Solutions to Questions - Chapter 11
Investment Analysis and Taxation of Income Properties

Question 11-1

What are the motivations for investing in real estate income property?

Net Income: Dollars left over after collecting rent and paying expenses but before considering taxes and financing costs.

Property Sale: Expecting a price increase over a specified holding period increases investor return.

Diversification: Reduces overall risk to hold many types of investments.

Tax Benefits: Preferential tax benefits. Taxable income is often less than before-tax cash flow.

Question 11-2

Name the four general real estate investment styles and describe each. Identify three investment strategies within these general categories and give examples of each.

(4) styles: Core, Core Plus, Value Added, Opportunistic

Core:	Office Properties Trophy Properties Gateway Markets
Core Plus:	Properties to be re-tenanted Properties needing minor capital improvements Properties to be leveraged
Value Added:	Properties with excess land to be developed Properties need to have greater amenities (fitness center, restaurant) Properties needing major improvement (eg. parking lot expansion, improving elevators)
Opportunistic:	Raw land development Distressed assets Loans in default

Question 11-3

How may supply and demand affect a property's projected NOI?

Expected market rents and vacancy rates

Expenses associated with operating the property

Nature of any leases on the property

Question 11-4

What factors would result in a property increasing in value over a holding period?

Inflation: This causes rents as well as the final sale price to be higher.

Demand: Increased demand for space may increase value if the supply of space doesn't increase as well.

Question 11-5

How do you think expense stops and CPI adjustments in leases affect the riskiness of the lease from the lessor's point of view?

There is less risk for the lessor with expense stops and CPI adjustments in leases.

CPI Adjustments: The risk of unexpected inflation is shifted to the lessee.

Expense Stops: The risk of increases in expenses is shifted to the lessee while allowing the lessor to retain the benefit of any decrease in expenses.

Question 11-6

Why should investors be concerned about market rents if they are purchasing a property subject to leases?

Even if the investment is an existing building that has already been leased, the income can be affected when the existing leases expire and are renewed at the market rent at the time.

Question 11-7

What is meant by equity?

The investor's initial equity in the project is equal to the purchase price less the amount borrowed. The amount of equity an investor has in a property may change over time if the property value and loan balance changes (e.g. if the property value increases and the loan balance is reduced through amortization, the investor's equity increases).

Question 11-8

What is the equity dividend rate?

The equity dividend rate relates the BTCF (or equity dividend) in the first year to the initial equity investment.
It is not a measure of investment yield because it does not take into account future income from operations or resale of the property at the end of the holding period. It is based on a single year, usually the first year.

Question 11-9

What is the significance of a debt coverage ratio?

It is a ratio of the NOI to the mortgage payment that indicates the riskiness of a loan. It is the degree to which the NOI from the property is expected to exceed the mortgage payment. Lenders typically want a debt coverage ratio (DCR) to be at least 1.2.

Question 11-10

What is meant by tax shelter?

The term "tax shelter" refers to an investment that allows a taxpayer to reduce taxable income. Although most of the tax shelter benefits of real estate were removed by the Tax Reform Act of 1986, depreciation deductions still provide some "shelter" in that they are non-cash deductions that reduce taxable income. Interest deductions on the mortgage also serve to reduce and in a sense shelter taxable income.

Question 11-11

How is the gain from the sale of real estate taxed?

The entire taxable gain from the sale of real estate is taxed at the same rate as ordinary income.
It is still important to keep track of capital gains/losses and ordinary income gains/losses. This is due to TRA rules for passive investors and properties acquired prior to 1986.

Question 11-12

What is meant by an effective tax rate? What does it measure?

An effective tax rate is a tax rate that takes into account the effects of depreciation and time value of money.
It measures the actual difference between the BTIRR and the ATIRR. This difference is the effective tax rate and can be less than the actual marginal tax rate.
This difference is also due to the fact that the interest on the mortgage loan is deductible.

