FINM1001 Foundations of Finance

AUSTRALIAN NATIONAL UNIVERSITY · FINANCE · LEVEL 1

Full guide + ask Sia about FINM1001

SIDE 1/2 DEFINITIONS · FORMULAS · DECISION RULES · COMPARISONS — CLOSED-BOOK MEMORY SHEET — S2 2026 · final base weight **60%**

01 · Exam map

COURSE + L1

Q1 10 | Q2 10 | Q3 10 | Q4 10 | FINAL EXAM 60%

"Closed book, based on all content covered through semester" (FINM1001 Foundations of Finance Lecture 1 slides, Semester 2 2026 (PDFRAW_FoF_Lecture_1.txt))

ASSESSMENT	BASE	MEMORY CUE
Tutorial quizzes 1–4	10% each	Each individually redeemable
Final examination	60%	Can absorb quiz weight when redemption improves the result

Final timing: 15 minutes reading + 2 hours writing. The final can therefore carry more than its 60% base weight.

02 · Classify the market

CH 1



Financing circuit: trace funds one way and claims or promised returns back.

AXIS	QUESTION	RULE
Money / capital	What maturity or claim?	Short-term instruments / equity and medium-to-long-term debt
Primary / secondary	Who receives proceeds?	Issuer receives funding / investor resells an existing claim
Direct / intermediated	Whose claim does saver hold?	Ultimate user's claim / intermediary's own claim

Labels sit on separate axes. A new long-term note can be both primary and capital-market; later resale is secondary but remains capital-market.

CHANGED-FACT TEST

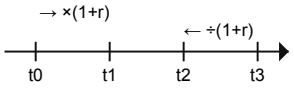
Change one feature and move only the matching conclusion. Shorten maturity: reconsider money versus capital, not issuance. Replace a new issue with investor-to-investor resale: primary becomes secondary, but maturity does not change. Replace a directly held borrower claim with a deposit-funded loan: reconsider intermediation. If unrelated labels move together, the dimensions have been collapsed.

Worked classification: newly created long-term notes sold by a transport company through a dealer to investment funds are capital-market and primary because the company creates the claims and receives proceeds. The dealer's presence alone does not prove intermediation: trace who holds the ultimate company claim.

ANSWER SHAPE *Name the label → cite maturity, issuer receipt or claim ownership → state the consequence.*

04 · Time value first

CH 2



Count intervals, not printed date labels; every cash flow must reach one comparison date.

SINGLE CASH FLOW

$FV_n = PV(1 + r)^n$

$PV = FV_n/(1 + r)^n$

FINITE LEVEL STREAM

$PV\ ordinary\ annuity = C[1 - (1 + r)^{-n}]/r$

$FV\ ordinary\ annuity = C[(1 + r)^n - 1]/r$

$PV\ due = PV\ ordinary \times (1 + r)$

FOREVER

$PV\ level\ perpetuity = C/r$

$PV\ growing\ perpetuity = C_1/(r - g),\ with\ r > g$

PATTERN	FIRST PAYMENT	WHERE PV LANDS
Ordinary annuity	One period after valuation	One period before first payment
Annuity due	Immediately	At first payment
Deferred	Later	One period before stream; discount again
Unequal	As dated	Value separately

Positive rate direction: moving right raises a positive value; moving left lowers it. A due stream exceeds the otherwise identical ordinary stream; deferral lowers PV.

05 · Put rate on same clock

CH 2

CONVERSIONS

$periodic\ i = nominal\ annual\ quotation\ j\ /\ m$

$EAR = (1 + j/m)^m - 1$

$periodic\ i\ from\ EAR = (1 + EAR)^{1/m} - 1$

STEM GIVES	DO	DO NOT
Nominal annual, m times	Divide quotation by m; use m×years	Insert annual quotation directly
Effective annual	Use for annual cash flows or take root	Simply divide for a shorter effective period

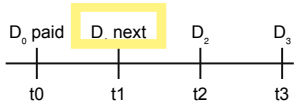
EXAM CHECK *Write a time unit beside r and n. Rate and cash-flow intervals must match before substitution.*

FORMULA-CHOICE AUDIT

CASH-FLOW SHAPE	SHORTCUT	INDEPENDENT CHECK
One amount	Single factor	Undo the move and recover the start value
Finite equal stream	Annuity	Value a short stream payment by payment
Equal forever	Perpetuity	First payment one period after valuation
Different amounts	Separate PVs	Add only after dates match

06 · Value shares

CH 3



"Just paid" is D_0 and historical; grow once for D_1. If D_1 is given, use it directly.

