of 40, and say how a lender would view it.

Software value rests on how durable, and how cheaply won, the recurring revenue is. Start by defining annual recurring revenue (ARR) tightly, counting contracted subscription and committed usage that repeats, and leaving out implementation fees, one-off licences and overage that may not return. Then build the ARR bridge: opening ARR, plus new customers, plus expansion, less downgrades, less churn, equals closing ARR. Gross revenue retention (GRR) counts only losses against the opening base, so it cannot exceed 100%. Gross revenue retention = (Opening ARR − churn − downgrades) ÷ Opening ARR. Net revenue retention (NRR) adds expansion back, so it can exceed 100%. Strong businesses often show GRR in the 90s and NRR above 100%, but norms differ with customer size, because small business customers usually churn faster than large enterprises. Always ask whether NRR is carried by a few large accounts, by one-off price rises, or by usage that can fall as

easily as it rose. Logo retention counts customers rather than dollars, and a gap between the two shows whether small or large customers are leaving. Cut every measure by annual cohort, because an average can hide a deteriorating recent vintage. Customer acquisition cost (CAC) payback shows how expensive growth is. Payback = Sales and marketing spend ÷ Gross profit on the new ARR it bought. The answer is in years, so multiply by 12 for months. A long payback means each pound of growth ties up cash for years, and a short one means growth is cheap to buy. The rule of 40 adds growth and margin, and it flatters a company whose growth is bought with leaky, expensive sales. Compare ARR with billings and deferred revenue, because annual prepayment makes cash look better than revenue earned, and billings growth that falls below revenue growth often signals a slowdown. Lenders like contracted, sticky revenue and often lend against ARR. They size the loan on retention and on the cash the business would make with growth spend cut back, not on the headline. The common mistake is quoting growth without retention. Ask for the bridge before the headline.

WORKED EXAMPLE: TESTING THE ARR QUALITY OF FERROW LEARNING

Ferrow Learning (invented) sells training software to companies. It opened the year with ARR of 80.0m from 400 customers. During the year 44 customers left, taking ARR of 5.6m, and downgrades took 2.4m. Existing customers expanded by 14.4m, of which 7.2m came from three large accounts moving to a higher tier. New customers added 12.0m. Sales and marketing was 13.8m, all treated as the cost of winning those new customers, and gross margin is 76%. Build the bridge, find gross and net retention, logo retention, net retention without the three large accounts, and the CAC payback in months, then say what you make of it. Convention: year-end ARR; ignore tax and billing timing.

Answer: Closing ARR 98.4m (23.0% growth), GRR 90.0%, NRR 108.0% but 99.0% without three accounts, logo retention 89.0% and payback about 18.2 months. Decent growth on a base that leaks 10% a year, with net retention that depends on three customers.

> **Interview tip:** Say it in this order: bridge, gross retention, net retention and who carries it, then payback. For example: gross 90, net 108 but 99 without three accounts, payback 18 months, so diligence the three accounts.

INT.SA.5.b · Technology and Software

Restate a software take-private's adjusted EBITDA for stock-based pay and capitalised development, size the value creation levers, and test disruption and switching-cost risk.

In a take-private the buyer pays a premium for control, so the questions are what cash earnings the business really makes and what can be improved. Company-defined adjusted EBITDA often adds back stock-based compensation (SBC). Once the company is private those awards must be replaced by cash pay or a management incentive plan, so most of the add-back is a real cost. Capitalised development costs sit on the balance sheet and bypass EBITDA, yet the engineers are still paid in cash. So deduct them, or look at EBITDA less capitalised development. Sales commissions are often capitalised too, so compare the commissions paid in cash with the amount expensed. Restated earnings = Adjusted EBITDA − SBC − capitalised development − excess capitalised commissions. The multiple on restated earnings is higher than the headline multiple, and showing that gap is the first thing to do with an interviewer. The value creation levers are removing listed-company costs, general and administrative and hosting savings, sales efficiency, pricing power tested against churn, and add-on acquisitions. A price rise looks almost free because it carries no extra cost, but it must be netted against the gross profit lost on any customers who leave. Then test durability. Switching costs come from workflow depth, stored data, integrations, and the time and cost of replacement. The best evidence is behavioural: past price rises with little change in retention, and replacement projects that take many months. Satisfaction scores and long contracts are weaker evidence. Disruption risk is highest where pricing per seat shrinks if the customer needs fewer users. Switching costs protect against leaving but not against shrinking. Check seat counts at renewal, and whether the product can move to pricing by usage or outcome. Deferred revenue from annual prepayment funds the business, so agree how it is treated in the price, because the treatment of customer prepayments is often debated. The common mistake is paying a multiple of flattering EBITDA. Restate the earnings first, then talk about the multiple.

WORKED EXAMPLE: RESTATING EARNINGS FOR THE PELLMOOR DISPATCH TAKE-PRIVATE

Pellmoor Dispatch (invented) is a listed software company with revenue of 240m and company-defined adjusted EBITDA of 60m, which already adds back SBC of 7.2m. It capitalised 9.6m of development, and paid 1.2m more sales commission in cash than it expensed. A buyer would pay an enterprise value of 600m. The plan removes 3.6m of listed-company costs, saves 2.4m of hosting cost and raises prices by 2% across the base; the buyer expects 1% of revenue to churn as a result, at a gross margin of 75%. Restate the earnings, compare the multiples and size the plan. Convention: SBC is replaced in full by cash pay; savings and the price rise are shown at run rate; ignore tax.

Answer: Restated earnings are 42.0m, so 600m is 14.3x rather than 10.0x. A delivered plan reaches about 51.0m (21.0% margin, 11.8x entry price), but 2.95m of that depends on the churn assumption.

Interview tip: Open with the restatement and say the gap aloud: the headline says 10 times, the cash figure says 14.3 times, and the plan only closes part of the difference.

INT.SA.5.c · Technology and Software

Place a technology target in its sub-sector (software as a service, vertical software, infrastructure and tools, IT services, internet and marketplaces, or hardware), name the metric that leads for it and say how much debt it suits.

Technology is not one sector, so the first answer to a question about a tech company is which kind it is. Software as a service (SaaS) sells subscription software across many industries, with gross margin often in the 70s or 80s and a cost base weighted to engineering and sales. Its leading numbers are annual recurring revenue, retention and customer acquisition payback. Vertical software serves one industry, such as practice management for dental clinics, and often embeds payments or other services. Deeper workflow usually means lower churn, more pricing power and steadier but smaller growth, which suits a buy-and-build plan. Infrastructure and tools, such as databases, security and developer software, often charge by usage. Revenue then follows the customer's consumption, so net retention is lumpier, and hosting cost sits in gross margin. IT services is a people business. Revenue = Billable staff × Utilisation × Billable days × Day rate. Gross margin is often in the 20s or 30s, and the numbers that lead are utilisation, attrition, bookings, and the share of work under managed-service contracts that renew. Internet and marketplaces earn a take rate on the value of transactions between two sides. Take rate = Revenue ÷ Gross merchandise value. Look at repeat behaviour by cohort and at contribution margin after variable costs, because attracting both sides is expensive. Hardware earns units times price, with gross margin often well below software, and carries inventory, supply chain and product-cycle risk. An installed base that pulls through consumables or service contracts is what makes hardware recurring. Many targets are hybrids, so split revenue and gross profit by line and judge each part with its own measure. Recurring share of revenue can mislead, because a low-margin recurring line counts for less of the profit than of the revenue. Debt capacity follows this map. Lenders tolerate more debt where revenue is contracted and sticky, the cost base can flex and capex is light. They tolerate less where revenue is transactional, cyclical or tied to product launches. The common mistake is applying software metrics to a services business, or a software multiple to hardware revenue. Name the kind, name the number that leads for it, then say how much debt it suits.

WORKED EXAMPLE: LABELLING THE HYBRID BRACKENFELL SYSTEMS

Brackenfell Systems (invented) has revenue of 120m: subscription software of 48m at an 82% gross margin, installation and support services of 42m at 28%, and hardware devices of 30m at 38%. EBITDA is 18m. An interviewer asks what kind of technology company it is, which numbers you would look at first and what that means for debt. Work out gross profit by line, the blended margin, and the recurring share of revenue and of gross profit. Convention: subscription is the only recurring line; ignore tax and capex.

Answer: A hybrid, software-led on profit: blended gross margin 52.1%, subscription 40.0% of revenue and 63.0% of gross profit. Lead with retention for subscription, utilisation for services and inventory for hardware, and size debt on the recurring profit, which covers 88.4% of operating costs.

Interview tip: Do not just say tech. Say the kind, say which line carries the profit, name the lead number for each line, and tie the debt to the part a lender can trust.

INT.SA.5.d · Technology and Software

Choose the valuation measure that fits a technology buyout, convert revenue multiples into earnings multiples, size debt on no-growth cash cover and attribute returns to growth, margin and multiple.

