

Investment appraisal A2

Read online at pastopic.com/cambridge/business-9609/notes/investment-appraisal

Last checked 5 October 2026

Read first: [Forecasting and managing cash flows](#), [Analysis of published accounts](#)

© 2026 Pastopic. Free for personal study. Please share the link, not the file.

What you need to know

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

1. **Explain why investment appraisal is needed:** why a business tests a big, long-lasting spending decision with numbers before it commits.
2. **Payback period:** say what it measures, calculate it from a table of net cash flows, and interpret the result.
3. **Accounting rate of return (ARR):** say what it measures, calculate it with the syllabus formula, $ARR = \text{average profit} \div \text{average investment} \times 100$, and interpret the result.
4. **Net present value (NPV):** say what it measures, calculate it from net cash flows and given discount factors, and interpret the result.
5. **Use the quantitative results** (payback, ARR, NPV) to judge whether an investment should go ahead, or which of two options is better.
6. **Weigh qualitative factors** (objectives, people, risk, the environment, the reliability of the forecasts) that can outweigh the numbers.
7. **Compare the three methods**, including the limitations of each and of investment appraisal as a whole.

Understand it

Why appraise an investment?

An **investment** here means spending a large sum now (on a machine, a new site, a computer system, a new product) in the hope of earning more than it cost over the following years. These decisions are different from day-to-day spending:

- the sum is large, often borrowed, and has to be found **before** any money comes back;
- the money is tied up for years and is hard to get back if the plan fails (a half-used machine sells for far less than it cost);
- the same money could have been used for something else, so every project has an **opportunity cost**;
- there are usually several possible projects and only enough finance for one.

Investment appraisal is the set of number-based tests a business runs on the forecast cash flows of a project before it commits. Each test answers a different question:

Method	The question it answers	Result is in
Payback period	How soon do we get our money back?	years and months
Accounting rate of return	What yearly profit does it make, compared with the money tied up in it?	%
Net present value	Once we allow for money arriving later being worth less, does it add value, and how much?	dollars

All three start from the same table: the **capital cost** paid at the start (called year 0) and the **net cash flow** for each year of the project's life (cash coming in minus cash going out because of the project, such as extra revenue or cost savings minus running costs).

All the methods below use one project. Saltmarsh Laundry is thinking of buying an automated washing system for 240,000 dollars. It expects the system to last five years and to be worth nothing at the end.

Year	Net cash flow (thousand dollars)
0	(240)
1	50
2	70
3	80
4	80
5	70

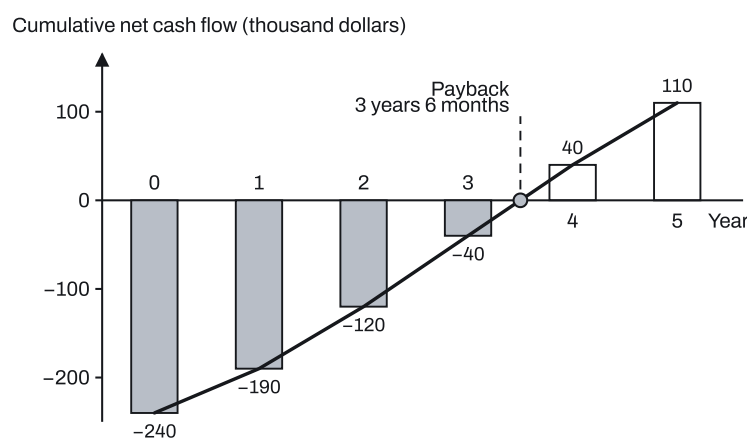
Brackets mean money going out.

Payback period

Payback looks only at speed. Start with the capital cost as a debt and add each year's net cash flow to it. The running total is the **cumulative net cash flow**; payback is reached at the moment it climbs back to zero.

Year	Net cash flow	Cumulative net cash flow
0	(240)	(240)
1	50	(190)
2	70	(120)
3	80	(40)
4	80	40
5	70	110

The total turns positive during year 4. At the start of year 4 Saltmarsh still needs 40 thousand dollars, and year 4 brings in 80 thousand. Assuming the cash arrives evenly through the year, it needs $40 \div 80 = 0.5$ of the year, which is $0.5 \times 12 = 6$ months. Payback is **3 years 6 months** (3.5 years).



