



# Department of Local Government Finance

## **Income Approach Problem and Answer Packet**

2026 Level II Tutorials

**Class Problem # 1**  
**Development of Potential Gross Income**

You are appraising a neighborhood strip shopping center known as Gateway Shopping Center. The leases with the tenants were entered into at various times over the past five years. The current rent roll follows:

Tenant	Leasable Area	Annual Rent
Kathy's Cards and Gifts	2,500 SF	\$37,500
Sports Galore	2,500 SF	\$40,000
Deuce Hardware	4,000 SF	\$40,000
Palace Restaurant	3,000 SF	\$60,000
Mother Goose Shoes	2,000 SF	\$40,000
House of Beauty	1,500 SF	\$37,500
Safe Insurance	800 SF	\$14,400
Vacant Retail Space	2,500 SF	\$0
	18,800 SF	\$269,400

You have researched the market and found recently negotiated rents for competing shopping centers run \$25.00/SF for space regardless of size or build outs.

What Potential Gross Income (PGI) will you use in your reconstructed operating statement for the Gateway Shopping Center?



**Class Problem # 1 Answer**  
**Development of Potential Gross Income**

What Potential Gross Income (PGI) will you use in your reconstructed operating statement for the Gateway Shopping Center?

Tenant	Leasable Area	Market Rent	PGI
Kathy's Cards and Gifts	2,500 SF	\$25	\$62,500
Sports Galore	2,500 SF	\$25	\$62,500
Deuce Hardware	4,000 SF	\$25	\$100,000
Palace Restaurant	3,000 SF	\$25	\$75,000
Mother Goose Shoes	2,000 SF	\$25	\$50,000
House of Beauty	1,500 SF	\$25	\$37,500
Safe Insurance	800 SF	\$25	\$20,000
Vacant Retail Space	2,500 SF	\$25	\$62,500
	18,800 SF		\$470,000

OR

18,800	Times	\$25
		\$470,000

The Potential Gross Income is :

\$470,000



**Class Problem # 2**  
**Development of Vacancy and Collection Loss**

You have researched the properties that compete with the Gateway Shopping Center and have obtained the following information:

<b>Property</b>	<b>Vacant Space</b>	<b>Total Leasable Area</b>	<b>Rents Receivable</b>	<b>Rents Collected</b>
Riverton SC	1,200 SF	20,000 SF	\$475,000	\$469,775
Eagle Ridge SC	1,050 SF	18,000 SF	\$396,000	\$392,440
Chatham SC	1,600 SF	26,000 SF	\$524,000	\$518,760
Hyde Park SC	850 SF	14,000 SF	\$322,000	\$318,780
Gateway SC (Subject Property)	2,500 SF	18,800 SF	\$269,400	\$269,400

What Vacancy and Collection Loss Rate (V & C) will you use in your reconstructed operating statement for Gateway Shopping Center?



**Class Problem # 2 Answer**  
**Development of Vacancy and Collection Loss**

What Vacancy and Collection Loss Rate (V & C) will you use in your reconstructed operating statement for Gateway Shopping Center?

Property	Vacant Space	Total Leasable Area	Rents Receivable	Rents Collected
Riverton SC	1,200 SF	20,000 SF	\$475,000	\$469,775
Eagle Ridge SC	1,050 SF	18,000 SF	\$396,000	\$392,440
Chatham SC	1,600 SF	26,000 SF	\$524,000	\$518,760
Hyde Park SC	850 SF	14,000 SF	\$322,000	\$318,780
Gateway SC (Subject Property)	2,500 SF	18,800 SF	\$269,400	\$269,400

**Vacancy Rate Calculation**

Property	Vacant Space	Total Leasable Area	Vacancy Rate
Riverton SC	1,200 SF	20,000 SF	6%
Eagle Ridge SC	1,050 SF	18,000 SF	6%
Chatham SC	1,600 SF	26,000 SF	6%
Hyde Park SC	850 SF	14,000 SF	6%
Gateway SC (Subject Property)	2,500 SF	18,800 SF	13%