Valuation in technology starts by choosing a measure that fits the company's stage and sub-sector. A fast-growing software business with thin margins is often priced on a multiple of ARR or revenue, because growth spending depresses its EBITDA. A mature one is priced on EBITDA less capitalised development, or on unlevered free cash flow. Services and hardware are

priced on EBITDA or EBITDA less capex, using earnings through the cycle. Marketplaces are often priced on contribution profit or gross profit. A revenue multiple hides margin, so convert it. Revenue multiple = EBITDA multiple × EBITDA margin. A buyer paying a high revenue multiple is therefore betting on a margin it must be able to reach, so ask what margin the cost base allows once growth spending is trimmed. Enterprise value divided by gross profit puts a software company and a services company on the same footing, because it removes the difference in delivery cost. A multiple of ARR is only comparable between companies with similar retention, growth and margin. Leverage follows the cash. Early-stage companies with recurring revenue but little profit may borrow against ARR, often on terms that later convert to EBITDA tests. Mature companies borrow against EBITDA, and the limit is set by interest cover and free cash flow after interest in a no-growth case. Cover = No-growth cash EBITDA ÷ Cash interest. Returns come from three sources: EBITDA growth, the change in the multiple, and debt repaid from cash flow. Base cases should not assume multiple expansion, and a company whose growth slows usually exits on a lower multiple than it entered on. Exits are to a strategic buyer, to a larger sponsor or by listing, and each pays for scale, growth and margin proven on cash earnings. The common mistake is paying a growth multiple and assuming the exit buyer will pay it too. Test the deal against a flat margin and a lower exit multiple before agreeing a price.

WORKED EXAMPLE: RETURNS ON THE BRIGHTWATER COMPLIANCE BUYOUT

Brightwater Compliance (invented) sells regulatory software to banks, with revenue of 150m and restated EBITDA of 30m (a 20% margin). A sponsor pays 14.0x restated EBITDA and borrows 150m. The plan lifts revenue to 240m in five years and the margin to 26%. Growth slows, so the exit is at 12.0x. Cumulative free cash flow after interest of 80m repays debt. Find the entry revenue multiple, the exit equity value, MOIC and IRR, split the gain into its sources, and test a case where the margin stays at 20%. Convention: ignore fees and tax beyond the cash flow given; no interim dividends; exit at the end of year 5.

Answer: Entry 420m (2.8x revenue). Base case: exit equity 678.8m, MOIC 2.51x, IRR about 20.2%, driven by EBITDA growth of 453.6m, less 124.8m from multiple compression, plus 80.0m of debt repayment. If the margin stays at 20%, IRR falls to about 13.4%.

> **Interview tip:** Always give the attribution and the stress: EBITDA growth carries the deal, the multiple falls two turns, and if the margin plan fails the return drops from about 20% to about 13%.

INT.SA.5.e · Technology and Software

Find the accounting traps and failure modes of each technology sub-sector, set out the first-week diligence and value creation plan, and finish with a compact view of an invented target.

Each sub-sector hides its own accounting traps, so diligence starts with where the numbers can flatter. In software, check how ARR is defined, whether multi-year deals are counted in full, and whether billings growth lags revenue growth. Also check capitalised development, capitalised commissions and the way stock-based pay is treated. In IT services, look at unbilled revenue, because work done but not invoiced can hide disputes. Check fixed-price contracts too, where percentage-of-completion estimates can bring profit forward. Marketplaces report revenue gross when the company acts as principal and net when it acts as agent, so the same business can show very different revenue and multiples. Look also at incentives that inflate transaction value. In hardware, compare sales to distributors with sales to end customers, since stuffing the channel pulls revenue forward, and check inventory ageing, warranty provisions and component commitments. Across every kind, receivable days that climb, adjustments that grow each year and one customer above about 15% of revenue are red flags. Contracts matter too, so look at change-of-control clauses, termination for convenience and renewal dates for the top customers. The first week should produce the revenue bridge by cohort, the top twenty customers with their terms, the pricing history, win rates and a quality of earnings view. Then speak to customers directly, including some that left, because they say why in a way a model cannot. Review the technology itself: architecture, security, hosting cost, open-source licences and dependence on key engineers. Cycles differ. IT budgets, projects and hardware orders fall quickly in a downturn, while subscription revenue falls more slowly as contracts come up for renewal. The value creation plan should name each lever, its owner, its measure and its date, with price, cost and sales efficiency first and acquisitions after. The exit view asks who buys, at what growth and margin, and whether the numbers will have been proved on cash earnings. The common mistake is diligence by management model alone. Customer calls and cohort data should settle the plan, and the finishing question is always what would make it fail.

WORKED EXAMPLE: A FIRST-WEEK VIEW OF CALDERWICK FIELD SERVICE

Calderwick Field Service (invented) sells scheduling software and handheld devices to repair firms. Revenue rose from 77.6m to 90.0m. Deferred revenue was 25.0m at the start of year one, 30.0m at the end of year one and 31.5m at the end of year two. Receivables were 12.0m at the end of year one and 18.5m at the end of year two. The largest customer is 22% of revenue and can terminate on a change of control. Adjusted EBITDA is 21.6m after adding back SBC of 3.6m, and 5.4m of development was capitalised. The asking enterprise value is 270m, and a lender offers 5.0x adjusted EBITDA at 9% interest. Give a compact view. Convention: billings = revenue + increase in deferred revenue; days = receivables / billings x 365; ignore tax and capex.

Answer: Revenue growth of 16.0% outruns billings growth of 10.8%, receivable days have risen from 53 to 74, one customer is 22% of revenue with a change-of-control right, and cash earnings of 12.6m make 270m a 21.4x price with 1.30x cover on the offered debt. Pass at this price, and re-engage only after the week-one checks and with much less debt.

> **Interview tip:** Finish with a decision and its conditions: not at this price, here are the three week-one checks that could change my mind, and here is the lower debt I would accept.

INT.SA.6.a · Business Services

Judge the revenue quality and margin of a business services company by contract mix, retention, organic versus acquired growth, and price against wage inflation.

Business services companies sell people and process under contract, so the first job is to judge how good the revenue is. Start with how much of next year's revenue is already under contract and on what terms. Multi-year contracts that renew at retender are worth more than spot or project work, and renewal is the real test, because incumbents often concede price to keep the work. Check termination rights as well, since a five-year contract that the customer can end on three months notice is not five years of revenue. Then look at the pricing basis. Indexed, cost-plus and open-book contracts pass wage rises to the customer, while fixed-price contracts leave the supplier to absorb them until renewal. Next, strip out acquisitions to find organic growth. Organic growth = Reported growth − Acquired growth − Currency effect. An acquisition counts as acquired growth until it has been owned for a full year, so its effect keeps appearing in the following year's comparison. Split organic growth into price and volume, because price rises alone do not show that the company is winning work. Retention shows how much new work is needed just to stand still. Required new wins = 1 − Retention + Volume growth. A group that keeps 88% of its book and wants 3% volume growth must win about 15% of opening revenue every year. Margin is the other half of the picture. Labour is often 60% to 75% of revenue in cleaning, security and support services, so a wage rise that is only partly recovered cuts the margin quickly. Build the repricing calendar contract by contract and ask what share of revenue reprices this year. Statutory minimum wage rises hit hardest where pay sits close to the legal floor. One nuance is that pass-through contracts protect profit in money but dilute the percentage margin, because revenue rises with no extra profit on the pass-through. So judge such a business on EBITDA per contract or per site as well as on margin. The common mistake is to treat long contracts as safe when they are fixed price and the wage bill is rising.

WORKED EXAMPLE: READING THE GROWTH AND THE WAGE SQUEEZE AT LARKHILL SUPPORT SERVICES

Larkhill Support Services (invented) cleans and secures commercial buildings. Revenue rose from 240.0m to 276.0m, of which 18.0m came from a bolt-on bought during the year. Contractual price escalators added 4.0 percentage points to growth, and 90% of last year's contract value was retained. On each 100 of revenue, labour is 68, other costs are 20 and EBITDA is 12. Next year wages rise 5%. Of revenue, 60% is on contracts indexed to wages, which pass the labour cost rise straight through, and 40% is fixed price until renewal after next year. Work out organic growth, the volume growth, the new work to be won, the new margin, and what the margin would be if every contract were indexed. Convention: price and volume otherwise unchanged, other costs flat, indexed contracts recover the labour cost increase but no margin on it.

Answer: Organic growth is 7.5% (reported 15.0%), volume growth is 3.5%, new wins needed are 13.5% of opening revenue (32.4m), the margin falls to 10.4% with 60% indexed, and a fully indexed book would hold EBITDA in money but dilute the margin to 11.6%.

> **Interview tip:** Give organic before reported, split price from volume, then do the wage arithmetic per 100 of revenue and say which share of the book cannot reprice this year.

INT.SA.6.b · Business Services

Test a buy-and-build plan in business services: the multiple arbitrage, integration risk, customer concentration, and the working capital and cash conversion that fund it.