Interpreting payback. A shorter payback means the money is at risk for less time, and the cash is back sooner to repay a loan or fund something else, which matters most to a business short of cash or in a fast-changing market. Compare it with the asset's expected life (paying back in year 4 of a 5-year life leaves little margin), with a target the owners set, or with another option. Payback says nothing about what happens **after** it is reached: a project that pays back fast and then stops earning can be worse than a slower one that keeps earning for years.

Accounting rate of return (ARR)

ARR looks at profitability. It sets the project's **average yearly profit** against the **average amount of money tied up in it**.

1. **Total profit** = total net cash flows – capital cost = $(50 + 70 + 80 + 80 + 70) - 240 = 350 - 240 = 110$ thousand dollars.
The capital cost comes off because buying the system is itself a cost of earning those inflows.
2. **Average profit** = total profit ÷ number of years = $110 \div 5 = 22$ thousand dollars a year.
3. **Average investment** = $\frac{\text{capital cost} + \text{residual value}}{2} = \frac{240 + 0}{2} = 120$ thousand dollars. The residual value is what the asset can be sold for at the end. The value tied up in the system falls from 240 at the start to 0 at the end, so on average half of it is tied up.
4. **ARR** = $\frac{\text{average profit}}{\text{average investment}} \times 100 = \frac{22}{120} \times 100 = 18.33\%$.

Interpreting ARR. Saltmarsh earns, on average, about 18 cents a year for every dollar tied up in the system. Set it against a yardstick: the interest rate on a loan to pay for it, the return from leaving the money in a bank, the business's current ROCE, or a **criterion rate** (the minimum return the owners will accept). An ARR well above the cost of borrowing suggests the project pays for its finance with room to spare. ARR treats a dollar in year 5 exactly like a dollar in year 1, and it uses an average, so it cannot show whether the profit comes early or late.

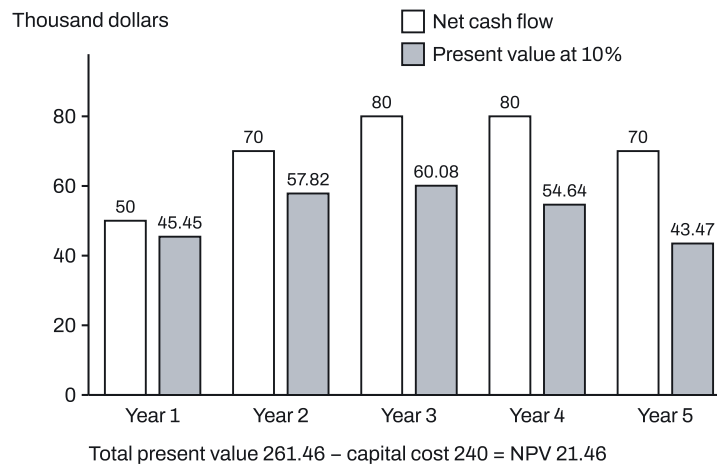
Net present value (NPV)

A dollar promised in four years is worth less than a dollar today: a dollar today could be put in the bank and earn interest, prices may rise in the meantime, and the promise may not be kept. NPV corrects for this. Each future net cash flow is multiplied by a **discount factor** to turn it into its **present value**, the amount that would be worth the same to the business today. Discount factors, or the discounted cash flows themselves, are always given; you never work them out. The factors come from a **discount rate**, usually the cost of borrowing or the return the owners require. At a 10% rate, a year-1 dollar is worth $1 \div 1.1 = 0.909$ dollars today, a year-2 dollar $1 \div 1.1^2 = 0.826$, and so on.

Year	Net cash flow	Discount factor at 10%	Present value
0	(240)	1.000	(240.00)
1	50	0.909	45.45
2	70	0.826	57.82
3	80	0.751	60.08
4	80	0.683	54.64
5	70	0.621	43.47

The present values of years 1 to 5 add up to $45.45 + 57.82 + 60.08 + 54.64 + 43.47 = 261.46$ thousand dollars. Then

$\text{NPV} = \text{total present value of the net cash flows} - \text{capital cost} = 261.46 - 240 = 21.46$ thousand dollars = 21,460 dollars.



