P77 #3

Buy lot for $2,000
sell in 10 yr for $5,000

Want to earn an E/N of 10%
Should I buy?

D/YR 1

I YR (PV $7000, FV = $15,000 N 10)

772% < 10% = Do not buy

P77 #4

Param 45 mo after
6 yr.

She can make 18% compounded quarterly on alternate investments How much should she pay for the one? (i.e. What is the PV?)

\[
P_V = \frac{F_V}{(1+i)^N} = \frac{45,000}{(1 + \frac{18\%}{4})^{24}} \quad 24 \text{ quarters in 6 yr}
\]

rate each quarter

\[
= \frac{45,000}{(1.045)^{24}} = 15,646.66
\]

D/YR 4

FV(FV $45,000 I/YR 8 N 24) = 15,646.66
Problem 5. Deposit $5,800 at the end of each 6 mo. period for the next 12 yr and earn interest at 8.5% compounded semiannually. What is the FV of this investment? 

\[ FV = ? \]

<table>
<thead>
<tr>
<th>yr</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td></td>
</tr>
</tbody>
</table>

\[ FV (PMT \quad 5000 \quad I/YR \quad 8.5; \quad N \quad 24) \]

\[ 20 \quad 20.5 \quad 67 \]

(5) If \( PMT \) are made at the beginning of the period what's the FV? (The FV will be 425% higher as each investment will collect interest for 6 more months.)

On calculator, press \( \boxed{1} \) \( \boxed{N} \) \( \boxed{PMT} \) \( \boxed{FV} \)

Then press \( F1 \) \( 7 \) \( 1 \) \( 0 \) \( 382 \) \( 41 \)
P77 #6

P/yr 4

\[ v(\text{PMT } 250, \text{I/yr } 15, N \ 16) \]

\[ = 26 740.93 \]

P77 #7

\[ \text{FV} = 2500(1.09)^4 + 750(1.09)^2 + 750(1.19) + 1300(1.09) \]

\[ = 3578.96 + 2740.08 + 14700 \]

\[ = 2370.03 \]

P78 #8

2150 per yr (End of yr) for 10 yr.
Wants 18% annual return. What is PV?

F/yr

\[ \text{PV} = \text{PMT } 2150 \ N \ 10 \ \text{I/yr } 18 \]

\[ 7662.29 \]

What if the PMT are at the beginning of each year?

\[ \text{Press PV} \ 40150 \]
P 78 # 9

Pay 750 per year for the next 8 yrs and a return 12% compounded monthly. How much should you pay? P/NR 2

\[ PV(PMT \ 750, \ I/Y = 12, \ N = 96) \]

\[ 39 \ 222 \ 96 \]

b) What is the total sum of each year will be received?

96 * 750 = 72,000

How large difference? Discounting

P 78 # 10

<table>
<thead>
<tr>
<th>yr</th>
<th>AMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12500</td>
</tr>
<tr>
<td>2</td>
<td>10000</td>
</tr>
<tr>
<td>3</td>
<td>7500</td>
</tr>
<tr>
<td>4</td>
<td>5000</td>
</tr>
<tr>
<td>5</td>
<td>2500</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>12500</td>
</tr>
</tbody>
</table>

Wants to earn 9% compounded monthly. What is the PV?
To compounded monthly is 0.71.7% each month, so

\[ PV = \frac{5000}{(1.0075)^2} + \frac{2500}{(1.0075)^4} + \frac{0}{(1.0075)^6} + \frac{12500}{(1.0075)^8} + \frac{2500}{(1.0075)^{10}} + \frac{0}{(1.0075)^{12}} + \frac{2500}{(1.0075)^{14}} + \frac{-7500}{(1.0075)^{16}} \]

The easiest approach, however, is to use the CF button on our calculator. To get the correct discount rate we have to use the EAY as the I/YR as the CF are annual (or else type in the monthly CF's).

