



Department of Local Government Finance

Cost Approach Problem and Answer Packet

2024 Level II Tutorials



Problem #1

- A commercial building contains a total of 5,200 square feet. Of this total, 3,900 square feet of the area has a wall height of 16 feet. The remaining 1,300 square feet of the area has a wall height of 14 feet. What is the average wall height for this structure?





Problem #1 Answer

- $3,900 \text{ divided by } 5,200 = 75\%$
- $1,300 \text{ divided by } 5,200 = 25\%$

- $16' \times .75 = 12'$
- $14' \times .25 = 3.5'$

- $12' + 3.5' = 15.5'$ rounded to 16 ft.





Problem #2

- A commercial building measures 200 feet by 500 feet. What is the PAR of this structure?





Problem #2 Answer

- $200 + 200 + 500 + 500 = 1,400$ (perimeter)
- $200 \times 500 = 100,000$
- $1,400$ divided by $100,000 = .014$
- $0.014 \times 100 = 1.4$ or a PAR of 1





Problem #3

- A structure has 2,500 square feet of area of which 1,500 square feet is general office and 1,000 square feet is utility storage area. The walls of the structure are Type 1. The building measures 100 feet by 25 feet.
- Figure the adjusted base rate for this structure using the GCM schedule.





Problem #3 Answer

- Step 1 – Figure the PAR
 - $100 + 100 + 25 + 25 = 250$
 - $100 \times 25 = 2,500$
 - $250 \text{ divided by } 2,500 = 0.10 \times 100 = 10$



Problem #3 Answer

- Step 2 – Percentage of each use
 - 1,500 divided by 2,500 = 60% (General Office)
 - 1,000 divided by 2,500 = 40% (Utility Storage)





Problem #3 Answer

- Step 3 – Go to appropriate Schedule in Appendix G and select the correct base rates
 - General office - \$127.59
 - Utility storage - \$ 75.83





Problem #3 Answer

- Step 4 – Figure adjusted rates for each use
 - $\$127.59 \times .60 = \76.55
 - $\$ 75.83 \times .40 = \30.33





Problem #3 Answer

- Figure new adjusted base rate by adding the individual rates together
 - $\$76.55 + \$30.33 = \$106.88$





Problem #4

- A fire-resistant building with exterior walls of brick measures 100' x 180'. Twenty-five percent of the building is used as industrial office space, and the remainder of the building is used as light warehousing. The office space has a wall height of 12 feet and the warehouse space has a wall height of 18 feet.
- What is the average wall height?
- What is the adjusted base rate?





Problem #4 Answer

- Area: $100 \times 180 = 18,000$ sq. ft
- Perimeter: $100+100+180+180 = 560$ linear feet
- $560/18,000 = .03 \times 100 = \text{PAR } 3$

- $12' \times 25\% = 3'$
- $18' \times 75\% = 13.50'$





Problem #4 Answer

- $3' + 13.50' = 16.5'$ rounded to $17'$ so the average wall height is 17 feet.
- Since the office walls are 12 feet, we need to make a positive 5-foot adjustment on it.
- Since the warehouse walls are 18 feet, we need to make a negative 1-foot adjustment on it.





Problem #4 Answer

- Industrial Office: base rate is \$77.07, adjustment is 5' x \$1.51 for a total of \$84.62
- Light Warehouse: base rate is \$48.48, minus adjustment of 1' x \$.86 for a total of \$47.62





Problem #4 Answer

- $\$84.62 \times 25\% = \21.16
- $\$47.62 \times 75\% = \35.72
- $\$21.16 + \$35.72 =$ adjusted rate of $\$56.88$ for the building.





Problem #4 Answer

- When you are using an average wall height, you must take into consideration the original wall heights of each part of the building and make wall height adjustments as necessary to the base rate.





Problem #5

- A structure has 3,000 square feet of area, of which 1,800 square feet is fire resistant. The remainder of the building is constructed with fireproof steel. The PAR is 8. The exterior walls are Type 1. The building is used as a bank. What is the amount of adjustment, per square foot, necessary to account for the fireproof steel framing?