Question 11-13

Do you think taxes affect the value of real estate versus other investments?

Yes. Not all investments are treated alike when it comes to federal income taxes. Thus, taxes must be considered when comparing returns for investments which are not taxed in the same manner. Investments that have the same before-tax return may have quite different after-tax returns.

Question 11-14

What is the significance of the passive activity loss limitation (PALL) rules for real estate investors?

The PALL rules are important because, in general, passive losses cannot be used to offset income from another category. Because any tax loss from real estate is usually considered a passive loss, it can not be used to offset income from other sources such as active income from salaries and wages or portfolio income from interest or dividends.

Solutions to Problems - Chapter 11

Investment Analysis and Taxation of Income Properties

Problem 11-1

ASSUMPTIONS:

Current Market Rent	$17.00	per s.f.
Gross square feet of building	50,000	s.f.
Net rentable square feet of building	50,000	s.f.
Projected Increase in Market Rent	3.00%	per year
Management costs	5.00%	of Effective Gross Income
Estimated increase in CPI	3.00%	per year
Vacancy rate starting year 4	10.00%	per year

Tenant	Sq. ft.	Rent per s.f.	Current Rent	Remaining term (yrs)	pense stop per s.f.	CPI adjustment
Tenant 1	20,000	$15.00	$300,000	3	$4.00	50.00%
Tenant 2	15,000	$15.50	232,500	4	4.50	50.00%
Tenant 3	15,000	$17.00	255,000	5	5.00	50.00%
Total	50,000		787,500			

Summary of Expense Information

	Dollars	per s.f.			
Property tax	$100,000	2.00	increase	3.00%	per year
Insurance	10,000	0.20	increase	3.00%	per year
Utilities	75,000	1.50	increase	3.00%	per year
Janitorial	25,000	0.50	increase	3.00%	per year
Maintenance	40,000	0.80	increase	3.00%	per year
Subtotal (before mgt)	250,000	5.00	(before management expenses)		
Management	$39,375	0.79		5.00%	of EGI
Total	$289,375	$5.79			

(a) EGI

Base Income:						
Year	1	2	3	4	5	6
Tenant 1	300,000	300,000	300,000	371,527	371,527	371,527
Tenant 2	232,500	232,500	232,500	232,500	287,005	287,005
Tenant 3	255,000	255,000	255,000	255,000	255,000	295,615
Total base	787,500	787,500	787,500	859,027	913,532	954,147
CPI Adjustment:						
Tenant 1	4,500	9,067	13,704	0	5,573	11,229
Tenant 2	3,488	7,027	10,620	14,267	0	4,305
Tenant 3	0	3,825	7,707	11,648	15,648	0
Total CPI	7,988	19,920	32,031	25,915	21,221	15,534
Total Base and CPI	795,488	807,420	819,531	884,942	934,753	969,681
Expense Reinmursements						
Tenant 1	$20,000	$23,000	$26,090	$0	$3,278	$6,655
Tenant 2	7,500	9,750	12,068	14,455	0	2,532
Tenant 3	0	2,250	4,568	6,955	9,413	0
Total Reimbursements	27,500	35,000	42,725	21,409	12,691	9,187
Potential Gross Income	822,988	842,420	862,256	906,351	947,444	978,868
Vacancy	0	0	0	90,635	94,744	97,887
Effective Gross Income	822,988	842,420	862,256	815,716	852,699	880,982

(b) Expense Reimbursements

The expense reimbursements were shown above in the calculation of effective gross income. Effective gross income includes income from expense reimbursements.