Note: CF button assume the CF's are at the frequency in the \( I/YR \). If we want to use annual CF then we need to use the correct annual discount rate.

\[ EAY = \left( \frac{1 + \frac{APR}{m}}{m} \right) \]
\[ PV = \frac{12,500}{1.093807^{12}} + \frac{10,000}{(1.093807)^2} + \frac{7500}{(1.093807)^3} + 9,3807 \]

Once I know the correct annual discount rate, I can use the CF key.

\[ P/\bar{A} = \frac{1}{i \bar{A}} \]

<table>
<thead>
<tr>
<th>( t )</th>
<th>( CF )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>12,500</td>
</tr>
<tr>
<td>2</td>
<td>10,000</td>
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<td>3</td>
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<tr>
<td>4</td>
<td>5,000</td>
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<tr>
<td>5</td>
<td>2,500</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>12,500</td>
</tr>
</tbody>
</table>

Then press \[ N P V = 37,280.28 \]

Alternate Calculator Approach

\[ P/\bar{A} = \frac{1}{i \bar{A}} \]

<table>
<thead>
<tr>
<th>( t )</th>
<th>( CF )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-11</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>12,500</td>
</tr>
<tr>
<td>3-23</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>10,000</td>
</tr>
<tr>
<td>25-35</td>
<td>0</td>
</tr>
<tr>
<td>36</td>
<td>7500</td>
</tr>
<tr>
<td>37-47</td>
<td>0</td>
</tr>
<tr>
<td>48</td>
<td>5000</td>
</tr>
<tr>
<td>49-59</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>2500</td>
</tr>
<tr>
<td>61-83</td>
<td>0</td>
</tr>
<tr>
<td>84</td>
<td>12500</td>
</tr>
</tbody>
</table>

Then $\text{NPV}$

$\text{PMT} = \dfrac{\text{FV}}{\text{PV}}$

$\text{PMT}(\text{FV} 50,000, N 0, I 10\% 0)$

3 3727

What if the bank pays 6% compounded monthly? (Still more annual PMT's)

First compute $\text{FV}_{12}$, which shows the annual rate each deposit will earn.
\[ E 4 \left( + \frac{A + R}{2} \right) \frac{1}{(1 + 0.10)^2} \frac{1}{1.047} \quad 0.47\% \]

[By calculator, not FVR.
IRR 0.471]

To select new residential PBI T

\[ \frac{F}{V} = \frac{PBI \times 50,000}{N \times IRR} \quad 0.471 \]

3.06714

Problem 4.2

Purchased Apt. for $90,000

Income is $8,000 per yr (end of year)

for next 10 yrs, at which time

the project will be worthless

What IRR to obtain?

\[ IRR( PV 90,000, PBI 5,000, n 10) \]

- 8 442%
The company requires 76% of this is a poor investment.

P78 # 3

Monthly Int 920 for 200 months

\[ P/I \text{yr} = 12 \]

\[ I/YR = \frac{75000 \text{ sum} \times 920, N \text{ 200} \text{ to an APR} \]

Total Cash Requirement 000 x 2.80-30,000

Of that, 75000 is return of capital invested

25000 -> 1000 in the return on capital or profit

Profit on capital is taxable

Profit of capital is not taxed
Problem 5

100,000

1500

1500

100,000

1500

60 months

2

-1

1 yr

PW = 100,000 - 500 FV

N = 60

18.00%

which is a 1 3/4 per month

Note 15%

Observe relation: If the initial value and future value are the same then the periodic rate of return is just

\[ \text{PMT} = \frac{\text{PV}}{N} \]

And APR = periodic rate \# of periods per yr

#16 What APR is equivalent to

or 0% any

so we can any equation for APR

\[ \text{EN} = \left[ 1 + \frac{\text{APR}}{m} \right]^m - 1 \]

\[ m \text{ # of periods per year} \]
What APR (quarterly) gives a 10% EAY? 

\( \text{EAY} = \frac{1}{4} \) 

To calculate, \( \text{EOM} = 9.6455 \) 

What APR (monthly, compounded) gives a 10% EAY? 