Problem #5 Answer

- $1,200 \text{ square feet} / 3,000 \text{ square feet} = 40\%$
- Fireproof steel frame adjustment: $\$9.28 \times 40\% = \3.71





Problem #6

- A parking lot of 20,000 square feet is paved with 2 inches of asphalt over an 8-inch base. It is located in Daviess County and is in average condition with a quality grade of C-1.
- It has 200 linear feet of metal guardrail on one side, which is also in average condition, with a quality grade of C. Both were installed in 1992.
- What is the total true tax improvement value?





Problem #6 Answer

- Since the square footage of the parking lot is 20,000, our base rate is \$2.57, and then we add \$0.40 for the 3" of base, so we start with a rate of \$2.97. However, the lot is a C-1 grade, so we need to account for that.
- $\$2.97 \times 0.95 = \2.82 for our base rate
- Now we need to account for the location multiplier, 0.91, so $\$2.82 \times 0.91 = \2.57 (our adjusted rate)





Problem #6 Answer

- We take $\$2.57 \times 20,000 = \$51,400$ for the replacement cost.
- Next is the depreciation. The lot is 32 years old and in average condition, so the depreciation percentage is 80%.
- $\$51,400 \times .80 = \$41,120$ and $\$51,400 - \$41,120 = \$10,280$ remainder value
- Or $\$51,400 \times .20 = \$10,280$ remainder value





Problem #6 Answer

- Taking the remainder value to the nearest \$100, our asphalt has a true tax value of \$10,300.
- The guardrail has a base rate of \$23.76, and since it is a C grade, we do not have to make any grade adjustment.
- We do need to make the adjustment for the location. Taking the $0.91 \times \$23.76$, gives you an adjusted rate of \$21.62.
- Then just take the 200 linear feet $\times \$21.62 = \$4,320$.





Problem #6 Answer

- Looking up the depreciation for the guard rail, it is also 80%, so $\$4,320 \times .80$ and subtracting (or $.20$ and not subtracting, whichever is easier for you) gives us a remainder value for the guard rail of $\$860$, rounded to $\$900$ for the true tax value.
- Adding our paving to the guardrail amount, we should have a total true tax improvement value of $\$11,200$.



Walls		Roofing		IMPROVEMENT DATA AND COMPUTATIONS																		
Brick		Built - up		Level II Cost Approach																		
Stone		Metal		Class Problem # 6																		
Concrete		Slate / Tile		Daviness County		LCM - 91%										Circle One →	1 or A	2 or B	3 or C	4 or D		
Frame or Metal		Shingle																				
C.B. or Tile		Insulation																				
Framing	B			Paving 20,000 sq. ft. \$2.57 + \$.40 for 3 " base = \$2.97																		
Wood Joist				\$2.97 X 95% for C - 1 Grade = \$2.82 base rate.\$2.82																		
Fire Resistant				\$2.82 X 91% L/M = \$2.57 adj. rate X 20,000 sq. ft. = \$51,400																		
Fire Proof Steel				Guard Rail = \$23.76 X 91% = \$21.62 X 200 = \$4,320, round to nearest																		
Reinf. Concrete				\$10 = \$4,320 X .20 = \$860 rounded to the nearest \$100 = \$900.																		
Flooring	B																					
Concrete																						
Wood																						
Tile or Carpet																						
Finish Type	B																					
Unfinished																						
Semifinished																						
Finished Open																						
Finished Divided																						
Use	B																					
Store																						
Office																						
Apartment																						
Vacant or Aband.																						
Heating & Air Conditioning																						
No Heating																						
Central Warm Air																						
Hot Water or Steam																						
Unit Heating				Actual Age		32																
Central Air				Eff age		32																
Package or Unit Air				Life Expectancy		10																
Sprinkler																						
Plumbing Fixtures		#	TF																			
Full Bath																						
Half Bath																						
Extra Fixtures																						
		TOTAL	0																			
Other Fixtures				SPECIAL FEATURES																		
Wash Fountain	G/F	ES	SS	Description		Value		SUMMARY OF IMPROVEMENTS														
Circular 36"				ID	Use	Story Height	Const. Type	Grade	Year Const.	Eff Age	Cond.	Base Rate	Features	L/M	Adj. Rate	Size or Area	Replacement Cost	Norm. Depr.	Remainder Value	Obsol. Depr.	True Tax Value	
Circular 54"				01	Paving	2"/8"	Asph	C-1	1992		Av	\$2.82		91%	\$2.57	20,000	\$51,400	80%	\$10,280		\$10,300	
Semi-circular 36"				02	Guard Rail		Mtl	C	1992		Av	\$23.76		91%	\$21.62	200	\$4,320	80%	\$860		\$900	
semi-circular 54"				03																		
Industrial Gang Sinks				04																		
4' long, 4 man				05																		
8' long, 8 man				06																		
Shower-Column				07																		
Circular, 5 per				08																		
semi-circular, 3 per				09																		
Corner, 2 per				10																		
Shower Multi-Stall				11																		
Circular, 5 per				12																		
Semi-circular, 3 per				13																		
Corner, 2 per				14																		
		No. Fixtures		15																		
Gang Shower Heads				16																		
Drinking Fountains				17																		
Refrigerated Water Coolers				18																		
.....with Hot & Cold Water																						
Emergency Shower/eye Wash																						
				Data Collector / Date					Appraiser / Date					Total True Tax Improvement Value					\$11,200			