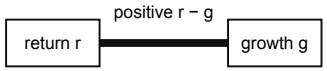
DIVIDEND DISCOUNT MODELS

$Level\ forever:\ P_0 = D_1 / r_e$

$Constant\ growth:\ P_0 = D_1 / (r_e - g),\ r_e > g$

$If\ D_0\ just\ paid:\ D_1 = D_0(1 + g)$

WORDING	TREATMENT
"Just paid"	Amount is D_0; grow once to D_1
"Next dividend"	Already D_1; do not grow again
"About to be paid"	Immediate cash flow; add at t0, value later dividends separately
Early irregular dividends	Discount each; calculate terminal price one period before stable stream begins



narrower spread ⇒ higher sensitivity

The controlling spread must stay positive; small changes dominate value when r_e and g are close.

CHANGE ONLY	VALUE DIRECTION	REASON
D_1 ↑	P_0 ↑	Larger future cash flow
g ↑	P_0 ↑	Smaller positive spread
r_e ↑	P_0 ↓	Heavier discounting

Finish with the valuation date and assumptions. An estimate is conditional; it does not guarantee perpetual growth or immediate market convergence.

MULTI-STAGE SHARE PATH

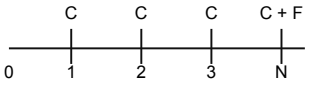
1. Place each early irregular dividend on its actual date.
2. Identify the first dividend in the stable-growth stage.
3. Calculate terminal price one period before that dividend: $P_k = D_{k+1}/(r_e - g)$.
4. Discount terminal price and each early dividend separately to t0; then add.

When testing a change in required return, hold dividends fixed and explain the discounting channel. When testing growth, keep the required return fixed. A sensitivity grid shows mathematical dependence, not that every forecast is equally credible.

BOUNDARY FAILURE	RESPONSE
$r_e \le g$ indefinitely	Constant-growth infinite-stream formula has no finite value
Numerator is D_0	Stop; relabel and obtain the next dividend
Higher r_e raises price	Stop; inspect denominator and timing

07 · Price debt

CH 4



Coupon bond = coupon annuity + single face-value payment at maturity.

COUPON BOND

$C = F \times annual\ coupon\ rate\ /\ m$

$y = nominal\ annual\ yield\ /\ m;\ N = m \times years$

$B = C[1 - (1 + y)^{-N}]/y + F/(1 + y)^N$

ZERO-COUPON DEBT

$B = F/(1 + y)^N$

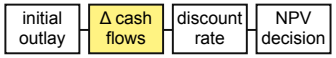
COUPON RATE VS YIELD	PRICE	ECONOMIC CHECK
coupon > yield	premium, B > F	Coupons exceed market requirement
coupon = yield	par, B = F	Contract and market align
coupon < yield	discount, B < F	Lower price supplements coupons

BEFORE PRICING	WRITE EXPLICITLY
1	Coupon dollars per payment period
2	Yield per same period
3	Number of coupon periods
4	Face value once at maturity

Face value is not divided by frequency: it is one maturity cash flow. At positive yield, a zero-coupon price is below face and rises towards face as maturity approaches. Follow any stated quotation or day-count convention.

08 · Incremental project cash flow

CH 5



with project − without project

Build the counterfactual before discounting: NPV cannot repair an irrelevant input.

INCLUDE	EXCLUDE / QUALIFY
Operating cash changes; capex; working capital; disposal; opportunity costs; side effects	Sunk costs already irreversible
Depreciation tax shield when tax is relevant	Depreciation itself is not a cash outflow
Working-capital recovery and after-tax disposal at terminal date	Owned resources are not free if use sacrifices rent or sale

SCHEDULE BEFORE FORMULA

For every item, write `accept cash flow - reject cash flow`, its date and tax treatment. Use separate rows for revenue, cash expense, tax, depreciation shield, capital expenditure, working capital and disposal. Audit vertically so every year contains each relevant category, and horizontally so each category reconciles over the whole horizon.