\( \text{EOM} = 12 \) 

\( \text{EFF%} \) 

\( \text{EOM} = 9.5690 \)

---

#17 1000/month for 28 months 

\( PV = -24,000 \)

What's the APR? 

\( \text{P/YR} = 2 \) 

\( I/YR = \frac{PMT + 000}{28} \) \( \text{N} = 28, \text{P} = -24,000 \)

\( = 3.49\% \)

What's the EAY? 

\( \text{EFF%} = 3.77\% \)
Chapter 4: Mortgages
where the Payments can be
started at or soon after

Early lending used high down payment (such as 50% down)
with interest only, and fairly short terms. The borrower was
supposed to save money to
pay off the mortgage balance
at the end of the term

Note: It is common today for
commercial mortgages to be
interest only and have a
fairly short term. When the
term expires, the mortgage
is "refinanced." When ever a
large payment is due at the
end of the term, it is called
a "balloon payment.

An interest only loan is often
called a "bullet loan"
The first amortizing loan were constant amortization loans (CAM). Each loan balance declines each month, and on such a mortgage, the payment declines each month by a fixed amount.

**Example:** Consider a 120-month $160,000 CAM at 10%. What is your first payment, and your balance after the first payment?

Step 1 - Compute the monthly amortization.

\[
\text{Loan Amt} = \frac{160,000}{120} = 1333.33 \text{ per mo in principle}
\]
The payment is principle + interest, so we need to determine the interest cost.

\[
\text{Interest} = \text{Balance} \times \text{Monthly Interest Rate}
\]

\[
60,000 \times \frac{10}{2} = 333.33\]

Payment = Principal + Interest

\[
333.33 + 333.33 = 666.66
\]

Balance after 1st payment

\[
\text{New Balance} = \text{Balance} - \text{Payment}
\]

\[
160,000 - 666.66 = 159,333.34
\]

What is the second Pmnt?

\[
\text{Pmt} = \text{Principal} + \text{Interest}
\]

\[
Pmt = 333.33 + 322.22 = 655.55
\]
Note each month the interest declines by
1333.33 \times \frac{10}{12}

What will your 37th payment be, and what is the loan balance after that payment?

What is the interest due for the 37th payment?

\[
\begin{array}{c}
\text{Beg Mo} \times \frac{10}{12} \\
\text{Balance} \times \frac{2}{12}
\end{array}
\]

\[
\text{Balance after 36 months}
\]

\[
160,000 - \left( -1333.33 \times 17.97978 \right)
\]

\[
2,000
\]

\[
\text{Int Dec} - 2000 \times \frac{10}{2}
\]

\[
-933
\]

\[
\text{Payment} = 3333.33 + 933333 = 2266666
\]
Loan Balance after 37th payment = 2,000 - 2,333.33
0 balance

For a CAM

2,666.66 pmt declines at 11.11% each month

1344.44

1333.33

Month

Note 2/4/11 123 333 + \( \frac{1}{11} \) per cent interest

Final Payment

---

Constant Payment Loan vs CAM

Pmt

\( \text{CAM} \)

\( \text{CPM} \)

BAL

\( \text{CAM} \)

\( \text{CPM} \)

Month
Closing Costs

When completing a real estate transaction, there are numerous closing costs. They can be broken down into 3 types:

1. Statutory
2. Third Party Costs
3. Additional Finance Charges

1. Statutory costs are fees paid to governments to record the transaction.

2. Third Party costs are fees paid to other entities to facilitate the transaction.

They include Title Fees, Escrow Fees (for services of holding money and various paperwork), Pre-Paid Inspection, Home Certification, Pre-Paid Appraisal, Home Inspection, Property Taxes.
Mortgage Fees
Condo Fees etc Association Fees

(3) Additional Finance Charges
Points (% of the loan amount)
Underwriting Fee
Document Fees
Loan Origination Fee
Prepaid Interest