Time Value of Money

Compounding: $FV = PV \times (1 + r)^n$ - Figures out the compound interest
where FV = future value, PV = present value, r = interest, n = number of periods.

Discounting is sort of the same as Compounding, but £1 tomorrow is viewed less than £1 today.
Discounting:

$$PV = FV \times \frac{1}{(1+r)^n}$$

Future cash flows need to be discounted in order to take into account the opportunity cost of an investment (OCI)

- Funds tied up in investment projects could have been used elsewhere to earn a return
- Funds tied up in investment are costly, since returns are required by the providers of finance

Net Present Value

It involves discounting all future cash flows to their present value.
The sum of all present values less the initial costs gives the net present value (NPV).

Decision rule:

- Accept project if NPV > 0
- Accept project with the highest NPV.

Year	Discount factor (10%)	Project A CF £	PV £	Project B CF £	PV £	Project C CF £	PV £
0	1.000	-1,000	-1,000	-1,000	-1,000	-2,000	-2,000
1	0.909	600	545	500	455	600	545
2	0.826	400	331	400	331	600	496
3	0.751	300	225	600	451	600	451
4	0.683	300	205	700	478	1,600	1,093
NPV			306		714		585

Internal Rate of Return (IRR)

It is equivalent to the discount rate (r) that will cause the NPV of an investment to be zero (0).

Decision rule:

- Accept project if IRR ≥ company's cost of capital
- Accept project with the highest IRR

$$IRR = r_1 + \frac{NPV_1}{NPV_1 - NPV_2}(r_2 - r_1)$$

r_1 = discount rate that gives a positive NPV_1
r_2 = discount rate that gives a negative NPV_2
NPV_1 = the positive NPV obtained by applying discount rate r_1
NPV_2 = the negative NPV obtained by applying discount rate r_2