Fragmented service markets invite buy-and-build, in which a sponsor buys a platform and adds smaller competitors. The thesis is multiple arbitrage, because the bolt-ons are bought at lower multiples than the larger, more diversified group may command at exit. Arbitrage = Acquired EBITDA × (Exit multiple − Purchase multiple) − Integration costs. It is real only if three things hold: the acquired earnings are verified, integration works and the exit multiple survives. Verify acquired earnings by rebuilding them, which means normalising the owner's pay, checking revenue customer by customer and adding the cost of moving staff onto the buyer's pay scales. Effective multiple = Price paid ÷ Earnings after adjustments. A bolt-on bought at 5.0 times reported EBITDA may really cost 6.0 times or more once these adjustments are made. Integration risk shows up as customers lost after the deal, managers who leave, payroll and systems that do not merge, and management time spread too thin. Stage the programme with gates, so that no further deal is signed until the earlier ones have met their retention and margin targets. Test customer concentration through the contract term, termination rights, the contract margin before shared overheads and the cost to the customer of switching. Where renewal of the largest contract is uncertain, size debt on EBITDA without that customer, remembering that the shared overheads stay when the customer leaves. Deferred consideration and earn-outs are debt-like, so include them in net debt and in the cash plan. Finally, service businesses grow into working capital. Receivables = Revenue × Debtor days ÷ 360. Faster growth and slow-paying customers, such as public bodies, absorb cash even when margins are good. Cash conversion = (EBITDA − Capex − Increase in working capital) ÷ EBITDA. Debt is serviced from cash, not from EBITDA, so low conversion shrinks what the business can borrow. The common mistake is to count the arbitrage and ignore the cash.

WORKED EXAMPLE: TESTING THE ROLL-UP AND ITS CASH AT MERIDALE CLEANING GROUP

A sponsor owns Meridale Cleaning Group (invented), a platform with EBITDA of 18.0m bought at 9.0x (162.0m). It buys five bolt-ons with combined reported EBITDA of 10.0m for 5.0x (50.0m), of which 10.0m is an earn-out payable next year. Diligence finds that the owners were paid 1.0m below a market salary for managers and that moving the bolt-on staff onto Meridale's pay scales costs 0.9m a year. Integration costs 6.0m. The plan assumes a 9.0x exit on total EBITDA. After the deals the group has revenue of 280.0m, capex of 2.6m, debtor days of 55 on a 360-day year, organic revenue growth of 5% and debt of 130.0m at 8%. Work out the true acquired EBITDA, the effective multiple, the gain at 9.0x and 8.0x, the break-even exit multiple and the cash left after interest. Convention: ignore fees and tax, hold EBITDA flat, treat the earn-out as part of the price.

Answer: True acquired EBITDA is 8.1m, an effective multiple of 6.2x; the gain is 16.9m at a 9.0x exit and a loss of 9.2m at 8.0x; break-even is 8.4x; conversion is 81.8% and cash after interest of 11.0m is about the size of the 10.0m earn-out.

> **Interview tip:** Quote the gain, then the rebuilt earnings and the break-even multiple, and finish with the cash: arbitrage that the cash flow cannot fund is not a return.

INT.SA.6.c · Business Services

Place a business services company in its sub-sector and read the unit economics that govern it: contract margin, gross profit per head, utilisation, capital intensity and sensitivity to volume.

Before analysing a business services company, say which kind it is, because the main sub-sectors earn money in quite different ways. Outsourcing, facilities and support services, such as cleaning, security, catering and maintenance, sell labour hours under multi-year contracts. Their EBITDA margins are often in the mid single digits to low teens and their capital needs are small. Value sits in retention at retender, contract margin, staff turnover and the share of revenue that reprices with wages. Testing, inspection and certification companies sell independent assurance that a product, site or system meets a standard. Demand is often set by regulation or by customers' own contracts, the work repeats on a cycle, and margins are often in the high teens or above. Look at revenue per inspector or laboratory, accreditation, spending on equipment and the share of recurring re-testing. Staffing companies sell hours of temporary workers or fees on permanent placements. Think in gross profit, not revenue, because revenue includes the pay of the worker. Conversion ratio = EBITDA ÷ Gross profit. Staffing is cyclical because temporary hours are cut first in a downturn and the costs of recruiters and branches are slower to fall. Professional services sell expertise by the hour or the project. Utilisation = Billable hours ÷ Available hours. Three things set the margin: utilisation, realisation, which is the share of standard rates actually collected, and the pyramid of juniors to seniors. Data and information providers sell subscriptions to proprietary content, so renewal rates, price increases and the cost of keeping the data fresh set the margin. Regulated compliance services, such as statutory safety inspection, are demand created by law. Visits repeat at a legal frequency, so route density, technician productivity and renewal rates matter, and a change in the rule is the main risk. The usual mistake is to compare margins across these groups, because a staffing margin of 5% and a data margin of 30% describe different businesses. Compare each company with its own sub-sector and ask what drives gross profit per employee.

WORKED EXAMPLE: READING THREE SUB-SECTORS WITH THE SAME REVENUE

Three invented companies each have revenue of 200.0m. Alderstone Staffing has gross profit of 36.0m, operating costs of 27.0m and capex of 1.0m. Brindle Facilities has direct delivery costs of 176.0m, central overheads of 8.0m and capex of 4.0m. Cavendish Testing has EBITDA of 44.0m and capex of 14.0m. Compute the metric a specialist would read first for each, compare them on cash after capex, and then apply a 10% volume fall. Convention for the fall: Alderstone's gross profit falls 10% and its operating costs 5%; Brindle's direct costs fall in proportion and its central overheads stay; half of Cavendish's costs are fixed and half vary with volume. Ignore tax and working capital.

Answer: Staffing: 18.0% gross margin, 4.5% EBITDA margin, 25% conversion ratio. Facilities: 12.0% contract margin, 8.0% EBITDA margin. Testing: 22.0% margin, 68.2% conversion before working capital. EBITDA less capex is 8.0m, 12.0m and 30.0m. A 10% volume fall cuts EBITDA by 25.0%, 15.0% and 27.7%.

Interview tip: Name the sub-sector first, then the one metric that governs it, and compare cash after capex and sensitivity to volume instead of headline margins.

INT.SA.6.d · Business Services

Value a business services company and size its debt from cleaned EBITDA, cash conversion and a stressed downturn case, and say where the returns will come from.

Valuation in business services starts from enterprise value to EBITDA, but the multiple means little until the earnings are cleaned and compared with cash. First check which EBITDA is meant. Under IFRS 16 lease accounting rent is taken out of EBITDA, which flatters businesses that rent depots, branches and vehicles. Use EBITDA after lease payments, or add the lease liabilities to debt, and apply the same choice to peers. For roll-ups, EBITA is often fairer because acquired intangibles are amortised, but check for development and contract costs that have been capitalised and so never reach EBITDA. Multiples differ by sub-sector because they capitalise quality. Mandatory, recurring, low-capital and fast-converting earnings, as in testing and compliance work, often earn higher multiples than thin-margin cyclical earnings, as in staffing and basic facilities. Cash conversion is the filter. Free cash flow = EBITDA − Capex − Increase in working capital − Tax. Rate the business on free cash flow yield as well as on the multiple. For cyclical businesses such as staffing, value earnings through the cycle, because a peak multiple on peak earnings is the classic overpayment. Debt capacity comes from stressed earnings and cash, not from the headline multiple. Run a downturn case in which gross profit falls faster than costs, and check leverage and interest cover at the trough. Fixed charge cover = (EBITDA − Capex − Tax) ÷ (Interest + Scheduled repayments). Contracted, high-conversion businesses can often carry more debt, while staffing usually carries less and funds part of itself against its receivables. Count drawn invoice finance as debt, since it must be repaid. Returns come from three sources, which are EBITDA growth, the change in the multiple and debt repaid. Equity value = EBITDA × Exit multiple − Net debt. Because conversion limits repayment, growth must come from price, utilisation, route density, procurement and bolt-ons, and the plan should assume an exit multiple no higher than entry. The common mistake is to lever a business on EBITDA that does not turn into cash.

WORKED EXAMPLE: SIZING DEBT ON TROUGH EARNINGS AT CORVANE STAFFING

A sponsor is bidding for Corvane Staffing (invented), a temporary-staffing business with revenue of 400.0m, gross profit of 80.0m (20.0%), operating costs of 56.0m and capex of 3.0m. The sponsor will pay 7.0x EBITDA and a lender offers 4.5x EBITDA, with a covenant at 6.0x. In a downturn, revenue falls 15%, the gross margin holds at 20.0% and operating costs fall only 5%. Debtor days are 45 on a 360-day year and fall with revenue. Interest is 9% and lenders want leverage at the trough no higher than 5.0x. Work out the trough EBITDA, the leverage on the offered debt, the debt the business can carry, the equity cheque and the interest cover at the trough. Convention: ignore tax and other working capital.

Answer: Trough EBITDA is 14.8m (down 38.3%), so the offered 108.0m is 7.3x at the trough; the business can carry about 74.0m (3.1x peak), the equity cheque is 94.0m (56% of the price) and trough interest cover is 1.8x.

Interview tip: Always give two numbers for leverage, at peak and at the trough, and say that the debt was sized on the second one.

INT.SA.6.e · Business Services

Find what goes wrong in a business services company, rebuild its earnings from contracts, labour and accounting adjustments, and plan the first weeks of diligence.