09 · NPV decides

CH 5

NET PRESENT VALUE

$NPV = \Sigma[t=1\ldots n]\ \Delta X_t/(1 + r_p)^t - I_0$

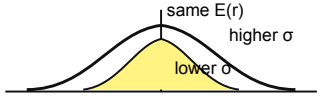
NPV	DECISION UNDER STATED FORECASTS
> 0	Accept: estimated value created
= 0	Indifferent at required return
< 0	Reject: benefits fall short of costs

For mutually exclusive projects, accepting one prevents another. If lives differ and replacement assumptions make annual comparison relevant, use equivalent annual value; do not apply it automatically to independent projects.

MARKER LINE *"NPV is __ at __%; therefore accept/reject under the forecasts." Name the assumption most likely to reverse it.*

10 · Distribution mechanics

CH 6



Expected return locates the centre; standard deviation describes total spread.

PROBABILITY DISTRIBUTION

$Check\ \Sigma p_i = 1$

$E(r) = \Sigma p_i r_i$

$Var(r) = \sigma^2 = \Sigma p_i[r_i - E(r)]^2$

$\sigma = \sqrt{Var(r)}$

STEP	GUARDRAIL
1 · Mean	Probability-weight each return
2 · Deviations	Use the same unrounded E(r) in every row
3 · Variance	Square, probability-weight, add
4 · Standard deviation	Square root; return to original units

MEASURE	ANSWERS	DOES NOT ANSWER
E(r)	Centre of stated distribution	Guaranteed or most likely outcome
σ	Total standalone dispersion	Systematic exposure alone
β	Market co-movement	Total standalone spread

Keep returns all as decimals or all as percentages. Mean must lie between minimum and maximum; variance cannot be negative. High volatility need not mean high beta when much variation is firm-specific.

TOTAL VERSUS PRICED RISK

SOURCE	PORTFOLIO EFFECT	RELEVANT MEASURE
Firm-specific events	Can be reduced when holdings do not move perfectly together	Part of standalone σ; unsystematic
Market-wide co-movement	Remains in a diversified portfolio	β; systematic

11 · Portfolio logic

CH 7

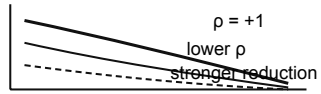
TWO-ASSET PORTFOLIO

$w_1 + w_2 = 1$

$E(r_p) = w_1E(r_1) + w_2E(r_2)$

$\sigma_p^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho_{12}\sigma_1\sigma_2$

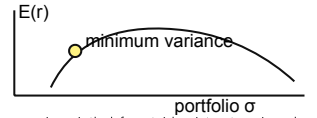
$Cov_{12} = \rho_{12}\sigma_1\sigma_2;\ \sigma_p = \sqrt{\sigma_p^2}$



Lower correlation reduces the covariance term while expected return stays unchanged.

P	RISK RESULT FOR POSITIVE WEIGHTS
+1	No usual diversification reduction; $\sigma_p = w_1\sigma_1 + w_2\sigma_2$
< +1	Diversification can lower σ_p below weighted standalone σ
−1	Zero-risk combination may exist when weights offset exactly

Correlation enters variance, never the expected-return line. Many holdings do not guarantee diversification when they share one industry or factor. Correlations may also rise in stress.



Minimum variance is the leftmost risk point, not a universal optimum without return and objectives.

12 · CAPM → project rate

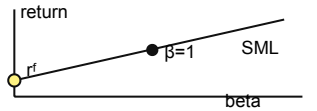
CH 8

SYSTEMATIC RISK PRICING

$\beta_i = Cov(r_i, r_m)\ /\ Var(r_m)$

$market\ risk\ premium = E(r_m) - r^f$

$r_i = r^f + \beta_i[E(r_m) - r^f]$



SML intercept = risk-free rate; slope = market risk premium.

BETA	WITH POSITIVE MARKET PREMIUM
0	CAPM return = risk-free rate
1	CAPM return = expected market return
> 1	Required return exceeds market return

β ↑ → required return ↑ → PV ↓ → NPV ↓, holding cash flows fixed. Use company beta only when project systematic risk matches existing operations; otherwise use a project-relevant beta or justified adjustment.