Vacancy Rate Calculation

**6%**

**Collection Loss Rate Calculation**

Property	Rents Receivable	Rents Collected	Uncollected Rents	Rents Receivable	CL Rate
Riverton SC	\$475,000	\$469,775	\$5,225	\$475,000	1%
Eagle Ridge SC	\$396,000	\$392,440	\$3,560	\$396,000	1%
Chatham SC	\$524,000	\$518,760	\$5,240	\$524,000	1%
Hyde Park SC	\$322,000	\$318,780	\$3,220	\$322,000	1%
Gateway SC (Subject Property)	\$269,400	\$269,400	\$0	\$269,400	0%

Collection Loss Rate Calculation

**1%**

The total Collection and Vacancy Rate is:

**7%**



**Class Problem # 3**  
**Development of Effective Gross Income**

Use the information from Problems 1 and 2 and develop an Effective Gross Income (EGI). Also, historically the Gateway SC has miscellaneous income of \$5,000 annually.

What is the Effective Gross Income (EGI) for the subject property?



**Class Problem # 3 Answer**  
**Development of Effective Gross Income**

What is the Effective Gross Income (EGI) for the property?

Potential Gross Income (Problem 1)	PGI	\$470,000
Less: Vacancy and Collection Loss (Problem 2)	V & C (7%)	-\$32,900
Miscellaneous Income	Misc. Inc	\$5,000
Effective Gross Income	EGI	\$442,100

The Effective Gross Income for the subject property is: \$442,100



**Class Problem # 4**  
**Development of Allowable Expenses**

Given below is the statement of expenses for the Gateway SC as prepared by the owner's accountant. They are actual bank withdrawals and are assumed to be correct. In your analysis of the statement for appraisal purposes, you have decided that some items can be used as stated, others need to be eliminated, and some need to be pro-rated. Indicate with an "X" which items you would use as stated, pro-rated (over more than one year), or would eliminate from your reconstructed operating statement.

	<u>As Stated</u>	<u>Pro-Rate</u>	<u>Eliminate</u>
A. Management Fees			
B. Advertising			
C. Maintenance Personnel Salaries			
D. Maintenance Personnel Benefits			
E. Debt Service on Mortgage			
F. Water and Sewage Fees			
G. Electricity			
H. Gas for Heating			
I. New Roof			
J. Miscellaneous Repairs			
K. Supplies			
L. Casualty Insurance--3 year policy			
M. Liability Insurance			
N. Snow Removal			
O. Income Tax			
P. Donation, Christmas Gift Expense			
Q. Real Estate Taxes			





## Class Problem # 4 Answer

### Development of Allowable Expenses

Indicate with an "X" which items you would use as stated, pro-rated (over more than one year), or would eliminate from your reconstructed operating statement.

	<u>As Stated</u>	<u>Pro-Rate</u>	<u>Eliminate</u>
A. Management Fees	X		
B. Advertising	X		
C. Maintenance Personnel Salaries	X		
D. Maintenance Personnel Benefits	X		
E. Debt Service on Mortgage			X
F. Water and Sewage Fees	X		
G. Electricity	X		
H. Gas for Heating	X		
I. New Roof		X	
J. Miscellaneous Repairs	X		
K. Supplies	X		
L. Casualty Insurance--3 year policy		X	
M. Liability Insurance	X		
N. Snow Removal	X		
O. Income Tax			X
P. Donation, Christmas Gift Expense			X
Q. Real Estate Taxes			X



**Class Problem # 5**  
**Development of Reserve for Replacements**

The following are capital items on the Gateway SC that have to be replaced periodically.

The roof costs \$30,000 to replace and typically lasts 15 years.

The HVAC equipment lasts 20 years and costs \$20,000 to replace.

The parking lot has to be re-paved every 10 years at a cost of \$40,000.

The awnings and store fronts need updated every 15 years at a cost of \$50,000.

Set up the Reserve for Replacements Account that you will use in your reconstructed operating statement. Determine the annual expense for these items.