What goes wrong in business services is usually visible in the contracts, the cash or the adjustments, so diligence starts there. The first risk is the contract book, such as a large contract lost at retender, a customer who brings the work in house, or a price concession given to win a renewal. The second is labour, such as a minimum wage rise, a shortage of skilled

technicians, or a back-pay claim because workers were classified wrongly or holiday pay was set too low. The third is regulation and liability, such as an accreditation withdrawn, a missed safety defect, or a rule change that cuts the number of required visits. Then come the accounting traps. Adjusted EBITDA often adds back restructuring that recurs every year, costs capitalised as mobilisation or development, accrual releases and savings that have not yet happened. On long contracts, check revenue recognised ahead of billing, because accrued income that keeps growing is cash not yet received. Check service credits and penalties for missed targets, which can be netted off revenue or provided too late. Rebuild the earnings before the model starts. Diligence EBITDA = Management EBITDA − Unsupported add-backs − Capitalised costs − Accrual releases. In the first week, ask for the contract register, with term, notice period, pricing basis, renewal date and contract margin for every material contract. Ask also for customer cohorts by year to show retention, headcount and pay bands by site, debtor ageing and accrued income, and the pipeline with win rates. Then test the value creation plan, which is price, utilisation or route density, procurement and bolt-ons, each with an owner and a date. Finally, ask who buys the business at exit and what they will pay for. Set leverage on the diligence EBITDA, not on the management figure. A nuance a generalist misses is that a contract won at a low margin with its start-up cost capitalised looks profitable until the cost is expensed. The common mistake is to build the model before rebuilding the earnings.

WORKED EXAMPLE: AN END-TO-END LOOK AT BRENHOLT FIRE AND SAFETY

Brenholt Fire and Safety (invented) inspects and services fire alarms and extinguishers in commercial premises, where the inspection frequency is set by law. Revenue is 150.0m and management EBITDA is 27.0m, which the sellers ask the sponsor to value at 9.0x and finance with debt of 5.0x. Of revenue, 78% is on three-year inspection contracts with 93% retention and 70% of contracts index-linked. One framework agreement, 14% of revenue, is retendered within 12 months and a price concession of 3% is likely. Diligence disallows an accrual release of 1.0m, mobilisation costs of 1.6m that were capitalised, unrealised savings of 1.4m and restructuring of 0.8m that recurs every year. Capex is 4.5m, the working capital increase 2.1m and interest 8%. Rebuild the earnings, re-price, test cash and leverage, and give a view. Convention: ignore tax, the concession falls fully to EBITDA, debt is 4.5x diligence EBITDA.

Answer: Diligence EBITDA is 22.2m rather than 27.0m, so the asked price of 243.0m is 10.9x, the sellers' debt is 6.1x, cash conversion is 70.3%, and debt of about 99.9m (4.5x) is more suitable; the framework retender is a further 0.63m of EBITDA at risk.

> **Interview tip:** Show the earnings bridge first, restate the multiple and the leverage on the rebuilt figure, then name the one contract and the one accounting item you would check next.

INT.SA.7.a · Energy and Infrastructure

Separate an energy or infrastructure business's contracted, regulated and merchant cash flow and size the debt it can carry.

The first question in energy and infrastructure is how much of the revenue is contracted, regulated or merchant, for how long, and with whom. Contracted revenue is fixed by agreement, such as a power purchase agreement, a take-or-pay pipeline contract or an availability payment from a public authority. Merchant revenue moves with power, commodity or traffic prices and carries no promise. A regulated network is different again. It earns an allowed return on a regulated asset base (RAB) that the regulator sets for a price control period, so earnings grow as accepted investment lifts the RAB and are reset at each price review. Regulated debt is usually judged as net debt to RAB, often around 60 percent, rather than by a project cover ratio. Concession length sets how long the cash flows last, so debt should amortise inside it with a tail of unused years. Availability payments are reduced by deductions when the asset is not available, so ask for the history of deductions. Ask what share of revenue and of cost is inflation linked, and to which index, because a mismatch squeezes cover. Lenders size debt on the debt service cover ratio (DSCR), using cash flow available for debt service (CFADS). DSCR = CFADS ÷ annual debt service. Lenders typically accept thinner cover on contracted cash than on merchant cash, so size each stream separately. The risks that remain are refinancing before the contract ends, the credit of the party paying the contract, and the merchant tail afterwards. A generalist often misses that the same output can be contracted in year three and merchant in year thirteen, so cover must be tested year by year and not on an average. Common mistake: applying one multiple and one leverage level to all the EBITDA.

WORKED EXAMPLE: SIZING DEBT ON A CONTRACTED WIND PORTFOLIO

Brackwater Wind is an invented portfolio with cash flow available for debt service (CFADS) of 12.0m a year, flat. Of this, 9.0m comes from a 15-year power purchase agreement with an investment grade utility and 3.0m is merchant. Lenders want a DSCR of 1.30x on contracted cash and 2.00x on merchant cash, with a 15-year level annuity at 5% interest. The enterprise value (EV) is 150m. How much debt can it carry? Convention: annual payments at year end, ignore tax and fees.

Answer: Debt capacity is about 87m, 58% of EV, because lenders size each stream separately. The contracted stream carries most of it, so a counterparty downgrade to 1.60x cover cuts debt by about 13m to 74m.

Interview tip: Say that you split the cash flow by type before you talk about leverage, and name the cover ratio you used for each part. Then volunteer the counterparty stress, because it shows you know what the contracted debt depends on.

INT.SA.7.b · Energy and Infrastructure

Assess a commodity-exposed or energy-transition-exposed business using breakeven prices, reserve life, decline and capital intensity, and judge its fit for leverage and an infrastructure exit.

Commodity-exposed energy businesses are valued and financed on what happens when the price falls, not on today's price. Start with the cash breakeven price. Cash breakeven = operating cost + sustaining capex + interest, all per unit of output. The gap between the spot price and the breakeven is the margin of safety, and it is worth quoting as a percentage of the price. For a producing asset, reserve life shows how long the asset can run. Reserve life = reserves ÷ annual output. The decline rate shows how much output disappears each year without new drilling, often 15 to 20 percent for an unmaintained field. Multiply the lost output by the finding and development cost per barrel to get the capex needed just to stand still, which is why EBITDA overstates free cash flow. Debt should repay inside the reserve life, because the reserves are the collateral and they are being used up. Size debt on a lender price deck, usually near mid-cycle, and on hedges covering the early years, rather than on spot. Check how long the hedges run, what they cap and who the hedge counterparty is. A gas-fired plant has the same logic through its margin, which is power price less fuel cost less carbon cost per unit of output. For transition and policy risk, ask what a carbon price, a subsidy change, a capacity contract ending or a regulatory reset does to margin, and test the plan at several values. Look for contracts that pass fuel or carbon cost through to the customer. For the exit, infrastructure investors usually pay higher multiples for contracted, long-duration cash flow than trade buyers pay for merchant cash flow. A value creation plan may therefore be to contract the revenue, even though it lowers EBITDA, because a lower profit at a higher multiple can still raise value. Common mistake: levering a cyclical asset at peak prices.

WORKED EXAMPLE: BREAKEVEN AND LEVERAGE FOR A SMALL OIL PRODUCER

Harbury Upstream is an invented producer making 2.0m barrels of oil equivalent (boe) a year from 16m boe of reserves. Operating cost is 22 per boe, sustaining capex is 25 per boe and it has 100m of debt at 8% interest. The oil price is 70 per boe today. Find the cash breakeven price, the free cash flow at 70, 50 and 45, and say how you would size new debt. Convention: annual figures, ignore tax and hedging.

Answer: Cash breakeven is 51 per boe against 70 spot. Free cash flow is 38m at 70 but negative at 50 and 45, and the asset has 8 years of reserves that need continuous capex, so debt must be sized on a lower deck with hedges.

Interview tip: Quote the breakeven first, then the margin of safety, then show the price at which free cash flow turns negative. Interviewers want to hear that you lever the downside price, not the spot price.

INT.SA.7.c · Energy and Infrastructure

Classify an energy or infrastructure company into its sub-sector and read the first metrics a specialist checks for each, with what normal looks like.

Energy and infrastructure covers businesses with very different economics, so the first job is to say which one you are looking at. A regulated utility earns an allowed return on its asset base, so read RAB growth first, then how far actual cost sits below the regulator's allowance. A contracted renewable plant sells output under a long agreement, so read its capacity factor. Capacity factor = annual output ÷ (capacity × hours in the year). Lenders size debt on the P90 output, which is exceeded in nine years out of ten, while equity cases often use the P50. A merchant power plant sells at market prices, so read the capture price it actually receives, which for wind and solar is often below the average price because output clusters when supply is high. Upstream oil and gas is read through lifting cost, netback per barrel and the decline rate, and midstream through throughput against contracted capacity and the share that is take-or-pay. Fee-based pipelines behave more like infrastructure than like oil. Transport earns from traffic or a toll, so read volumes against the forecast and ask how far they fall in a

recession. Social infrastructure earns an availability payment, so read the deductions and the lifecycle maintenance cost. Towers earn rent per tenant, so read the tenancy ratio, which is tenants per tower, together with the escalator in the lease. Each extra tenant adds little cost, so incremental margins are very high, and the risks are churn when customers merge and the ground lease cost. Fibre networks are read through penetration, which is homes connected as a share of homes passed. EBITDA margins are often 70 percent or more for towers and contracted renewables, but a high margin can hide heavy capital intensity, so always set capex beside EBITDA. Common mistake: comparing EV/EBITDA across sub-sectors without asking how much of the EBITDA is contracted and how much capex it needs.