Interpreting NPV. A **positive NPV** means the project earns back its cost **and** more than the return set by the discount rate: in today's money it adds about 21,460 dollars to Saltmarsh. A **negative NPV** means the project does not reach the required return, even if its cash flows add up to more than its cost. An NPV close to zero means a small change in the forecasts could flip the decision. When two projects are compared at the same rate, the higher NPV adds more value, though a bigger project naturally tends to have a bigger NPV. The answer depends on the rate chosen: a higher rate shrinks the present values, so the same project can be positive at 8% and negative at 12%.

The three methods side by side

	Payback	ARR	NPV
Strengths	Simple; focuses on risk and on how soon cash returns, which matters when cash is short or technology changes fast	Uses every year's figures; a percentage, so it can be set against an interest rate, ROCE or a target	Allows for the time value of money; uses every year's figures; shows the value added in dollars
Limitations	Ignores everything after payback; ignores profit; treats all years' money alike	Ignores timing (early and late profit count the same); an average can hide a slow start	Harder to work out and explain; the answer depends on the discount rate chosen, which is a judgement

All three share the biggest weakness: they are only as good as the **forecasts** behind them. The cash flows are estimates of sales, prices and costs years ahead. They may come from someone with a reason to be optimistic, such as a manager who wants the project or the supplier selling the equipment. The appraisal may cover fewer years than the asset will really last, or ignore effects on the rest of the business (lost sales of an older product, a better reputation). And none of the methods measures anything that is not in the cash flows.

Qualitative factors

Numbers are only part of the decision. A business also asks:

- **Does it fit the objectives?** A firm aiming for rapid growth may accept a slow payback for a project that opens a new market; one aiming to survive a downturn may not.
- **Can it be financed, and at what risk?** Borrowing raises gearing and interest costs; a business already highly geared may find loans costly or unavailable.
- **How will people react?** Automation may lead to redundancies, lower morale or industrial action, and staff need training.
- **What will it do to the environment and the community?** A project that pollutes may attract protests, fines or bad publicity; a greener option may win customers even with a lower NPV.
- **How reliable are the forecasts?** Who made them, how far ahead they go, and how uncertain the market is.
- **What are competitors and the wider economy doing?** Not investing can be riskier than investing if rivals are modernising; a recession or rising interest rates can wipe out a forecast.

- **What is the owners' attitude to risk?** Two owners can look at the same figures and decide differently.

Key facts and formulas

There is no formula list for this subject in the exam. The syllabus prints the ARR formula, but you must still learn it. Discount factors, or the discounted cash flows themselves, are always given; you never work them out.

Fact or formula	Status
Cumulative net cash flow: start with the capital cost as a negative figure and add each year's net cash flow	Learn it
Payback months = amount still to recover at the start of the payback year $\div$ that year's net cash flow $\times 12$	Learn it
Total profit of a project = total net cash flows – capital cost	Learn it
Average (annual) profit = total profit $\div$ number of years	Learn it
Average investment = (capital cost + residual value) $\div 2$	Learn it
ARR = average profit $\div$ average investment $\times 100$ (%)	Learn it
Present value = net cash flow $\times$ discount factor for that year	Learn it
NPV = total present value of the future net cash flows – capital cost	Learn it
Positive NPV: the project beats the return set by the discount rate; negative NPV: it falls short	Learn it

How to do it

We have tagged 17 questions on this topic, all from Paper 3, from 2021 to 2026 (February/March 2026 included). All 17 mix more than one type (each pairs one or more calculations with a 12- or 14-mark judgement), so the counts add up to 46.

Question type	Questions
Calculate the accounting rate of return (ARR)	14
Evaluate or recommend whether to go ahead with one investment	13
Calculate the payback period	9
Calculate the net present value (NPV) from given discount factors	6
Evaluate which of two investment options to choose	4

How calculation marks work. Marks build up step by step, and the first one is usually for the formula if nothing else is right. A correct final answer with no working can still earn full marks, but a wrong one with no working earns nothing, so set out every step. Your later evaluation is marked on your own figures, even if they were wrong.