**Class Problem # 5 Answer**  
**Development of Reserve for Replacements**

Set up the Reserve for Replacements Account that you will use in your reconstructed operating statement. Determine the annual expense for these items.

Item	Cost to Replace	Typical Life	Reserve
Roof	\$30,000	15	\$2,000
HVAC	\$20,000	20	\$1,000
Parking Lot	\$40,000	10	\$4,000
Store Fronts	\$50,000	15	\$3,333

Total

\$10,333

The total Reserve for Replacements would be :

\$10,333



**Level II**  
**Class Problem # 6**  
**Development of Expense Ratio**

An expense ratio is the total allowable expenses, including reserves, stated as a percentage of Effective Gross Income. (EGI)

You have obtained the following information on properties comparable to the Gateway SC.

Property	EGI	Expenses	Reserve for Replacements
Riverton SC	\$469,775	\$135,330	\$15,000
Eagle Ridge SC	\$392,440	\$117,500	\$12,000
Chatham SC	\$518,760	\$148,000	\$18,000
Hyde Park SC	\$318,780	\$88,020	\$10,800

What expense ratio should you use in your reconstructed operating statement for Gateway SC?



**Level II**  
**Class Problem # 6 Answer**  
**Development of Expense Ratio**

What expense ratio should you use in your reconstructed operating statement for Gateway SC?

Property	Expenses	Reserve for Replacements	Total Expenses	EGI	Expense Ratio
Riverton SC	\$135,330	\$15,000	\$150,330	\$469,775	32%
Eagle Ridge SC	\$117,500	\$12,000	\$129,500	\$392,440	33%
Chatham SC	\$148,000	\$18,000	\$166,000	\$518,760	32%
Hyde Park SC	\$88,020	\$10,800	\$98,820	\$318,780	31%

The Expense Ratio to use is	32%
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Level II  
Class Problem # 7  
Reconstructed Operating Statement

Using the information you developed for Problems 1, 2, 3, and 6, reconstruct an operating statement for the Gateway Shopping SC. Then develop its Net Operating Income (NOI).



**Level II**  
**Class Problem # 7 Answer**  
**Reconstructed Operating Statement**

Using the information you developed for Problems 1, 2, 3, and 6, reconstruct an operating statement for the Gateway Shopping SC. Then develop its Net Operating Income (NOI).

Potential Gross Income (Problem 1)	PGI	\$470,000
Less: Vacancy and Collection Loss (Problem 2)	V & C	-\$32,900
Miscellaneous Income	Misc. Inc	\$5,000
Effective Gross Income	EGI	\$442,100
Less: Expenses (at 32%)	-Exp	(\$141,472)
Less: Reserves for replacements	in expenses	\$0
Net Operating Income	NOI	\$300,628

The subject property's net operating income (NOI) is: \$300,628



Level II  
Class Problem # 8  
Land and Building Capitalization Rates

You are given the following information:

Discount Rate	9.0%
Mortgage Rate	6.5%
Recapture Rate	2.5%
Effective Tax Rate	1.5%
Nominal Tax Rate	\$3.00 per \$100 of Assessed Value

Calculate a Land Capitalization Rate.

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Calculate an improvement/building capitalization rate.

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Level II  
Class Problem # 8 Answer  
Land and Building Capitalization Rates

Calculate a Land Capitalization Rate.  
Calculate an improvement/building capitalization rate.

Calculate a Land Capitalization Rate.

Discount Rate	9.0%
Plus Effective Tax Rate	1.5%
<b>Land Cap Rate</b>	<b>10.5%</b>

Calculate an improvement/building capitalization rate.