(c) NOI

SUMMARY OF OPERATING EXPENSES

Reimbursable expenses						
Property tax	100,000	103,000	106,090	109,273	112,551	115,927
Insurance	10,000	10,300	10,609	10,927	11,255	11,593
Utilities	75,000	77,250	79,568	81,955	84,413	86,946
Janitorial	25,000	25,750	26,523	27,318	28,138	28,982
Maintenance	40,000	41,200	42,436	43,709	45,020	46,371
Total before management	250,000	257,500	265,225	273,182	281,377	289,819
per s.f.	5.00	5.15	5.30	5.46	5.63	5.80
Non reimbursable expenses						
Management	41,149	42,121	43,113	40,786	42,635	44,049
Total expenses						
Total Expenses	291,149	299,621	308,338	313,968	324,012	333,868

PROJECTED NET OPERATING INCOME

Year	1	2	3	4	5	6
Base income	$787,500	$787,500	$787,500	$859,027	$913,532	$954,147
Plus CPI Adjustment	7,988	19,920	32,031	25,915	21,221	15,534
Plus Reimbursements	$27,500	$35,000	$42,725	$21,409	$12,691	$9,187
Total Potential Income	$822,988	$842,420	$862,256	$906,351	$947,444	$978,868
Less Vacancy	0	0	0	90,635	94,744	97,887
Effective Gross Income	822,988	842,420	862,256	815,716	852,699	880,982
Less operating expenses:						
Reimbursable expenses	250,000	257,500	265,225	273,182	281,377	289,819
Non reimbursable expenses	41,149	42,121	43,113	40,786	42,635	44,049
NOI	$531,838	$542,799	$553,918	$501,749	$528,687	$547,114

(d) Average Compound Rate

Annual increase in NOI over holding period: 0.57%

(e) Overall Cap Rate (Going-In Rate)

Cap. Rate: 10.64%

Problem 11-2

ASSUMPTIONS:

Asking Price	$1,250,000	
Rent year 1	$200,000	
Growth-Rent	3.00%	
Vacancy & Coll. Loss	10.00%	of rents
Expenses	35.00%	of EGI
Loan-to-Value	70.00%	
Loan Interest	11.00%	
Loan term	30	years
Appreciation rate	3.00%	
Holding Period	5	years
Selling costs	0.00%	of sale price
Equity discount rate	14.00%	
Reinvestment rate	6.00%	

Equity	375,000		
Loan	875,000		
Annual Loan Payment	99,994		
Mortgage Balance	850,191	year	5

Year	1	2	3	4	5	6
PGI	200,000	206,000	212,180	218,545	225,102	231,855
Vacancy & Collection Loss	20,000	20,600	21,218	21,855	22,510	23,185
EGI	180,000	185,400	190,962	196,691	202,592	208,669
Expenses	63,000	64,890	66,837	68,842	70,907	73,034
NOI	117,000	120,510	124,125	127,849	131,685	135,635
Debt Service	99,994	99,994	99,994	99,994	99,994	99,994
BTCF	17,006	20,516	24,131	27,855	31,691	35,641

Cash flow from sale in year	5	
Sales Price		1,449,093
Sales costs		0
Mortgage Balance		850,191
Before-tax cash flow		598,902

(a) FIRST YEAR DEBT COVERAGE RATIO (DCR)

Year	1	2	3	4	5
Debt-Coverage Ratio	**1.17**	1.21	1.24	1.28	1.32

(b) TERMINAL CAPITALIZATION RATE

NOI Year 6	135,635
Resale Price	1,449,093
Terminal Cap Rate	**9.36%**

(c) BTIRR ON EQUITY

BTIRR on Equity

Year	0	1	2	3	4	5
BTCF	(375,000)	17,006	20,516	24,131	27,855	630,593
BTIRR on Equity	**15.04%**					

(d) NET PRESENT VALUE

NPV - Equity	**15,994**	@	14.00%

This means that the investor can invest $15,994 more in the property and still earn a 14% IRR.

(e) PROFITABILITY INDEX

Present Value BTCF	390,994		
Initial Equity Investment	375,000		
Profitability Index:	**1.04**	@	14.00%

This means that the investment is profitable in the sense that the investor could invest about 4% more in the property and still earn a 14% IRR.