The written answers are marked for four skills: **K** (knowledge), **App** (application to the business in the case), **An** (analysis: a chain of causes and consequences) and **Eval** (evaluation: a supported judgement). Below, (K), (App), (An) and (Eval) after a sentence show the mark it earns; (1), (2)... in a calculation show the marks building up.

1. Calculate the accounting rate of return (ARR) (14 questions)

Paper 3, 2–4 marks, from a table of yearly net cash flows (or cost savings) and a capital cost, sometimes with a residual value given in the text.

1. **Write the formula:** $ARR = \text{average profit} \div \text{average investment} \times 100$ (1 if nothing else scores).
2. **Total profit** = sum of the net cash flows – capital cost.
3. **Average profit** = total profit $\div$ number of years in the table.

4. **Average investment** = (capital cost + residual value) ÷ 2. With no residual value, it is half the capital cost.

5. **Divide and multiply by 100**, then write the answer **with a % sign**, rounded correctly.

On a 4-mark question the marks usually go: profit or average investment (1), average profit (2), average profit and average investment (3), the answer (4).

- **Use the syllabus formula.** Since 2023 the mark schemes reward average profit ÷ average investment. Dividing by the full capital cost (the older version) has earned fewer marks: 3 of 4 in March 2023 and June 2023 (Paper 32), and 1 of 2 in November 2025; the June 2024 Paper 32 scheme gave no mark at all for writing that non-syllabus equation. Schemes from 2021–2022 gave full marks for dividing by the capital cost, and most also accepted the average investment.
- **Residual value is added**, not subtracted, in the average investment.
- **Cost savings count as inflows.** A machine that saves 30,000 dollars a year in labour has a net cash flow of 30,000 dollars a year.
- **The cash flows may be in the text**, not a table: for example, a total return over the life of the asset. Read the lines the question points to.

2. Evaluate or recommend whether to go ahead with one investment (13 questions)

Paper 3, [12]. Since 2023: 2 K, 2 App, 2 An and 6 Eval, marked by level, with the top evaluation level needing a developed judgement **in the business context**. The 2021–2022 papers asked "Recommend ... Justify your recommendation" with 2 K, 2 App, 4 An, 4 Eval. The investment is often tied to another topic: new technology, automation, a new site, a sustainability project.

1. **K (2)**: what your appraisal results measure (payback, ARR, NPV), and at least one other factor in the decision (finance, staff, quality, objectives).
2. **App (2)**: use your own results **with a yardstick** from the case: ARR against the interest rate, ROCE or a target; payback against the asset's life; NPV positive or negative. Use case facts too: gearing, cash, the market, the people.
3. **An (2)**: one developed chain: the result or factor → what it means for the business → the effect on costs, revenue, profit, risk or reputation.
4. **Eval (6)**: the other side, then a judgement for **this** business. Question the figures: who estimated them, how many years they cover compared with the asset's life, and whether the market could change. Bring in qualitative factors that could outweigh the numbers. End with what the decision depends on and, where useful, what the business could do first (more research, a smaller trial, a different source of finance).

3. Calculate the payback period (9 questions)

Paper 3, 1–4 marks.

1. **Build the cumulative net cash flow**: year 0 is minus the capital cost; add each year's net cash flow in turn.
 2. **Find the year in which it turns positive**. Payback happens during that year.
 3. **Months** = the amount still to recover at the start of that year ÷ that year's net cash flow × 12.
 4. **Answer** = the number of full years before it, plus the months, for example "3 years 6 months". Decimal years (3.5 years) or years and days are also accepted.
- **One-mark questions** want the answer only; on 2–4 marks, a cumulative attempt or the right year earns the first mark.
 - **Write the units**. In November 2025 a payback with no years or months did not get full marks.
 - **Payback exactly at a year end**. If the cumulative total reaches zero at the end of a year, payback is that number of years, for example "3 years". There are no months to work out.
 - **Count the years carefully**. If the total turns positive during year 5, there are only 4 full years before it.

4. Calculate the net present value (NPV) from given discount factors (6 questions)

Paper 3, 2–4 marks. The discount factors (or the discounted cash flows) are in a table or the text.