Discount Rate	9.0%
Plus Effective Tax Rate	1.5%
Plus Recapture Rate	2.5%
<b>Building Cap Rate</b>	<b>13.0%</b>



Level II  
Class Problem # 9  
Overall Capitalization Rate  
and  
Weighted Land and Building Cap Rates

You are given the following information:

Discount Rate	8.0%
Recapture Rate	2.0%
Effective Tax Rate	2.0%
Land to Building Ratio	1:3

Calculate an overall capitalization rate (OAR)



Level II  
Class Problem # 9 Answer  
Overall Capitalization Rate  
and  
Weighted Land and Building Cap Rates

You are given the following information:

Discount Rate	8.0%
Recapture Rate	2.0%
Effective Tax Rate	2.0%
Land to Building Ratio	1:3

Calculate an overall capitalization rate (OAR)

Step 1) Calculate a Land Cap Rate:

Discount Rate	8.0%
Plus Effective Tax Rate	2.0%
Equals Land Cap Rate	10.0%

Step 2) Calculate a building capitalization rate.

Discount Rate	8.0%
Plus Effective Tax Rate	2.0%
Plus Recapture Rate	2.0%
Equals Building Cap Rate	12.0%

Step 3) Weight the land and building cap rates by the land to building ratio.

Land	1 part	1/4	25.0%
Building	3 parts		75.0%
Total	4 parts		100.0%

Land Cap Rate	10.0%	X	25.0%	2.5%
Building Cap Rate	12.0%	X	75.0%	9.0%
Total Overall Capitalization Rate				11.5%



**Level II**  
**Class Problem # 10**  
**Overall Capitalization Rate From the Market**

Property	EGI	Total Exp. And RR	Sale Price
Riverton SC	\$469,775	\$150,330	\$2,778,000
Eagle Ridge SC	\$392,440	\$129,500	\$2,307,000
Chatham SC	\$518,760	\$166,000	\$3,065,000
Hyde Park SC	\$318,780	\$98,820	\$1,895,000

Calculate an overall capitalization rate.



**Level II**  
**Class Problem # 10 Answer**  
**Overall Capitalization Rate From the Market**

Calculate an overall capitalization rate.

Property	EGI	Total Exp. and RR	NOI	Sale Price	OAR
Riverton SC	\$469,775	\$150,330	\$319,445	\$2,778,000	11.5%
Eagle Ridge SC	\$392,440	\$129,500	\$262,940	\$2,307,000	11.4%
Chatham SC	\$518,760	\$166,000	\$352,760	\$3,065,000	11.5%
Hyde Park SC	\$318,780	\$98,820	\$219,960	\$1,895,000	11.6%

The Overall Capitalization Rate is:

11.5%



Level II  
Class Problem # 11  
Direct Capitalization and Overall Cap Rate

Use the answers from Problems 7 and 10 and calculate the value of the Gateway Shopping Center using direct capitalization in the income approach to value.



Level II  
Class Problem # 11 Answer  
Direct Capitalization and Overall Cap Rate

Use the answers from Problems 7 and 10 and calculate the value of the Gateway Shopping Center using direct capitalization in the income approach to value.

Answer from Problem # 7:

The subject property's Net Operating Income (NOI) is: \$ 300,628

Answer from Problem # 10:

The Overall Capitalization Rate (OAR) is: 11.5%

Apply the Direct Capitalization Method IRV Formula

$$V = I/R$$

Net Operating Income/Over All Rate = Market Value

\$300,628/11.5% = \$ 2,614,157



**Level II**  
**Class Problem # 12**  
**Direct Capitalization Vs. Gross Income Multiplier**

Using the EGI arrived at in Problem # 3 and the chart below from problem # 10, calculate a Gross Income Multiplier (GIM) and determine the value of the subject property using Direct Capitalization in the Income Approach.

Then compare this answer to the one you arrived at in Problem # 11.

Property	EGI	Total Exp. And RR	Sale Price
Riverton SC	\$469,775	\$150,330	\$2,778,000
Eagle Ridge SC	\$392,440	\$129,500	\$2,307,000
Chatham SC	\$518,760	\$166,000	\$3,065,000
Hyde Park SC	\$318,780	\$98,820	\$1,895,000





Level II  
Class Problem # 12 Answer  
Direct Capitalization Vs. Gross Income Multiplier

Using the EGI arrived at in Problem # 3 and the chart below from problem # 10, calculate a Gross Income Multiplier (GIM) and determine of the value of the subject property using Direct Capitalization in the Income Approach.