Problem 11-3

ASSUMPTIONS:

Asking Price	**$1,250,000**	
Tax Considerations:		
Building Value	**$1,125,000**	
Depreciation	**39**	**years**
Ordinary income tax rate	**36.00%**	
Capital gains tax rate	**20.00%**	
Depreciation recapture tax rate	**25.00%**	
Loan-to-Value	**70.00%**	
Loan Interest	**11.00%**	
Loan term	**30**	**years**
Payments per year	**12**	
Holding Period	**5**	**years**
Selling costs	**0.00%**	**of sale price**
Equity discount rate	**14.00%**	
Reinvestment rate	**6.00%**	

Equity	375,000		
Loan	875,000		
Annual Loan Payment	99,994		
Mortgage Balance	850,191	year	5

SUMMARY LOAN INFORMATION:					
End of Year	1	2	3	4	5
Payment	99,994	99,994	99,994	99,994	99,994
Mortgage Balance	871,061	866,667	861,764	856,294	850,191
Interest	96,055	95,600	95,091	94,524	93,891
Principal	3,939	4,394	4,903	5,470	6,103

Year	1	2	3	4	5
Rent	200,000	206,000	212,180	218,545	225,102
Vacancy & Collection loss	20,000	20,600	21,218	21,855	22,510
Effective Gross Income	180,000	185,400	190,962	196,691	202,592
Operating Expenses	63,000	64,890	66,837	68,842	70,907
NOI	117,000	120,510	124,125	127,849	131,685
Debt Service	99,994	99,994	99,994	99,994	99,994
Before-tax Cash Flow	17,006	20,516	24,131	27,855	31,691

NOI	117,000	120,510	124,125	127,849	131,685
Less: Interest	96,055	95,600	95,091	94,524	93,891
Depreciation	28,846	28,846	28,846	28,846	28,846
Taxable Income	(7,902)	(3,936)	188	4,479	8,948
Tax (Savings)	(2,845)	(1,417)	68	1,613	3,221
After-tax Cash Flow	19,851	21,933	24,064	26,243	28,469

Cash flow from sale in year	5	
Sales Price		1,449,093
Sales costs		0
Mortgage Balance		850,191
Before-tax cash flow		598,902
Original Cost Basis	1,250,000	
Accumulated Depreciation	144,231	
Adjusted Basis	1,105,769	
Capital Gain	343,323	
Depreciation recapture	144,231	
Price appreciation	199,093	
Tax on price appreciation	39,819	
Tax on depreciation recapture	36,058	
Total capital gain tax		75,876
After-tax cash flow from sale		523,026

BTIRR on Equity

Year	0	1	2	3	4	5
BTCF	(375,000)	17,006	20,516	24,131	27,855	630,593
BTIRR on Equity	**15.04%**					
NPV - Equity	**15,994**	@	14.00%			

ATIRR on Equity

Year	0	1	2	3	4	5
ATCF	(375,000)	19,851	21,933	24,064	26,243	551,495
ATIRR on Equity	**12.45%**					
Effective Tax Rate	**17.20%**					
BT Equivalent Yield	**19.46%**					

(a)

ATIRR on Equity

Year	0	1	2	3	4	5
ATCF	(375,000)	19,851	21,933	24,064	26,243	551,495
ATIRR on Equity	**12.45%**					

(b)

Effective Tax Rate	**17.20%**
BT Equivalent Yield	**19.46%**

(c) The depreciation combined with the interest deductions has reduced the taxable income significantly. In fact, there are some tax losses all five years resulting in some additional tax shelter if the investor can use the passive losses. The effective tax rate is 17.2% compared with the investors marginal tax rate of 36%.

(d) ATIRR is 12.38%

Spreadsheet limitations: 5 year holding period. Assumes passive losses can not be used and must be carried forward to offset taxable income in future years.