WORKED EXAMPLE: READING FOUR INFRASTRUCTURE ASSETS BY THEIR FIRST METRIC

Orrin Fund is an invented investor holding four assets, and an interviewer asks you to name the sub-sector of each, the first metric you would check, and how exposed each cash flow is to its own driver. Millbrook Water is a regulated network with a RAB of 600m, an allowed return of 5.0% and RAB growth of 4% a year. Fenner Wind is a 60 MW wind farm with a P50 capacity factor of 34%, a P90 capacity factor of 30% and a power purchase agreement for all output at 75 per MWh. Harwick Towers has 2,000 towers with 1.5 tenants each, paying 1,200 a month per tenant. Calder Pipeline earns 24.0m a year from take-or-pay contracts and 6.0m from interruptible flows. Convention: 8,760 hours in a year, annual figures, ignore tax and inflation.

Answer: Four sub-sectors, four first metrics: RAB growth, the P90 capacity factor, the tenancy ratio and the take-or-pay share. On these illustrative stresses the pipeline is the least exposed on revenue and the wind farm the most, but the ranking depends on the stress chosen, so state each in the asset's own terms.

> **Interview tip:** Say which sub-sector it is before you say anything about value, then name the one metric you would check first and what a normal figure looks like. It shows that you treat a regulated network, a wind farm and a tower portfolio as different businesses.

INT.SA.7.d · Energy and Infrastructure

Choose the valuation measure that fits an energy or infrastructure asset, test it against the discount rate and the remaining life, and show how debt and equity returns follow.

The right valuation measure depends on whether the cash flows go on for ever, end on a date, or run down. A regulated network is valued against its asset base. EV/RAB = enterprise value ÷ RAB. A premium to RAB can be justified only when the allowed return plus expected outperformance exceeds the return investors require, and it shrinks when the regulator cuts the allowed return or when rates rise. A concession, a contract or a reserve base ends, so value is the present value of the cash flows to the end date with little or no terminal value. An EV/EBITDA multiple ignores remaining life, so ten times is generous for eight years left and cheap for forty. Discount each stream at its own rate, lower for availability and regulated cash and higher for the merchant tail, and check what share of value sits in the tail or in a terminal value. For upstream assets use net asset value, which is the present value of cash flows from the reserves on a stated price deck, with enterprise value per flowing barrel as a cross-check. Towers and networks often command high multiples because leases are long and escalators lift rent, but test the capex, the ground leases and the churn behind them. Leverage follows from the cash flow. Debt is sized on cover ratios and amortises inside the asset's life, and the equity is what remains. Equity return then depends heavily on gearing, the interest rate and the exit price, so show it at more than one financing. Long-life assets are very sensitive to the discount rate, so show value at a point either side of the base case. Cash yield is distributable cash divided by equity invested, and infrastructure investors often look at it beside the internal rate of return. Common mistake: applying a multiple from perpetual assets to an asset that ends.

WORKED EXAMPLE: VALUING A PORT TERMINAL WITH A FIXED CONCESSION

Selby Quay is an invented port terminal with 14 years left on its concession, after which it reverts to the port authority at no value. Next year's EBITDA is 20.0m and maintenance capex is 4.0m, and both grow 2% a year because tariffs are inflation linked. The seller asks 9.5 times EBITDA, which is 190.0m. An infrastructure investor requires 8% on the unlevered cash flow. Is the price fair, how does value move with the discount rate and the concession, and how much debt could it carry? Convention: year-end cash flows, ignore tax, no terminal value, and lenders size on year-one free cash flow with 1.35x cover on a 12-year loan at 6%.

Answer: Fair value is about 147m, or 7.3 times EBITDA, against an ask of 190m. At the ask the return is about 4%. A point on the discount rate moves value by about 6%, a 6-year extension adds 24%, and the debt of about 99m repays inside the concession.

Interview tip: Say that you value an ending asset by discounting its cash flows to the end date, and that the multiple is an output and not an input. Then name the two things that move value most: the discount rate and the concession length.

INT.SA.7.e · Energy and Infrastructure

Rank the risks of an energy or infrastructure deal, plan the diligence and value creation, and present a bid, conditional bid or pass.

An energy or infrastructure deal is usually lost through a few risks, so a good analysis ranks them by the cash flow at stake and names a test for each. Risks change with the phase. A construction asset carries cost overrun, delay and contractor risk, an operating asset carries resource, availability and major maintenance risk, and an ageing asset carries contract expiry and merchant tail risk. Regulatory and policy risk runs through all of them. Typical red flags are EBITDA built on P50 output, maintenance capitalised so it never reaches EBITDA, a short history of availability deductions, contracts with related parties, hedges that roll off soon, and one customer or one off-taker paying most of the revenue. Diligence sends specialists to each risk. A technical adviser tests output, availability and lifecycle cost, a market adviser tests the price curves against the buyer's own, and lawyers check change of control, termination rights and step-in rights in the main contracts. The first week asks three questions: what share of cash flow is contracted, regulated or merchant, when does each stream end, and how does normalised EBITDA differ from the seller's number. The data request follows from them. It asks for monthly output or traffic against budget for several years, the contracts, the deductions log, the lifecycle plan, the debt documents and the regulatory submissions. Value creation levers should each carry a number, such as re-contracting, extending life, cutting deductions, refinancing or filling a tower with tenants. On exit, the next buyer sees only the remaining contract life, so a five-year hold on a twelve-year contract sells a seven-year asset. A compact analysis names the sub-sector, normalises cash flow, sizes debt, values the finite life, ranks the risks and ends in a bid, a conditional bid or a pass. Common mistake: listing risks without ranking them or pricing them.

WORKED EXAMPLE: A COMPACT ANALYSIS OF A HOSPITAL AVAILABILITY CONTRACT

Ashgrove Hospital is an invented social infrastructure asset with 17 years left on an availability contract with a public health authority. The authority pays 36.0m a year, less deductions when areas are unavailable, and operating cost is 10.0m. The seller shows EBITDA of 26.0m and asks 8.5 times, which is 221.0m. Diligence finds that deductions have averaged 1.2m a year and that the building needs lifecycle maintenance of 3.0m a year, which the seller capitalises. Lenders accept 1.35x cover on a 15-year loan at 5.5%, and the fund wants 10% on its equity. What do you tell the investment committee? Convention: flat annual cash flows at year end, ignore tax and inflation, the contract has no value at the end, and the debt stays the same whatever price is paid.

Answer: Normalised cash flow is 21.8m, not 26.0m. Debt capacity is about 162m and the equity return at the asking price is 8.4% against a 10% target. A bid near 214m meets the target, subject to a lifecycle survey and a deductions plan.

Interview tip: Structure the answer as what kind of asset it is, what the real cash flow is, how much debt it carries, what return the price gives, which three risks matter and a clear bid. Interviewers want a decision with a price attached, not a list.

INT.SA.1.f · Financial Services

Name the sub-sectors of financial services and, for each, say what drives demand, the economic model, the first metrics a specialist reads and the usual misread, so that any target can be placed on the map.

Financial services is a family of sub-sectors with different economics, so the first step is to place the target on a map. The usual buy-side grouping is banks, general insurers, life insurers, brokers, asset and wealth managers, payment processors, specialty lenders, and financial infrastructure and software, though practice differs on the last. Banks earn a spread on lending funded by deposits, demand follows credit and rates, the model is balance-sheet, the first numbers are net interest margin, cost of risk and common equity tier one, and a benign loss year misleads. General insurers collect premiums, invest the float and pay claims later, demand follows the pricing cycle, the model is balance-sheet, the first numbers are combined ratio, reserve development and solvency ratio, and a quiet catastrophe year flatters. Life insurers earn a margin on long-dated savings and protection, demand follows household saving and rates, the model is balance-sheet, the first numbers are new business margin, persistency and solvency ratio, and generous embedded value assumptions mislead. Brokers earn commission and fees for placing cover, demand follows insurance prices and renewals, the model is recurring and asset-light, the first numbers are organic growth, retention and revenue per producer, and price-led growth misleads. Asset and wealth managers earn a basis-point fee on assets, demand follows markets and flows, the model is recurring but market-linked, the first numbers are net flows, revenue margin and fee-related earnings, and market gains hiding outflows mislead. Payment

processors earn a small take rate on the value handled, demand follows spending, the model is volume-based, the first numbers are net revenue, net take rate and merchant churn, and pass-through fees in gross revenue mislead. Specialty lenders earn a yield on loans funded by borrowing, demand follows credit appetite, the model is balance-sheet, the first numbers are risk-adjusted margin, vintage loss curves and funding triggers, and unseasoned growth hides future losses. Financial infrastructure and software, such as fund administration, earns subscriptions or asset-linked fees, demand follows regulation, the model is contractual, the first numbers are recurring share, retention and backlog, and project revenue counted as recurring misleads. Fee-based groups suit debt sized on stressed earnings, while balance-sheet groups are limited by funding and capital, so buyers there tend to use equity, minority stakes or carve-outs. Use the map in an answer by naming the sub-sector first, then the driver, then the two or three numbers that prove it. If a company spans several sub-sectors, split it by share of profit and give each part its own metrics and valuation.

