"Compounding" situations

A basic compounding situation

Recurrence Relation

$$V_{n+1} = RV_n, \qquad V_0 = \_\_\_$$

Rule

$$V_n = V_0 R^n$$

A "Reducing balance loan"

You take out a loan, which accrues interest, and you're paying it off in instalments

Recurrence Relation

$$V_{n+1} = RV_n - d, \qquad V_0 = \_\_\_$$

There is no 'rule' for the n^{th} term as they're complex calculations

Finance Solver

N:
I(%):
PV: Positive
Pmt: Negative
FV: Negative → zero → (Positive if you've paid *too much* off)
Cpy/Ppy:

Amortisation table

Payment number (n)	Payment made ($)	Interest paid ($)	Principal reduction ($)	Balance of loan ($)
0	0	0	0	V_0
1	★	☾	♥	ϟ
2	★	☾	♥	ϟ
3	★	☾	♥	ϟ

Entries in an amortisation table follow a pattern...

★ $= r\% \times$ ϟ

★ + ☾ = ♥

ϟ − ♥ = ϟ

Question: How much interest was paid in the 4th payment?

Steps:
1) Find 'FV' at N=3
2) Calculate $r\% \times V_3$

Question: How much did the principal reduce by in the 10th payment?

Steps:
1) Find 'FV' at N=10
2) Find 'FV' at N=11
3) Calculate $V_{10} - V_{11}$

Total Interest Paid = Total Repayments – Principal Value

number of full payments × payment amount + last 'bit' owed + interest owed on the last 'bit'

Annuities

An "Annuity"

You take have money in an interest-bearing account, which is being paid to you in equal instalments for a set amount of time

Finance Solver

N:
I(%):
PV: Negative
Pmt: Positive
FV: Positive → zero
Cpy/Ppy:

An "Annuity Investment"

You take have money in an interest-bearing account, which you contribute to each time period, with the view to use the lump sum at a future point in time

Finance Solver

N:
I(%):
PV: Negative
Pmt: Negative
FV: Positive
Cpy/Ppy:

This is what happens to superannuation when you retire

This is what happens when you keep adding money to a savings account

Payment *to* the person

Payment *from* the person to the investment

Payment number (n)	Payment made ($)	Interest earned ($)	Principal reduction ($)	Balance of annuity ($)
0	0	0	0	V_0
1				
2				
3				