Data Input Box:

Asking Price	**$1,250,000**	
Tax Considerations:		
Building Value	**$1,125,000**	
Depreciation	**39**	**years**
Ordinary income tax rate	**36.00%**	
Capital gains tax rate	**20.00%**	
Depreciation recapture tax rate	**25.00%**	
Loan-to-Value	**70.00%**	
Loan Interest	**11.00%**	
Loan term	**30**	**years**
Payments per year	**12**	
Holding Period	**5**	**years**
Selling costs	**0.00%**	**of sale price**
Equity discount rate	**14.00%**	
Reinvestment rate	**6.00%**	

Equity	375,000		
Loan	875,000		
Annual Loan Payment	99,994		
Mortgage Balance	850,191	year	5

SUMMARY LOAN INFORMATION:					
End of Year	1	2	3	4	5
Payment	99,994	99,994	99,994	99,994	99,994
Mortgage Balance	871,061	866,667	861,764	856,294	850,191
Interest	96,055	95,600	95,091	94,524	93,891
Principal	3,939	4,394	4,903	5,470	6,103

Year	1	2	3	4	5
Rent	200,000	206,000	212,180	218,545	225,102
Vacancy & Collection loss	20,000	20,600	21,218	21,855	22,510
Effective Gross Income	180,000	185,400	190,962	196,691	202,592
Operating Expenses	63,000	64,890	66,837	68,842	70,907
NOI	117,000	120,510	124,125	127,849	131,685
Debt Service	99,994	99,994	99,994	99,994	99,994
Before-tax Cash Flow	17,006	20,516	24,131	27,855	31,691

NOI	117,000	120,510	124,125	127,849	131,685
Less: Interest	96,055	95,600	95,091	94,524	93,891
Depreciation	28,846	28,846	28,846	28,846	28,846
Tax loss (before limitation)	(7,902)	(3,936)	188	4,479	8,948
Accumulated tax loss	(7,902)	(11,837)	(11,649)	(7,170)	1,778
Taxable income	0	0	0	0	1,778
Tax	0	0	0	0	640
After-tax Cash Flow	17,006	20,516	24,131	27,855	31,051

Cash flow from sale in year	5	
Sales Price		1,449,093
Sales costs		0
Mortgage Balance		850,191
Before-tax cash flow		598,902
Original Cost Basis	1,250,000	
Accumulated Depreciation	144,231	
Adjusted Basis	1,105,769	
Unused accumulated tax loss	0	
Capital Gain	343,323	
Depreciation recapture	144,231	
Price appreciation	199,093	
Tax on price appreciation	39,819	
Tax on depreciation recapture	36,058	
Total capital gain tax		75,876
After-tax cash flow from sale		523,026

BTIRR on Equity

Year	0	1	2	3	4	5
BTCF	(375,000)	17,006	20,516	24,131	27,855	630,593
BTIRR on Equity	**15.04%**					
NPV - Equity	**15,994**	@	14.00%			

ATIRR on Equity

Year	0	1	2	3	4	5
ATCF	(375,000)	17,006	20,516	24,131	27,855	554,076
ATIRR on Equity	**12.38%**					

PROBLEM 11-4

The after-tax IRR increases to 17.21% from 15.45%.

PROBLEM 11-5

Year	New Employees	Space per Employee	Absorption	Occupied
0				900,000
1	100	300	30,000	930,000
2	100	300	30,000	960,000
3	100	300	30,000	990,000

Year	New Supply	Supply	Occupied	Occupancy %
0		1,000,000	900,000	90%
1	50,000	1,050,000	930,000	88.57%
2		1,050,000	960,000	91.43%
3		1,050000	990,000	94.29%

a) Current occupancy is 90%
b) Absorption each year is shown in the first table above
c) Occupancy each year is shown in the second table above
d) Although demand is weak, occupancy is increasing because there is no new supply after year 1. So rents are likely to increase.