WORKED EXAMPLE: ONE LABEL, THREE BUSINESSES: PLACING LEDBURY, PENNINE AND TOLLAND ON THE MAP

A fund screens three invented targets filed under financial services. Ledbury General is a general insurer with earned premium of 150m, a loss ratio of 64% and an expense ratio of 30%, and its loss ratio includes favourable reserve releases worth 4 points of premium. Pennine Wealth is a wealth manager with opening assets of 5,000m, net outflows of 150m, market gains of 400m, a revenue margin of 48 basis points on average assets and costs of 17.2m. Tolland Payments is a processor with payment volume of 12,000m, gross revenue of 240m, interchange and scheme fees of 168m, and EBITDA of 21.6m. The seller of Tolland asks for 2.0 times gross revenue. Convention: ignore tax, average assets are the mean of opening and closing, costs of Pennine and Tolland are fixed in a downturn, and acquisition debt is sized at 4.0 times stressed EBITDA.

Answer: Ledbury is a balance-sheet insurer whose underlying combined ratio is 98%, not 94%. Pennine is a fee manager whose 5.0% growth in assets hides outflows of 3.0% and whose EBITDA falls 33.2% if revenue falls 10%. Tolland is a processor with a net take rate of 0.60%, whose asking price is 22.2 times EBITDA, and on stressed earnings Pennine and Tolland support about 19.8m and 57.6m of debt while Ledbury supports none.

> **Interview tip:** Say it in the order of the map: I would first name the sub-sector, then the driver that moves it, then the two or three numbers that prove it. For this trio: an insurer read on combined ratio and reserves, a manager read on net flows and revenue margin, and a processor read on net revenue and take rate. Then say which of them a lender would size on EBITDA and which not.

INT.SA.2.f · Healthcare

Map the healthcare sub-sectors, giving for each how it earns, what drives demand, the first metrics a specialist reads and the usual misread, and use the map to structure an answer.

This map names eight healthcare sub-sectors, and practitioners differ on grouping, so say aloud which grouping you use. Provider services such as clinic, dental, veterinary and care groups sell visits at tariffs, demand follows ageing and referrals, and the model is labour-based and transactional. A buyer reads same-site growth, clinician retention and site margin first, strikes debt after leases, and watches for bought growth that hides weak cohorts. Pharma and biotech sell patented products, demand follows clinical need and payer access, and value is driven by events such as approvals and patent expiry. A buyer reads net sales, years to loss of exclusivity and pipeline probability, lends only on commercial earnings, and is misled by unrisked peak sales. Generics and consumer health sell off-patent and over-the-counter products in volume, demand is steady, and margins are thin and price-driven. A buyer reads price erosion, launch cadence and plant cost, and an unnoticed tender loss or price reset is the usual surprise. Medical devices sell implants, instruments and consumables, demand follows procedure volumes and reimbursement, and revenue mixes lumpy equipment sales with recurring consumables. A buyer reads installed base, consumable pull-through and utilisation, because equipment sales are often mistaken for a recurring base. Diagnostics sell tests, so revenue is volume multiplied by the reimbursed price, and demand follows referrals and screening. A buyer reads tests per day, price per test and payer mix, and one payer cut falling almost straight to profit is the usual surprise. Contract research and manufacturing sell capacity to drug developers, demand follows developer funding and trial starts, and backlog converts to revenue over time. A buyer reads net book-to-bill, utilisation and customer concentration, and gross backlog or fragile customer funding often misleads. Healthcare IT sells subscription software and data to providers and payers, and demand follows budgets, regulation and clinical workflow. A buyer reads net revenue retention, implementation time and capitalised development, lenders favour the recurring base, and signed contracts are often mistaken for live revenue. Distribution and pharmacy buy from manufacturers and sell to providers or patients on thin margins, and demand follows

prescription volume. A buyer reads gross margin per item, inventory days and rebate dependence, and working capital swings or reimbursement squeezes are often missed. In an answer, name the sub-sector first, then the driver that moves its earnings, then the two or three numbers that prove it, and finish with the one event that would change your view.

WORKED EXAMPLE: THREE HEALTHCARE COMPANIES, THREE MAPS

Three invented companies are each described to you only as a healthcare company. Carrowby Dental Group had revenue of 60.0m last year from practices owned in both years, those practices now bring in 61.8m, six practices bought this year add 7.2m, and 12 of its 120 dentists left. Thornquist Surgical has 1,500 surgical systems installed, 1,200 of them in active use, each active system buys 25k of consumables a year, and it sold 150 new systems at 120k each. Quillmark Health Software started the year with 40.0m of subscription revenue, lost 3.0m to cancellations, gave back 1.0m in downgrades, gained 4.0m from upgrades, and signed 8.0m of new contracts of which 6.0m are live. Name the sub-sector of each, compute its first metrics and say what each could be misread as. Convention: ignore tax and treat the subscription figures as annual recurring revenue.

Answer: Carrowby is provider services with same-site growth of 3.0% against reported growth of 15.0% and clinician turnover of 10%. Thornquist is a device maker with 62.5% recurring revenue, 80% utilisation and 20k pull-through per installed system. Quillmark is healthcare IT with net revenue retention of 100.0%, gross retention of 90.0% and 46.0m of live recurring revenue.

> **Interview tip:** Say the sub-sector first, then the driver, then two numbers, and finish with the misread you would test, for example: this is a device maker, revenue follows procedures, 62.5% is recurring and I would check that utilisation holds.

INT.SA.3.f · Industrials

Name the sub-sectors of industrials and, for each, say what drives demand, which metrics a specialist checks first, the usual misread, and what a buyer tests and how it is financed.

Industrials is a set of sub-sectors with different economics, so this map names six, each with its demand driver, first metrics, usual misread and financing. Practice differs, since some buyers treat aftermarket services or electrical equipment as groups of their own. Machinery and capital equipment makers sell into customers' investment budgets and earn recurring profit from spares and service on the installed base. A specialist reads orders, backlog and the aftermarket share of profit first, and the usual misread is peak margin taken as normal. A buyer tests the cancellation terms behind the backlog and sizes the debt on trough earnings. Components and engineered products are designed into a customer's product and qualified once, so revenue repeats but follows the customer's output. The first numbers are content per unit, share of the customer's spend and programme lives, and the usual misread is stickiness taken for pricing power. A buyer tests customer concentration and the annual cost savings needed to offset the agreed price-downs. Building products makers sell through merchants and builders on housing starts, repair and remodelling and non-residential building. Volume against price and merchant stock come first, and the usual misread is destocking taken for lost demand. A buyer tests the end-market mix and the speed of cost pass-through, and a revolving facility covers the seasonal peak. Aerospace and defence suppliers sell certified parts against programme build rates and long-term agreements, with the aftermarket as the annuity. Platform mix, build-rate cover and fixed-price development work come first, and the usual misread is a long backlog taken as risk-free. A buyer tests programme and certification risk, and contracted cash flow can support more debt. Distributors buy and resell through branches for a thin gross margin, so the economics sit in inventory turns and branch productivity. The usual misread is judging a distributor by margin when return on capital is the better test. A buyer tests rebate terms and stock ageing, and an asset-based facility on inventory and receivables funds working capital. Transport equipment makers of trucks, trailers, rail vehicles and ships sell against production slots and often run a financing arm. The order book, delivery schedule and used-equipment prices come first, and the usual misread is a full order book at the peak taken for durable demand. A buyer tests cancellation rights and residual value exposure in the financing arm, and keeps debt modest. In an answer, name the sub-sector first, then the driver of its demand, then the two or three numbers you would ask for.

WORKED EXAMPLE: READING THREE INDUSTRIAL TARGETS WITH THREE DIFFERENT LENSES

An interviewer names three invented targets and asks you to classify each and say which numbers you would check first. Harnwick Cranes has revenue of 200, orders of 240 and a backlog of 300. Aftermarket revenue is 50 at a 40% EBITDA margin and equipment revenue is 150 at a 12% margin. Kilverne Bearings supplies a vehicle maker: 3.0m units at 50 each is revenue of 150, EBITDA is 24, and the customer takes a 3% price-down each year. Sallowfield Supply is a branch distributor with revenue of 400, gross profit of 100, EBITDA of 28, depreciation of 4, inventory of 60, receivables of 45, payables of 40 and fixed assets of 55. Conventions: ignore tax, use year-end balances and take cost of sales as revenue less gross profit.

Answer: Harnwick is machinery (book-to-bill 1.2, cover 1.5 years, aftermarket 52.6% of EBITDA), Kilverne is a component supplier (content per unit 50, a 3% price-down worth 4.5 or 18.8% of EBITDA) and Sallowfield is a distributor (inventory days 73, return on invested capital 20.0%).

> **Interview tip:** Say it in order: the sub-sector, what drives its demand, the two or three numbers, then the misread. For example: this is a component supplier, so I would ask for content per unit and the annual price-down, and I would not take stickiness for pricing power.

INT.SA.3.g · Industrials

Place an industrial sub-sector in its cycle from leading, coincident and lagging indicators, and say what each stage means for how a buyer prices, finances and times a deal.