INTEGRATION *CAPM sets the risk-adjusted return; NPV translates incremental cash flows to time zero. Show the interface.*

ASSUMPTION AND DIRECTION AUDIT

CHECK	MEANING
β=0	Required return returns to r^f
β=1	Required return equals $E(r_m)$

FINM1001 Foundations of Finance · Drills & self-test

AUSTRALIAN NATIONAL UNIVERSITY · ANSWER PATH BEFORE ARITHMETIC

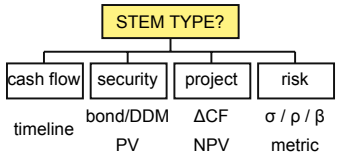
Full guide + ask Sia about FINM1001

SIDE 2/2 · 5 WORKED DRILLS · IF YOU SEE X → DO Y · CLASSIC TRAPS · EXAM-MORNING RETRIEVAL

CLOSED-BOOK MEMORY SHEET

Write setup · calculate · interpret

13 · Method chooser CH 2–8



Classify the object before selecting the equation; interpretation follows the calculation.

IF YOU SEE...	DO THIS FIRST
Cash flows on dates	Draw timeline; choose valuation date; match rate clock
"Just paid" dividend	Label D_0; grow once to D_1
Coupons + face value	Split annuity and maturity payment
Project item	Write "with − without"; date it
Outcomes + probabilities	Check probabilities sum to one; find E(r) first
Two assets + correlation	Return line separate from variance line
Beta + market inputs	Box market premium; use CAPM, then NPV if asked

14 · Answer-path checklist ALL

1 · REPRESENT	Timeline, state table, cash-flow schedule or two-asset inputs
2 · SELECT	Name formula and why its assumptions fit
3 · SUBSTITUTE	Expose units, periodic rate, period count and signs
4 · CALCULATE	Retain full precision until final line
5 · CHECK	Predict direction, bounds or premium/discount
6 · DECIDE	Date + units + financial interpretation

SELF-TEST *Cover the answer column. Say the first unsupported step aloud; that is the item to relearn.*

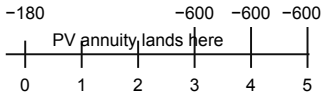
QUALITATIVE STEM ROUTE

STEM ASKS	EVIDENCE TO NAME	CLOSING ACTION
Market label	Maturity, issuer receipt, claim holder	Keep axes independent
Conflict	Duty + scenario fact + threatened party	Disclose, correct, escalate or withdraw
Project relevance	Cash flow changes under acceptance	Include or exclude with date
Risk comparison	Centre, total spread, co-movement or beta	Name the supported comparison only

Classification answers earn their force from the proving fact, not from a familiar institution name. A bank may arrange a direct issue, hold a security or intermediate deposits into loans; trace claims before deciding.

16 · Worked 1: deferred annuity CH 2

Q. Pay $180 now and $600 at the ends of years 3, 4 and 5. Find present cost at 7% effective annually.



The three-payment annuity value lands at year 2, then moves two intervals to time zero.

ANSWER PATH

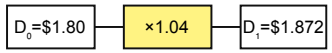
```
PV₂ = 600[1 - 1.07⁻³]/0.07 = $1,574.59
PV₀(stream) = 1,574.59/1.07² =
$1,375.31
Total PV₀ = 180 + 1,375.31 = $1,555.31
```

Interpret: present cost at t0. **Check:** below undiscounted $1,980; deferral reduces the repeated-payment PV.

TRAP *Do not treat the annuity factor as automatically landing at t0.*

17 · Worked 2: growing dividends CH 3

Q. A company just paid $1.80 per share. Dividends grow at 4%; required return is 10%. Estimate value.



Translate wording into the numerator before touching the denominator.

ANSWER PATH

```
D₁ = 1.80(1.04) = $1.872
P₀ = 1.872/(0.10 - 0.04)
P₀ = $31.20 per share
```

Checks: $r_e > g$; next dividend is used; value is at t0 under constant-growth assumptions. If D_1 had been supplied directly, growing again would shift the stream forward wrongly.

18 · Timing traps CH 2–3

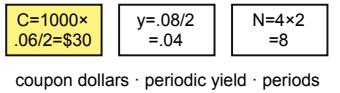
CLASSIC ERROR	REPAIR
Count labels, not intervals	Mark each move between dates
Divide an EAR by m	Take the mth root
Use D_0 in growing perpetuity	Convert to D_1 once
Put terminal price at first growth payment	Place it one period before that payment
Round intermediate rate	Carry full precision

THIRTY-SECOND REVERSIBILITY CHECK

Deposit $1,000 for three years at 8% effective annually: $FV_3 = 1{,}000(1.08)^3 =$ $1,259.71. Discounting that amount over the same three periods must return to $1,000 apart from final rounding. If it does not, direction, exponent or rate clock is wrong.