1. **Multiply** each year's net cash flow by that year's discount factor.
2. **Add** the present values for years 1 onwards.
3. **Subtract the capital cost** (year 0 is not discounted).
4. **Write the answer with its sign**: a negative NPV as $-4,020$ dollars or $(4,020)$ dollars.

On a 4-mark question the marks usually go: any correct present value (1), all of them or their total (2), total minus capital cost (3), the answer (4).

- **A negative NPV must look negative.** In November 2023 an answer without the minus sign or brackets lost the last mark.
- **Discounted cash flows already given.** If the table already gives discounted cash flows, just add them (including any negative ones) and subtract the year-0 cost.
- **Part of the capital cost paid later.** If some of the cost is paid in year 1, discount that part too before subtracting.
- **Keep the units of the table.** If the table is in 0000m, say so in your answer.

5. Evaluate which of two investment options to choose (4 questions)

Paper 3, [12] (2 K, 2 App, 2 An, 6 Eval); one 2021 paper asked for a [14] recommendation (2 K, 2 App, 5 An, 5 Eval) between buying equipment and outsourcing. You have usually calculated one result for one option, and the case gives the rest.

1. **Compare the options figure by figure**, with the differences worked out: "B pays back 9 months sooner", "A's ARR is 4 percentage points higher", "A costs 180,000 dollars more".
 2. **Say what each difference means**: a quicker payback means less risk; a higher ARR or NPV means more profit for the money; a higher cost means more finance to find.
 3. **Add two or three qualitative factors** from the case for each option (reliability, quality, staff, environment, fit with objectives), each developed into a chain.
 4. **Choose**, and justify the choice with the factor that matters most for this business, and say what the choice depends on.
- Focus on two or three key factors and develop them fully; a long list of factors earns little.
 - If the options' results point different ways, say why (for example, a bigger project tends to have a larger NPV but may have a lower ARR) and which matters more here.

Worked examples

Example 1

Brightwater Bottling is buying a new labelling line for 1.6 million dollars. It expects to use the line for six years and then sell it for 0.2 million dollars. The forecast net cash flows, including the 0.2 million dollars from the sale in year 6, are:

Year	0	1	2	3	4	5	6
Net cash flow (\$m)	(1.6)	0.2	0.4	0.5	0.4	0.6	0.6

(a) Calculate the payback period. [3]

(b) Calculate the accounting rate of return (ARR). [4]

(c) Brightwater's directors want payback within 5 years and an ARR of at least 15%. State, with a reason, whether the labelling line meets both targets. [2]

(a) Cumulative net cash flow (m) : year0(1.6), year1(1.4), year2(1.0), year3(0.5), year4(0.1), year50.5

(1). It turns positive during year 5 (2). Months = $0.1 \div 0.6 \times 12 = 2$, so payback is **4 years 2 months** (4.17 years) (3).

(b) Total profit = $(0.2 + 0.4 + 0.5 + 0.4 + 0.6 + 0.6) - 1.6 = 2.7 - 1.6 = 1.1$ million dollars (1). Average profit = $1.1 \div 6 = 0.1833$ million dollars (2). Average investment = $(1.6 + 0.2) \div 2 = 0.9$ million dollars (3). ARR = $0.1833 \div 0.9 \times 100 = 20.37\%$, so **20.4%** (4).

(c) Yes, both: payback of 4 years 2 months is inside the 5-year target, and the ARR of 20.4% is above 15% (1), so on these forecasts the line both returns its cost in time and earns more than the minimum return the directors want (2).

Example 2

Pinewood Dental Clinic is considering an intra-oral scanner, which takes digital impressions of teeth, for 90,000 dollars. The scanner's maker forecasts the following net cash flows over four years, with no resale value. The clinic uses a discount rate of 10%.

Year	Net cash flow (\$)	Discount factor at 10%
0	(90,000)	1.000
1	20,000	0.909
2	30,000	0.826
3	30,000	0.751
4	30,000	0.683

(a) Calculate the payback period. [2]

(b) Calculate the net present value (NPV). [4]

(c) Calculate the accounting rate of return (ARR). [3]

(a) Cumulative: (90,000), (70,000), (40,000), (10,000), then 20,000 at the end of year 4, so payback is during year 4 (1). Months = $10,000 \div 30,000 \times 12 = 4$: **3 years 4 months** (2).