The industrial cycle has four stages, and a buyer should place the target in its stage before pricing, financing or timing a deal. In early recovery orders and quotes turn up first while revenue and margins are still low and stock is lean, so earnings look poor and a buyer prices on mid-cycle earnings. In expansion volumes, utilisation and price rise together, incremental margins are high, backlog builds and growth absorbs cash, so debt stays sized to the trough. At late cycle or peak orders flatten while revenue peaks on backlog, margins are widest and stock builds, so sellers want to exit and a buyer avoids borrowing against peak earnings. In a downturn orders and cancellations fall first, decremental margins bite and price slips, while falling stock releases cash that flatters the first year. To judge visibility, use cover = backlog ÷ revenue over the next twelve months, the years of revenue already secured. A rising book-to-bill together with falling cancellations is stronger evidence of a turn than either alone. Machinery and capital equipment: orders, quotes and cancellations lead, shipments and utilisation are coincident, and margins lag, with revenue typically following orders by several quarters or, for large machines, years. Components: customer production schedules and customer stock lead, shipments and price-downs are coincident, and margin recovery lags, so a customer destock can undershoot end demand for a quarter or two. Building products: housing starts, permits and mortgage approvals lead, sell-through and merchant weeks of stock are coincident, and repair spending and margins lag, with sales typically following starts by a few quarters. Aerospace and defence: build rates, delivery slots and backlog cover lead, traffic and spares demand are coincident, and margins lag, so the cycle is usually longer and smoother and visibility earns a better price. Distribution: manufacturers' orders and quote activity lead, branch same-day sales and price are coincident, and inventory days, rebates and bad debts lag, so a stock build late in the cycle warns of markdowns. Transport equipment: order intake, used-equipment prices and fleet age lead, production rates and delivery slots are coincident, and residual values and financing losses lag, so a full order book at the peak is a reason to keep debt modest. Overall a buyer typically prices on mid-cycle earnings, finances on trough earnings and aims to enter in early recovery rather than at the peak. Cycles differ in length by sub-sector, indicators are read together and never alone, and every pattern here is typical rather than a statistic.

WORKED EXAMPLE: PLACING A MACHINE TOOL MAKER AND A CLADDING MAKER IN THE CYCLE

Tolmerton Machine Tools is an invented maker of machine tools. Over the last four quarters its revenue was 50, 46, 44 and 43, its book-to-bill was 0.82, 0.91, 1.04 and 1.12, cancellations fell from 6% to 2% of orders, backlog is 160 and EBITDA margin is 12% against a mid-cycle 16% on mid-cycle revenue of 200. Its trough EBITDA in the last downturn was 18.0. Quillgate Cladding is an invented building products maker. Housing starts are down 12% year on year. Its price is up 5%, sales to merchants rose 6.0% from 260 to 275.6, merchant sell-through fell from 268 to 260, and merchants hold 14 weeks of stock against a normal 10. Its contribution margin is 30%. Conventions: ignore tax, annual flows, and quarterly revenue annualised by multiplying by four.

Answer: Tolmerton is in early recovery (orders up for three quarters while revenue falls, run-rate EBITDA 20.6 against mid-cycle 32.0, debt 72.0 on trough EBITDA). Quillgate is late cycle (volume growth 1.0%, sell-through down 3.0%, 15.6 of channel build that flatters EBITDA by 4.7 and a possible 10.7 hit if merchants destock).

> **Interview tip:** Name the stage first, support it with one leading, one coincident and one lagging indicator, then say what it changes: the price, the debt and the timing. Add that no single indicator decides it.

INT.SA.4.f · Consumer and Retail

Name every consumer sub-sector and, for each, say what drives demand, how it makes money, which first metrics a specialist reads and what is most often misjudged, then use the map to open an answer.

Consumer divides into eight sub-sectors, and any answer starts by saying which one the company belongs to. Branded goods companies sell household, personal care and drinks brands through retailers, so demand is habitual and the model is repeat purchase with little capital. Check gross margin, advertising as a share of sales and volume against the category first, because the usual trap is price rises hiding falling volume. Food and drink makers turn farm and packaging inputs into products for grocers, so demand is steady and the model is plant based and tied to commodity costs. Look first at gross margin against input costs, plant utilisation and the price gap to private label, and beware of margin that looks healthy before cost rises arrive. Fashion and footwear brands sell seasonal ranges through wholesale, own stores and online, so demand follows taste and each season is a fresh bet. Check full-price sell-through, stock days and reliance on a few wholesale accounts, because one hot season is easily mistaken for a lasting brand. Grocery and everyday retailers sell necessities in volume on thin margins, so demand is typically steady and profit comes from buying terms and tight costs. Look at like-for-like sales, gross margin and stock turn, because profit can rest on supplier terms or stretched payables rather than trading. Discretionary store retailers sell homewares, clothing and leisure goods from leased sites, so demand follows household confidence and fixed costs are high. Four-wall profit, like-for-like sales and markdown rate come first, and the usual trap is a healthy average hiding a tail of weak stores. Restaurants and leisure venues sell meals and experiences, so demand follows visits and spend per head, and sites are owned or franchised for royalties. Same-site sales, prime cost and, for franchisors, system sales matter most, and revenue can be lifted by buying back franchised sites. E-commerce and subscription businesses sell directly online, so demand depends on winning and keeping customers, and marketing pays for repeat orders. Customer acquisition cost, contribution per order and cohort retention come first, and a blended acquisition cost is flattered by organic customers. Consumer services such as gyms, salons and car washes sell access to local fixed sites, so the model is memberships or visits against high fixed costs. Utilisation, churn and profit per site come first, and joiner numbers can hide members who leave within months. Practice differs, because some firms treat luxury as its own sub-sector or split food from drinks, so say which grouping you use. In an answer, name the sub-sector first, then the driver of its profit, then the two or three numbers that prove it.

WORKED EXAMPLE: THREE CONSUMER COMPANIES, THREE DIFFERENT MAPS

Three invented consumer companies are on a screening list. Wynmoor Apparel sells seasonal clothing to department stores and through its own website. Harrowdene Fitness runs 12 gyms with 36,000 members paying 30 a month, each gym can hold 4,000 members, monthly churn is 4%, each gym has fixed costs of 0.60 a year and variable costs of 15% of revenue. Thistledown Foods bakes packaged biscuits for grocers, with sales of 200, raw materials of 110 and other cost of sales of 28. Wynmoor has sales of 90 against 82 last year, cost of sales of 43.9 against 38.2, and stock of 22 against 15, and sold 60% of its units at full price against 72% last year, clearing the rest at 35% off. Name each sub-sector, give the first metrics, and test the misread for each. Convention: money in millions, a 365-day year, year-end figures, ignore tax.

Answer: Wynmoor is a fashion brand whose growth of 9.8% hides stock up 46.7%, stock days of 183 against 143 and a realised gross margin down from 53.4% to 51.2%. Harrowdene is a consumer service at 75% utilisation where a 10% fall in members cuts profit per gym by 28.9%, and it needs 1,440 joiners a month to stand still. Thistledown is a food maker whose 10% rise in raw materials costs 11, needs a 5.5% price rise to recover, and a 3% rise leaves gross margin at 27.7% against 31%.

> **Interview tip:** Open each answer with the sub-sector, then the driver of profit, then the two or three numbers that prove it, and finish with the one trap you would test, for example stock against sell-through for the apparel brand, joiners against leavers for the gym, or pass-through against the private label gap for the food maker.

INT.SA.5.f · Technology and Software

Name every sub-sector of technology and, for each, say how it earns, what drives demand, which numbers lead, what is usually misread and how a buyer diligences and finances it, then use the map to structure an answer.

Use six sub-sectors as the map of technology, and describe each in the same order: how it earns, what drives demand, the economic model, the numbers read first, what goes wrong, and how a buyer diligences and finances it. Software as a service sells subscriptions to many industries, and demand follows customer headcount and software budgets. Its revenue is recurring, so a buyer reads net revenue retention, customer acquisition payback and gross margin first. The usual misread is

growth bought with discounts and heavy sales spend, so diligence tests cohorts and pricing, and lenders often size debt on recurring revenue. Vertical software serves one industry, and demand follows that industry's activity, its compliance needs and its payments. Revenue is recurring with a payments or services layer, so a buyer reads gross retention, revenue per customer and payments share first. It goes wrong when the industry shrinks or consolidates, so diligence tests customer concentration, and steady cash flow often supports more debt and bolt-on acquisitions. Infrastructure and tools such as databases and security charge mainly by usage, and demand follows customers' data and workloads. Revenue is recurring but variable, so a buyer reads net retention by cohort, hosting cost within gross margin and consumption trends first. It goes wrong when customers optimise usage or move platforms, so diligence tests how deep the integrations run, and lenders often accept less debt than for seat-based software. IT services sells the time of skilled staff, and demand follows project budgets and the wish to outsource. Revenue mixes project work with renewing managed services, so a buyer reads utilisation, attrition and the renewing share first. It goes wrong when utilisation or day rates fall while salaries stay, so diligence tests contract terms and unbilled work, and debt is sized on trough earnings. Internet and marketplaces connect buyers and sellers or sell online, and demand follows consumer spending and the habit of using the site. Revenue is transactional, so a buyer reads take rate, repeat behaviour by cohort and contribution margin first. It goes wrong when marketing spend is needed to hold volume, so diligence tests acquisition cost by cohort, and lenders often look to contribution profit with caution. Hardware and semiconductors sell devices and components, and demand follows product cycles and customers' capital spending. Revenue is transactional unless an installed base pulls through consumables or service, so a buyer reads unit volumes, inventory and attach rate first. It goes wrong when the channel is stuffed or stock ages, so diligence tests sell-through and component commitments, and debt is sized on mid-cycle earnings. Where practice differs, payments, data and information services and telecoms are sometimes placed in financial services, business services or infrastructure, so say which grouping you use. In an answer, name the sub-sector first, then the driver of demand, then the two or three numbers that decide it, and finish with what you would test and how much debt it suits.