19 · Worked 3: coupon bond CH 4

Q. Four-year bond; $1,000 face; 6% annual coupons paid semiannually; 8% nominal yield compounded semiannually.



coupon dollars · periodic yield · periods

Put every input on the half-year clock; leave face value whole.

ANSWER PATH

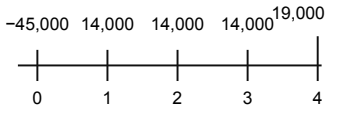
```
B = 30[1 - 1.04⁻⁸]/0.04 + 1,000/1.04⁸
B = $932.67
```

Interpret: discount bond because coupon rate 6% < yield 8%. **Independent check:** price must be below $1,000; at coupon rate = yield it would be at par.

TRAP *Divide coupon dollars and nominal yield by two; do not divide face value.*

20 · Worked 4: project NPV CH 5

Q. Asset costs $45,000 now, saves $14,000 at each year-end for four years and sells for $5,000 in year 4. Use 9%.



Year 4 contains ordinary savings plus resale; discount the patterns separately or the combined dated flows.

ANSWER PATH

```
NPV = -45,000 + 14,000[1 - 1.09⁻⁴]/0.09
+ 5,000/1.09⁴
= +$3,898.20 → accept
```

Decision holds under the stated savings, resale and 9% required return. The incremental schedule must be complete before selecting discount factors.

21 · Cash-flow traps CH 5

ITEM	CORRECT TREATMENT
Survey already paid	Sunk; exclude
Rent forgone on owned space	Opportunity cost; include
Inventory only if project starts	Incremental working capital; include and date recovery if stated
Depreciation	Non-cash; include only its tax effect when relevant

DEBT SPEED CHECK

Three-year zero-coupon bond, $1,000 face, 7% effective annual yield: $B = 1{,}000/1.07^3 =$ $816.30. It must be below face at a positive yield. Holding yield fixed, price rises towards face as maturity approaches. The calculation changes if the question specifies another quotation basis.

22 · Worked 5: distribution CH 6

Q. Returns are −10%, 8%, 24% with probabilities 0.25, 0.50, 0.25.

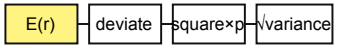
R_i	P_i	P_iR_i	$P_i(R_i-.075)^2$
−.10	.25	−.025	.00765625
.08	.50	.040	.00001250
.24	.25	.060	.00680625
TOTAL	**1.00**	**.075**	**.014475**

ANSWER PATH

```
E(r) = 7.5%
Var(r) = 0.014475
σ = √0.014475 = 12.03%
```

Standard deviation describes **total dispersion** around expected return, not market exposure alone. E(r) is not guaranteed and need not equal a possible outcome.

Audit before accepting: probabilities add to one; 7.5% lies between −10% and 24%; variance is non-negative; the square root is reported in return units. Use the unrounded 7.5% centre in all deviation rows. Mixing 8 with .08 would change the scale by orders of magnitude.



one unrounded centre for every row

Fixed sequence: centre first, then deviations, variance and square root.

23 · Portfolio drill CH 7

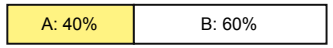
Q. w_1=.40, $E(r_1)$=8%, σ_1=10%; w_2=.60, $E(r_2)$=14%, σ_2=18%; ρ=.25.

RETURN LINE

```
E(rₚ)=.4(.08)+.6(.14)=11.6%
```

RISK LINE

```
σₚ²=.4²(.10²)+.6²(.18²)+2(.4)(.6)(.25)
(.10)(.18)
=.015424;  σₚ=12.42%
```



return: w · risk: w² + cross

Expected return is linear in weights; variance includes squared weights and co-movement.

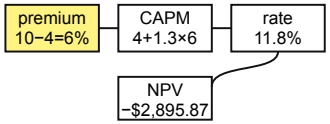
Weighted standalone σ = .4(.10)+.6(.18)=14.8%; portfolio σ is lower because ρ<1. If ρ changes, $E(r_\rho)$ remains 11.6% with the same weights and expected returns.