(b) Present values: $20,000 \times 0.909 = 18,180$; $30,000 \times 0.826 = 24,780$; $30,000 \times 0.751 = 22,530$; $30,000 \times 0.683 = 20,490$ (1). Total = 85,980 dollars (2). NPV = $85,980 - 90,000$ (3) = -4,020 dollars, written (4,020) (4).

(c) Total profit = $110,000 - 90,000 = 20,000$ dollars; average profit = $20,000 \div 4 = 5,000$ dollars (1). Average investment = $(90,000 + 0) \div 2 = 45,000$ dollars (2). ARR = $5,000 \div 45,000 \times 100 = 11.1\%$ (3).

The methods disagree: the scanner pays back inside its four years and its ARR is positive, but once later money is discounted at 10% it falls just short.

Example 3

Use your answers to Example 2. Pinewood's owner, Dr Imani Osei, would pay for the scanner with a bank loan at 6% interest a year. Digital impressions take about half as long as the moulds the clinic uses now, so each dentist could see two more patients a day. Patients often complain about the moulds. A new clinic offering same-day crowns made from scans has opened nearby. Scanners of this type usually work for six years or more, but the maker's forecast covers only the four years of its warranty. The clinic's gearing is 20%.

Evaluate whether Pinewood should buy the scanner. [12]

A negative NPV means that, once later cash is discounted at the clinic's 10% rate, the scanner's inflows are worth less today than the scanner costs; the ARR shows the average yearly profit as a percentage of the money tied up (K). Other factors in the decision include how it is financed and how patients will react (K).

The case against. At 10% the scanner's NPV is (4,020) dollars (App): over the four forecast years it does not earn the return Pinewood sets for its money. The forecast was prepared by the company selling the scanner, which benefits if the clinic buys, so the figures may lean high; if they do, the NPV is more negative still and the clinic would be paying loan interest on a machine that never

earns its keep, leaving less profit for the owner (An).

The case for. The ARR of 11.1% is well above the 6% the loan would cost (App), and payback of 3 years 4 months comes before the end of even the four-year forecast. With gearing of only 20%, the clinic has room to borrow. Seeing two more patients a day per dentist raises revenue, and replacing moulds that patients dislike should help keep them from moving to the new rival, protecting future revenue that the forecast does not include (An).

Judgement. Pinewood should buy the scanner (Eval). The negative NPV is small and comes from counting only four years: if the scanner works for a fifth year and earns another 30,000 dollars, that year adds $30,000 \times 0.621 = 18,630$ dollars of present value, turning the NPV to +14,610 dollars (Eval). The bigger risk is not buying: a rival offering scan-based same-day crowns could take patients who are tired of moulds, a loss of future revenue that the 4,020 dollar shortfall in NPV does not take into account (Eval). The decision depends on whether the extra appointments really fill. Dr Osei should check the maker's figures against her own appointment records, or ask a clinic already using the scanner, before she signs the loan (Eval).

The marks: 2 K for NPV, ARR and other factors; 2 App for the NPV and the ARR against the loan rate, both used in the argument; 2 An for the developed chains on the maker's forecast and on patients and revenue; 6 Eval for weighing the short forecast period, the rival and the reliability of the data, ending in a judgement built on Pinewood's facts.

Example 4

Lakeside Cinema has two screens and can afford only one of these investments. It has 200,000 dollars of retained profit and would borrow the rest. Cinema attendance in its town has fallen by about 3% a year for five years. Lakeside has never sold food before.

	Option A: laser projection on both screens	Option B: a café in the foyer
Capital cost	300,000 dollars	120,000 dollars
Payback period	3 years 3 months	2 years 6 months
ARR	18%	22%
NPV at 10% over 6 years	48,000 dollars	26,000 dollars
Other information	Sharper, brighter pictures; lower power use than the old projectors; the supplier services them for 5 years	Needs 4 new staff and a food hygiene licence; can open in the daytime when no films are showing

Evaluate which option Lakeside Cinema should choose. [12]

Payback measures how quickly the capital cost is recovered and so how long the money is at risk; NPV measures the value a project adds in today's money (K). Other factors include the cost of finance and how each option fits the business's market (K).

