

CTC/MTC 374 Test Review: Midterm 1 (Lectures 1-7); Midterm 2 (Lectures 7-13); Final (Lectures 14-21)

1. Single Sums (equation and/or factor form)

Equation: $F=P(1+i)^n$

- Find F given P (move single cash flow to the future)
- Find P given F (move single cash flow back in time)
- Find the interest rate (i) or time period (n)

2. Cash Flow Patterns (Shortcuts of multiple cash flows that show a pattern)

- Uniform Series (where A is a uniform cash flow of n periods)
 - P/A (P occurs 1 time period before first A; n=number of cash flows)
 - F/A (F occurs at the same time as the last A; n=number of cash flows)
 - A/P (Find a uniform series given a single sum one year before the first cash flow A)
 - A/F (Find a uniform series given a single sum at the end of the last cash flow A)
- Gradient Series (cash flows differ by a constant amount)
- Geometric Series (cash flows differ by a constant percentage)

3. Rates (all three must match: 5% per year compounded yearly; time period-years)

- Sometimes you can just change time period (usually P/F or F/P)
- Change interest rate to match the cash flow period (any type of series)
- Determining interest and principal (equity)
- Continuous Compounding ($i_{eff}=e^r-1$)

4. Methods for Determining Economic Feasibility (MARR is minimum attractive rate-of-return)

- Present Worth (PW)-Move all cash flows to period 0; $PW>0$
- Future Worth (FW)-Move all cash flows to the future; $FW>0$
- Annual Worth (AW)-Find A/P or find A/F; $FW>0$
- IRR-Set PW/AW or $FW=0$ and solve for IRR; $IRR>MARR$
- ERR-Set FW of negative Cash Flow(s) @ ERR equal to FW of positive cash flows @ MARR (or e that is different than MARR); $ERR>MARR$
- SIR or B/C-PW of positive cash flows/PW of negative cash flows ($B/C>1$)
- PBP (non-discounted or discounted)-how many time periods until you get your investment back (not equivalent to a-f)
- Capitalized Worth (often $AW/MARR$ but not necessarily equivalent to a-f)

5. Bonds

- $I=V*(b/c)$ ---I does not change; it is fixed when bond is issued
- Present Worth= $I (P/A i, n) + V (P/F i, n)$ ---i can change if the bond is not purchased and/or sold at par

6. Comparing alternatives

- Ranking (works for PW, AW, FW)
- Incremental (must use for IRR, ERR or B/C)

7. Replacement Problems (defender vs challenger; outside viewpoint)

8. Inflation

9. Cost Estimating/Accounting/Breakeven-Present Economy

- a. Cost Estimating (Indices: time, place, size) Units (per sq ft), Factor (complete breakdown)
- b. Balance Sheet; Income Sheet
- c. Present Economy (determine which machine should be used)
- d. Linear/Nonlinear Breakeven (equations for costs, revenue and net profit)

10. Depreciation

- a. Methods (SL, DB, SOYD, MACRS)
- b. Book value; Depreciation

11. Convert Before-Tax Cash Flow (BTCF) to After-Tax Cash Flow (ATCF)

12. Methods to help evaluate Uncertainty

- a. Breakeven
- b. OMP (optimistic, most probably, pessimistic)
- c. Spider-Graph (evaluate range of values)
- d. Monte-Carlo simulations (define probabilities, make many runs)