Exam tip !

Worked example: Payback period

Suppose the construction of a new sports complex costs $1m and is expected to generate the following net cash flows during the first four years:

Year 1	$200 000
Year 2	$340 000
Year 3	$430 000
Year 4	$430 000

The project will obviously not break-even in the first year (the cash outflow was $1.24m whereas the net cash inflow in Year 1 is only $200 000). By calculating the cumulative cash flow, we get the following figures:

	Net cash inflow	Cumulative cash inflow
Year 1	$200 000	$200 000
Year 2	$340 000	$540 000
Year 3	$430 000	$970 000
Year 4	$360 000	$1 330 000

We can now see that the payback period (for the initial $1m) happens in the fourth year (the cumulative cash flow at the end of the third year is only $970 000). To work out the PBP:

(a) Calculate the shortfall at the end of Year 3, i.e. $1 000 000 minus $970 000 = $30 000

(b) Calculate the average monthly cash inflow in Year 4, i.e. $360 000 divided by twelve months = $30 000

(c) Divide (a) by (b) to find the number of months, i.e. $30 000 into $30 000 = 1 month

Therefore, the payback period for the sports complex is forecast to be 3 years and 1 month.

Exam tip !

Worked example: Average rate of return

Suppose the purchase of a new computer system that costs $350 000 is forecast to generate the following net cash flows over the next five years (when it needs to be replaced):

Year 1	$100 000
Year 2	$130 000
Year 3	$180 000
Year 4	$150 000
Year 5	$100 000

There are several steps needed to calculate the ARR for this project:

- Total net cash inflow over the five years is $660 000
- Projected profit = $660 000 minus $350 000 (for the initial investment) = $310 000
- Average annual profit = $310 000 ÷ 5 years = $62 000 per year
- Hence the ARR = $62 000 ÷ $350 000 = 17.7%

Comparing this figure with interest rates helps to assess whether the project is worth the risk. If the return on savings is 3.54%, then this particular project seems attractive as the return on investment is five times as large.

Question 3.8.2 Payback period and average rate of return

Study the information in the table below and then answer the questions that follow.

Year	Net cash flow	
	Project Atlanta ($)	Project Boston ($)
0	(140 000)	(150 000)
1	80 000	60 000
2	60 000	60 000
3	20 000	60 000

(a) State the cost of the investment projects under consideration. *[1 mark]*

(b) Calculate the **payback period** for both projects and comment on your findings. *[4 marks]*

(c) Calculate the **average rate of return** on both projects. Assuming that the savings interest rate is 4.75%, comment on your findings. *[4 marks]*

(d) Considering all relevant factors, examine which investment project is more attractive. *[6 marks]*