The case for Option B. The café pays back 9 months sooner and has an ARR 4 percentage points higher (App). It costs 120,000 dollars, which Lakeside can pay entirely from its 200,000 dollars of retained profit, so it takes on no loan and no interest; with attendance falling, keeping the cinema free of debt lowers the risk that interest payments squeeze profit in a bad year (An). It also earns from people who are not watching a film, so its revenue depends less on falling cinema attendance.

The case for Option A. Option A adds 22,000 dollars more value in today's money (App), because it is a bigger project that earns more each year. Better pictures could give people a reason to come to the cinema instead of streaming at home, tackling the fall in attendance directly; more tickets sold would also mean more customers for any future food sales (An). But it costs 180,000 dollars more and needs a loan of 100,000 dollars on top of all the retained profit, leaving no cash buffer.

Judgement. Lakeside should choose Option B (Eval). Its NPV is lower in dollars only because it is a smaller project: it returns more per dollar invested (22% against 18%) and repays its cost faster, which matters most to a business whose main market is shrinking (Eval). Option A bets 300,000 dollars on reversing that decline, and if attendance keeps falling at 3% a year its cash flows over six years could be lower than forecast if the forecast assumed steady audiences (Eval). The choice depends on how reliable the café's sales forecast is, since Lakeside has never sold food before; Lakeside could test demand with a small kiosk before fitting out the full café, and keep laser projection as a later step once the café's profit can help pay for it (Eval).

The marks: 2 K for payback, NPV and the other factors; 2 App for the payback, ARR and NPV differences used as evidence; 2 An for the chains on finance and on attendance; 6 Eval for weighing scale against return and risk in Lakeside's falling market, with a clear choice and what it depends on.

Common mistakes

- **Using the old ARR formula.** Examiners in March and June 2023 reported many answers that divided the average profit by the whole capital cost instead of working out the average investment, and in March 2026 some candidates still used a wrong ARR formula. It costs marks even when every other step is right.
- **Forgetting to take off the capital cost.** Adding up the net cash flows and calling that the profit was a typical error in November 2021 (Paper 31) and November 2022 (Paper 32). The total of the inflows is not profit until the cost of the asset is subtracted.
- **Stopping at total profit.** In November 2022 (Papers 32 and 33) many answers worked out the project's total profit but never divided it by the number of years. ARR needs the **average** profit.
- **Mixing up the methods.** In June 2021 (Paper 32) some candidates discounted the cash flows when asked for ARR. ARR uses the plain cash flows; only NPV uses discount factors.
- **Getting the months wrong in payback.** In June 2021 (Paper 32) many found the right year but not the months. Divide what is still owed at the start of that year by that year's cash flow, then multiply by 12. In November 2021 (Paper 33) a significant minority could not build the cumulative cash flow at all.
- **Losing the minus sign on NPV.** In November 2021 (Paper 31) some answers set the NPV out correctly but gave it as a positive number. A project whose present values fall short of its cost has a negative NPV; show it with a minus sign or brackets.
- **Not discounting, or not subtracting the cost, in NPV.** Both were common in November 2021 (Paper 33). Work in a table: cash flow, factor, present value, total, minus capital cost.
- **Missing units.** Answers without a % sign on ARR were reported in November 2022 and March 2026, and in November 2025 an ARR given as a dollar figure scored only 1 of 2. Payback needs years and months.
- **Skipping the calculation.** In November 2022 (Paper 33) 13% of candidates left the NPV blank, and in June 2021 (Paper 34) 15% left out the ARR. The formula and one correct step usually earn marks, and the evaluation can use your own figures.
- **Repeating the table instead of using it.** In March 2026 many answers copied the two options' figures and declared one better. Work out the differences and say what each means for the business.
- **Too many factors.** Reports in June 2021, November 2022 and March 2026 found answers that listed many factors and developed none. Two or three well-developed points earn more.
- **A conclusion that only repeats.** In March 2026 many conclusions restated earlier points and simply named an option, which earns little evaluation credit. Say which factor matters most for this business, and what the decision depends on.