Counter-case: set ρ=+1 while leaving every other input fixed. Then σ_ρ=.4(.10)+.6(.18)= 14.8% . The expected return remains 11.6%. This isolates the diversification mechanism: correlation changes the covariance contribution, not the weighted mean.

Decision trap: lower risk is not automatically better. Report E(r) and σ together, name the investor objective, and check no-short-sale weights remain between 0 and 1.

24 · Integrated CAPM → NPV CH 8

Q. Project costs $70,000, pays $22,000 at each year-end for four years, β=1.30, r^f=4%, $E(r_m)$=10%.



Do not skip the interface: market premium → project required return → project NPV.

STAGE 1 · REQUIRED RETURN

```
market premium = .10 - .04 = .06
rₚ = .04 + 1.30(.06) = .118 = 11.8%
```

STAGE 2 · DECISION

```
NPV = -70,000 + 22,000[1 -
1.118⁻⁴]/.118
= -$2,895.87 → reject
```

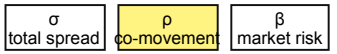
Decision is conditional on forecasts and β=1.30 representing project systematic risk. Keep the CAPM return unrounded in the NPV calculation.

Boundary speed check: r^f=3%, $E(r_m)$=9%, β=.75 gives a 6% market premium and required return 3%+.75(6%)= 7.5% . With a positive premium, the result lies between risk-free and market returns because beta lies between zero and one.

What beta does: it scales only the market risk premium; r^f remains the intercept. Standard deviation cannot replace beta in CAPM because it includes diversifiable variation. If the project belongs to another risk class, explain how a project-relevant beta is obtained or qualify the result.

25 · Classic interpretation traps CH 4–8

WRONG MOVE	WHY IT FAILS	REPAIR
"High σ means high β"	Total and systematic risk differ	Name what each measure supports
Use company β automatically	Project may have another risk class	State beta-fit assumption
Change cash flows and discount rate for same risk	May double count	When testing beta channel, hold forecasts fixed
Accept lower-risk portfolio automatically	Ignores return and objectives	Report E(r), σ and objective together
Call expected return "the outcome"	It is a distribution centre	Use conditional language

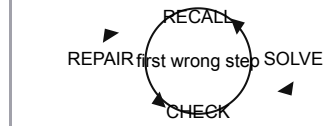


same word "risk"; three different questions

Choose the risk measure by the question, not by familiarity.

26 · Closed-book retrieval grid STRATEGY

WITHOUT NOTES, WRITE...	PASS CONDITION
Single PV/FV; annuity; perpetuity; rate conversions	Correct direction, rate clock and landing date
D_0/D_1 rule and both share formulas	Numerator and r_e>g boundary correct
Bond price decomposition	C, y, N, F exposed; predict side of par
Incremental boundary and NPV rule	Sunk out; opportunity cost in; sign interpreted
E(r), variance, σ	One centre; consistent units; square root last
Portfolio return and variance	ρ only in variance; cross term complete
β, market premium, CAPM	0 and 1 beta boundary checks work



Mark the first unsupported step, repair it, then rerun the whole chain from memory.

27 · Exam-morning plan STRATEGY

PASS	SELF-TEST
1 · Definitions	Primary/secondary; sunk/opportunity; σ/ρ/β
2 · Timelines	One single amount; one deferred annuity; $D_0 \to D_1$
3 · Valuation	One share; one bond; one project
4 · Risk	One distribution; one two-asset variance
5 · Integration	One CAPM-to-NPV chain with beta-fit sentence
6 · Direction	Say six judgement cards without calculation

Stop adding material. Retrieve, calculate and explain. The final rehearsal should be mixed and note-free: formula selection is part of the problem.

READING-TIME SCAN

1. Circle valuation date, first payment and quotation frequency.
2. Mark every cash flow as time-zero, repeated, terminal or excluded.
3. Underline the requested output: price, NPV, E(r), σ, portfolio risk or CAPM return.
4. Predict direction or range before calculation.
5. Reserve the closing sentence: date + unit + decision + controlling assumption.

28 · Final 30-second audit ALL

TICK	QUESTION
☐	Rate and period units match?
☐	Exponent counts intervals?
☐	Cash flows share a valuation date?
☐	Percentages entered consistently?
☐	Result passes direction/bound check?
☐	Interpretation names what the number means?