Property	EGI	Total Exp. And RR	Sale Price
Riverton SC	\$469,775	\$150,330	\$2,778,000
Eagle Ridge SC	\$392,440	\$129,500	\$2,307,000
Chatham SC	\$518,760	\$166,000	\$3,065,000
Hyde Park SC	\$318,780	\$98,820	\$1,895,000

Calculation of Gross Income Multiplier (GIM):  $GIM = \text{Sale Price} / \text{Annual EGI}$

Property	Sale Price	EGI	GIM
Riverton SC	\$2,778,000	\$469,775	5.9
Eagle Ridge SC	\$2,307,000	\$392,440	5.9
Chatham SC	\$3,065,000	\$518,760	5.9
Hyde Park SC	\$1,895,000	\$318,780	5.9

The Gross Income Multiplier in this problem would be 5.9

Now apply the VIF formula:

EGI Times GIM = Market Value

\$442,100 times 5.9 =

\$2,608,390

Now compare this answer to the one arrived at in Problem # 11:

\$2,614,157



Practice Problem # 1  
PGI-EGI-NOI

You have obtained the following information:

A building has total of 40,000 Square Feet. There is 8,000 Square Feet of common area. Market rent is currently \$20.00 per square foot of net leasable area. The Vacancy and Collection Loss Rate is 6%. The Operating Expense and the Reserves for Replacements is at 18%. The Overall Capitalization Rate is 10%.

You are to develop the Potential Gross Income (PGI), the Effective Gross Income (EGI), and the Net Operating Income (NOI). Once you have done that, calculate an estimate of value for this property.



## Practice Problem # 1

### PGI-EGI-NOI Answer

You are to develop the Potential Gross Income (PGI), the Effective Gross Income (EGI), and the Net Operating Income (NOI). Once you have done that, calculate an estimate of value for this property.

Potential Gross Income			\$640,000
Vacancy and Collection Loss			-\$38,400
Misc Income			0
Effective Gross Income			\$601,600
Operating Expenses & RR			-\$108,288
Net Operating Income			<u>\$493,312</u>

#### COMPUTATION OF PGI, EGI, AND NOI FOR ABOVE PROBLEM

PGI	32,000	\$20	\$640,000
V and C	\$640,000	6%	-\$38,400
Misc Income	\$0		0
Effective Gross Income			\$601,600
Operating Expenses & RR	\$601,600	18%	-\$108,288
Net Operating Income			<u>\$493,312</u>

THE INCOME FROM ABOVE IS	<u>\$493,312</u>
Overall Capitalization Rate	<u>10%</u>
Estimate of value using the IRV formula	<u>\$4,933,120</u>



**Practice Problem # 2**  
**Development of NOI and Overall Cap Rate**

Potential Gross Income	\$150,000
Vacancy and Collection Loss	10%
Operating Expense	\$25,000
Christmas Gift	\$2,500
Property Value	\$800,000
Loan to value ratio	0.4

The above is given to you. Develop the NOI and the Overall Capitalization Rate.



**Practice Problem # 2 Answer**  
**Development of NOI and Overall Cap Rate**

Potential Gross Income	\$150,000
Vacancy and Collection Loss	10%
Operating Expense	\$25,000
Christmas Gift	\$2,500
Property Value	\$800,000
Loan to value ratio	0.4

The above is given to you. Develop the NOI and the Overall Capitalization Rate.

Net Operating Income	<b>\$110,000</b>
Overall Cap Rate	<b>13.8%</b>

**DEVELOPMENT OF NET OPERATING INCOME**

PGI	\$150,000
V & C Loss	-\$15,000
Misc Inc	\$0
Effective Gross Income	\$135,000
Operating Expense	-\$25,000
Net Operating Income	<b>\$110,000</b>



### Practice Problem # 3

#### Expense Ratio Problem

You have obtained the following information. Develop an Expense Ratio for the subject property based on this market information. What expense ratio will you use for your subject property?