How to get the marks

- **Command words.** *Calculate*: formula, working, answer with its unit. *Evaluate*: arguments on both sides and a supported judgement for this business. *Recommend ... Justify*: a clear decision with reasons, and what it depends on.
- **Set out calculations as tables** (cumulative cash flow, discounted cash flow). Each correct line can earn a mark, and examiners can follow your figures if one is wrong.
- **Units every time**: ARR as %, payback in years and months (or years and days, or decimal years), NPV in dollars with its sign and the table's units (000,m).
- **Round correctly** (20.37% becomes 20.4%, not 20.3%), and keep at least two decimal places in the working.
- **Give every result a yardstick** in the evaluation: ARR against the interest rate, ROCE or a target; payback against the asset's life; NPV against zero, or against the other option.
- **Question the numbers.** Who made the forecast, how many years it covers, what could change, and what it leaves out. This is the quickest route to evaluation marks.
- **Use qualitative factors from the case**, each developed into a chain that ends in an effect on costs, revenue, profit, risk or reputation.

- **Judge in context.** The top evaluation level needs a judgement built on the case's own facts: its owners, its finances, its market. Say what the decision depends on and, if helpful, what the business should do next.

Quick check

1. A bakery spends 75,000 dollars on a shop refit. The forecast net cash flows are 15,000, 20,000, 25,000, 25,000 and 30,000 dollars in years 1 to 5, with no residual value. Calculate the payback period and the ARR.
2. A machine costs 500,000 dollars, will be sold for 100,000 dollars after 5 years, and has total net cash flows of 750,000 dollars over those years (including the sale). A student gives its ARR as 10%. Which formula did the student use, and what is the correct ARR?
3. A project costs 50,000 dollars and has net cash flows of 20,000, 25,000 and 25,000 dollars in years 1 to 3. The discount factors at 12% are 0.893, 0.797 and 0.712. Calculate the NPV and say what it means.
4. Explain two limitations of the payback period as a way of choosing between investments. **[4]**
5. A project has a positive NPV, but the owners decide not to go ahead. Give two possible reasons.

Answers

1. Cumulative: (75,000), (60,000), (40,000), (15,000), then 10,000 at the end of year 4. Months = $15,000 \div 25,000 \times 12 = 7.2$, so payback is 3 years 7.2 months (about 3 years 7 months). ARR: total profit = $115,000 - 75,000 = 40,000$; average profit = $40,000 \div 5 = 8,000$; average investment = $75,000 \div 2 = 37,500$; ARR = $8,000 \div 37,500 \times 100 = 21.33\%$.
2. Total profit = $750,000 - 500,000 = 250,000$, average profit = $250,000 \div 5 = 50,000$. The student divided by the capital cost: $50,000 \div 500,000 \times 100 = 10\%$. The syllabus formula uses the average investment, $(500,000 + 100,000) \div 2 = 300,000$, so ARR = $50,000 \div 300,000 \times 100 = 16.67\%$.
3. Present values: $17,860 + 19,925 + 17,800 = 55,585$. NPV = $55,585 - 50,000 = 5,585$ dollars. It is positive, so the project earns more than the 12% return used to discount it, adding about 5,585 dollars in today's money.
4. It ignores cash flows after payback (1): a project that pays back slightly faster but stops earning soon after could be chosen over one that earns far more over its life, so the business may pick the less profitable option (2). It ignores the time value of money (1): a dollar received in year 3 is counted the same as one received in year 1, so two projects with the same payback can be very different in real value, depending on when the cash arrives (2).
5. For example: the forecasts may be unreliable (made by the seller, or for a market that is changing fast), so the real NPV could be negative; the business may not be able to raise the finance without taking its gearing or its risk too high; the project may not fit the objectives, or may harm staff, customers or the environment and damage the business's reputation; another project may have a higher NPV.

Past questions to try

- **9609/32/O/N/23 Q4**: discounting five years of cost savings to an NPV below zero, then judging a project that supports the business's environmental aims.
- **9609/32/M/J/24 Q4**: an ARR with a residual value over six years, then whether automating production is worth it.
- **9609/33/M/J/23 Q3**: a payback that falls exactly at a year end and an ARR, then judging a new customer-facing outlet.
- **9609/34/M/J/21 Q4**: payback and ARR for equipment, then a recommendation between buying it and outsourcing the work.