WORKED EXAMPLE: READING THREE TECHNOLOGY TARGETS BY THEIR OWN NUMBERS

Three invented targets are on the desk. Pennistone Practice Software sells workflow software to veterinary clinics, with opening annual recurring revenue (ARR) of 54.0m, churn of 2.2m, downgrades of 1.0m, expansion of 5.6m, a gross margin of 76% and EBITDA of 15.0m. Bramshaw Query Tools sells a usage-priced database service, with revenue of 80.0m, hosting cost that varies at 20% of revenue and EBITDA of 16.0m. Kestrelby Integration is an IT services firm with 400 billable staff, 78% utilisation, 215 billable days, a day rate of GBP 480 and EBITDA of 4.5m. Name each sub-sector, give the first metrics, and test how each reacts to one illustrative shock. Convention: ignore tax, assume costs other than those stated stay fixed, and treat each shock as a full-year effect.

Answer: Pennistone is vertical software with gross retention 94.1% and net retention 104.4%, and a 3-point rise in churn costs 8.2% of EBITDA. Bramshaw is usage-priced infrastructure, and a 15% fall in usage costs 60.0% of EBITDA. Kestrelby is IT services with revenue of GBP 32.2m, and a 5-point fall in utilisation costs 45.9% of EBITDA. Size each one's debt on its own driver.

> **Interview tip:** Say the sub-sector first, then the driver, then the numbers, as in: this is vertical software, retention is what protects it, and gross retention is 94.1%. Then name what you would test and why one leverage multiple would not fit all three.

INT.SA.6.f · Business Services

Map the seven main business services sub-sectors, and for each say how it earns money, what drives its demand, which first metrics a specialist reads, the usual misread and what a buyer diligences.

Business services is a family of sub-sectors, so a buyer names the sub-sector first. This map uses seven standard groupings, and practice differs, since some buyers fold regulated compliance into testing and inspection. Facilities and support services, such as cleaning, security and catering, sell labour hours under multi-year contracts at thin margins, and demand follows outsourcing decisions. Retention at retender, contract margin and wage repricing come first, the misread is calling fixed-price contracts safe, and buyers diligence the contract register. Business process outsourcing runs a client's back office or contact centre for a fee per seat or transaction, and demand follows client cost programmes. Revenue per seat, agent attrition and utilisation come first, the misread is a low-price win that client automation erodes, and buyers diligence exit rights. Testing, inspection and certification sells independent assurance that products and sites meet a standard, and regulation brings the work back on a cycle. Revenue per inspector, accreditation and equipment spending come first, the misread is treating the high margin as capital-free, and buyers diligence the recurring re-test share. Regulated compliance services, such as statutory fire and lift inspection, repeat at a legal frequency, so the rule creates the demand. Renewal rate, visits per technician and

indexation come first, the misread is forgetting that a rule change can cut visits, and recurring cash often supports the debt. Staffing sells temporary hours and placement fees, demand tracks hiring, and revenue includes worker pay, so gross profit is the real income. Gross profit, the conversion ratio and gross profit per consultant come first, the misread is valuing peak earnings as normal, and buyers size debt on the trough. Professional services sell expertise by the hour or project, demand follows client budgets, and people cost is largely fixed in the short run. Utilisation, realisation and the ratio of juniors to seniors come first, the misread is growth bought by discounting, and buyers diligence key-person risk. Data and information providers sell subscriptions to proprietary content, demand follows how embedded the product is, and the model is recurring with high margins. Renewal rate, price increases and refresh cost come first, the misread is capitalised data cost that flatters EBITDA, and recurring cash often supports more debt. In an answer, name the sub-sector first, then the driver of its demand, then the two or three numbers that sub-sector reads. Compare a company only with its own sub-sector, and ask what is mandatory, what is recurring and what turns into cash.

WORKED EXAMPLE: READING THREE DIFFERENT SUB-SECTORS AT HOLLIN, CALDWELL AND ORRIN

Three invented companies are on a buyer's desk. Hollin Lift Safety has revenue of 64.0m, EBITDA of 14.4m and capex of 2.0m, with 400 technicians who work 220 days a year at 4.5 visits a day and a 94% renewal rate. Caldwell Contact Services runs 3,000 seats with revenue of 90.0m, EBITDA of 8.1m and capex of 3.6m, agent attrition of 40% and a replacement cost of 3,000 per agent. Orrin Trade Data has revenue of 50.0m and reported EBITDA of 20.0m, after capitalising 6.0m of the cost of refreshing its data, with 92% renewal by value. Classify each, read the first metrics of its sub-sector, restate Orrin, and compare the three on cash. Convention: ignore tax and working capital, treat capitalised data cost like capex, and keep demand for the lift inspections fixed by law.

Answer: Hollin is regulated compliance services with a 22.5% reported margin and 12.4m of cash after capex, so the questions are the rule and route density. Caldwell is business process outsourcing with a 9.0% margin, 4.5m of cash and attrition costing 44.4% of EBITDA. Orrin is a data provider whose 40.0% margin is 28.0% once the 6.0m of capitalised cost is expensed. Each is read on its own metrics, and on cash the gaps between them narrow.

> **Interview tip:** Say the sub-sector first, then the driver of its demand, then the numbers. For example: This is regulated compliance work, so the law sets the demand, and I would look first at visits per technician, renewal and the risk of a rule change. Then restate any earnings that rely on capitalised cost before comparing margins.

INT.SA.7.f · Energy and Infrastructure

Name the main sub-sectors of energy and infrastructure and, for each, say what drives its cash flow, which metrics a specialist reads first, what is usually misread and how it is financed.

Energy and infrastructure has eight sub-sectors that earn, are checked and are financed differently, although investors differ on where midstream and towers belong. Regulated networks such as water and electricity distribution earn an allowed return on a regulated asset base, so earnings follow accepted investment and not demand, and asset base growth, outperformance and the next price review come first. Buyers misread a premium to the asset base as safety, and lenders typically gear these networks on net debt to the asset base. Contracted renewables such as wind and solar farms sell output under long power purchase agreements, so the P90 capacity factor, contract tenor and off-taker credit come first. The misread is valuing a contract that ends years before the asset does, and debt is sized on P90 output. Merchant and thermal generation sells power or capacity at market prices, so the spark spread, capture price and the date a capacity contract ends come first. The misread is capitalising peak margins, so lenders rely on hedged years and a conservative price curve. Upstream oil and gas sells a depleting commodity, so cash breakeven, reserve life, netback and the decline rate come first. EBITDA is misread because it omits the capital spending needed to stand still, so debt must repay inside reserve life. Midstream pipelines and storage earn fees for moving product, so the take-or-pay share, contracted capacity and the shipper's credit come first. The misread is a long headline contract with one weak shipper, so debt is sized on contracted cash only. Transport assets such as airports, ports and toll roads earn from traffic and tariffs, so traffic against forecast, yield per user and the tariff cap come first. The classic misread is an optimistic traffic ramp-up, so a buyer sizes the debt on a recession case. Social infrastructure such as hospitals and schools earns availability payments from a public authority, so deductions, lifecycle cost and contract years left come first. The misread is treating a thin return as no risk, because lifecycle overruns and deductions erode it. Digital infrastructure such as towers, fibre and data centres earns rent on long leases, so the tenancy ratio, utilisation and churn come first. The misread is a high EBITDA margin that hides heavy capital spending, so lenders look at contracted cash. In an answer, name the sub-sector first, then the driver that sets its cash flow, then the numbers that test it. Then stress each in its own units, and avoid one multiple and one leverage level across all eight.

WORKED EXAMPLE: READING THREE ENERGY ASSETS BY THEIR SUB-SECTOR MAP

Ternbury Fund is an invented investor looking at three assets, and an interviewer asks you to classify each, name the first metric, and say what goes wrong in its own units. Elmsworth Water is a regulated network with a regulated asset base (RAB) of 800m, an allowed return of 5.0%, RAB growth of 3% a year, allowance for operating cost of 120.0m against actual cost of 114.0m, and net debt of 480m. Wydale Solar is a 120 MW solar farm with a P50 capacity factor of 22%, a P90 capacity factor of 20%, a power purchase agreement at 70 per MWh and running costs of 4.0m a year. Rushmoor Gas is an upstream producer with output of 2.5m barrels of oil equivalent (boe) a year, reserves of 15.0m boe, a realised price of 62 per boe, royalty and transport cost of 7 per boe, lifting cost of 17 per boe, a decline rate of 15% a year, finding and development cost of 32 per boe, and debt of 125m at 8%. Convention: annual figures, 8,760 hours in a year, ignore tax, royalty and lifting cost fixed per boe.

Answer: Three sub-sectors, three first metrics: RAB growth with the price review, the P90 capacity factor, and netback with reserve life and decline. On these illustrative stresses the producer is the most exposed, losing 48.9% of EBITDA to a 30% price fall, against 10% of return for the network and 9.1% of revenue for the solar farm.

> **Interview tip:** Name the sub-sector first, then the driver that sets its cash flow, then two or three numbers in that sub-sector's own units. Close by saying how the debt would be sized for that break point, which shows you treat the three as different businesses.

Summary of the Charta interview-preparation topic. Companies and figures in the examples are invented. Draft content, not yet expert reviewed.