Office Bldg.	EGI	Expenses	Reserves	Total Exp	Exp Ratio
Uptown	\$468,230	\$134,220	\$15,000		
River Edge	\$393,450	\$118,200	\$12,000		
East Lake	\$522,030	\$147,500	\$18,000		
Forest Glen	\$319,500	\$88,120	\$10,800		



### Practice Problem # 3 Answer

#### Expense Ratio Problem

What expense ratio will you use for your subject property?

Office Bldg.	EGI	Expenses	Reserves	Total Exp	Exp Ratio
Uptown	\$468,230	\$134,220	\$15,000	\$149,220	31.9%
River Edge	\$393,450	\$118,200	\$12,000	\$130,200	33.1%
East Lake	\$522,030	\$147,500	\$18,000	\$165,500	31.7%
Forest Glen	\$319,500	\$88,120	\$10,800	\$98,920	31.0%

Total Expense Ratio 31.8%



**Practice Problem # 4 (A)**  
**Gross Rent and Gross Income Multipliers**

**Gross Rent Multiplier Problem**

The subject property is a single family dwelling which is rented for \$475 per month. The market rent is also \$475 per month. Develop a GRM from the following data and use it to calculate a possible indication of value.

	<u>Sales</u>					
	1	2	3	4	5	6
Sale Price	\$60,000	\$72,000	\$65,000	\$62,000	\$68,000	\$70,000
Monthly Rent (EGI)	\$425	\$520	\$460	\$450	\$490	\$500
GRM						





**Practice Problem # 4 (A) Answer**  
**Gross Rent and Gross Income Multipliers**

**Gross Rent Multiplier Problem**

The subject property is a single family dwelling which is rented for \$475 per month. The market rent is also \$475 per month. Develop a GRM from the following data and use it to calculate a possible indication of value.

	<u>Sales</u>					
	1	2	3	4	5	6
Sale Price	\$60,000	\$72,000	\$65,000	\$62,000	\$68,000	\$70,000
Monthly Rent (EGI)	\$425	\$520	\$460	\$450	\$490	\$500
GRM	141	138	141	138	139	140

GRM = Sales Price divided by the Monthly Rent (EGI)

Median is 140

Possible indication of value: Market rent of \$475 times 140 = \$66,500



**Practice Problem # 4 (B)**  
**Gross Income Multiplier Problem**

The subject property produces Gross Annual Effective Gross Income of \$72,000. Analysis of rents and, sales of comparable properties rendered the following. Based upon this information calculate a Gross Income Multiplier (GIM) and then calculate an indication of value for the subject property.

Sale	Sale Price	EGI	Gross Income Multiplier	Range
1	\$675,000	\$75,000		
2	\$600,000	\$68,000		
3	\$720,000	\$85,700		
4	\$750,000	\$87,500		
5	\$650,000	\$73,000		

Estimated value of subject property:

Value using Median

Value using Low range

Value using High range




## Practice Problem # 4 (B) Answer

### Gross Income Multiplier Problem

The subject property produces Gross Annual Effective Gross Income of \$72,000. Analysis of rents and, sales of comparable properties rendered the following. Based upon this information calculate a Gross Income Multiplier (GIM) and then calculate an indication of value for the subject property.

Sale	Sale Price	EGI	Gross Income Multiplier	Range
1	\$675,000	\$75,000	9.0	8.4
2	\$600,000	\$68,000	8.8	8.6
3	\$720,000	\$85,700	8.4	8.8
4	\$750,000	\$87,500	8.6	8.9
5	\$650,000	\$73,000	8.9	9.0

GIM = Sale Price divided by the median EGI

Possible indicated range of value:

Subject property EGI of \$72,000 times low range =

Subject property EGI of \$72,000 times high range =

Subject property EGI of \$72,000 times median range 8.8 =

\$604,800
\$648,000
\$633,600