Class Problem #7

- This is a fast-food restaurant built on a slab in Carroll County in 2004. It contains 1,902 square feet and has a perimeter of 202 linear feet. It also has a commercial heating/air conditioning package that heats and cools the entire 1,902 square feet. It is a quality grade of C and is in average condition. The exterior walls are brick.
- There is 18,000 square feet of asphalt paving on a 2" over 8" base. It was put down at the same time as the construction date of the building. It is a quality grade of C +1 and is in average condition.
- What is the total improvement value of this property?



Walls		Roofing	
Brick		Built - up	
Stone		Metal	
Concrete		Slate / Tile	
Frame or Metal		Shingle	
C.B. or Tile		Insulation	

IMPROVEMENT DATA AND COMPUTATIONS				
Level II Cost Approach				
Class Problem # 7 Answer (Back of PRC)				
Paving = under 20,000 sq. ft. \$2.81 + \$.40 for 3 " base = \$3.21				
\$3.21 X 105% for C + 1 Grade = \$3.37 base rate.				
\$3.37 X 89% L/M = \$3.00 adj. rate X 18,000 sq. ft. = \$54,000				
Actual Age 20				
Effective Age 20				

Circle One →	1 or A	2 or B	3 or C	4 or D
Pricing Key	Fast Food			
S. F. Area	1,902			
Effective Perimeter				
P. A. R.				
Number of Units				
Average unit size				
Floor	Hgt.	Rate	Hgt.	Rate
Basement				
1st		\$139.66		
2nd				
3rd				
4th				
Frame Adj.	±			
Wall Hght. Adj.	±			
Base Price		\$139.66		
B. P. A. %		100%		
Sub-total		\$139.66		
Unit Finish				
Interior Finish				
Div./Pin Walls				
Lighting				
Heating/Air Cond.				
Sprinkler				
S. F. Price		\$139.66		
Area		1,902		
Sub.-total		\$265.630		
Plumbing				
Special Features				
Exterior Features				
TOTAL BASE		\$265,630		
Location Multiplier		89%		
Grade Factor		100%		
Replacement Cost		\$236,410		

Framing		B	
Wood Joist			
Fire Resistant			
Fire Proof Steel			
Reinf. Concrete			
Flooring		B	
Concrete			
Wood			
Tile or Carpet			
Finish Type		B	
Unfinished			
Semifinished			
Finished Open			
Finished Divided			
Use		B	
Store			
Office			
Apartment			
Vacant or Aband.			
Heating & Air Conditioning			
No Heating			
Central Warm Air			
Hot Water or Steam			
Unit Heating			
Central Air			
Package or Unit Air			
Sprinkler			
Plumbing Fixtures	#	TF	
Full Bath			
Half Bath			
Extra Fixtures			
TOTAL		0	

Other Fixtures			
Wash Fountain	G/F	ES	SS
Circular 36"			
Circular 54"			
Semi-circular 36"			
semi-circular 54"			
Industrial Gang Sinks			
4' long, 4 man			
8' lone, 8 man			
Shower-Column			
Circular, 5 per			
semi-circular, 3 per			
Corner, 2 per			
Shower Multi-Stall			
Circular, 5 per			
Semi-circular, 3 per			
Corner, 2 per			
No. Fixtures			
Gang Shower Heads			
Drinking Fountains			
Refrigerated Water Coolers			
.....with Hot & Cold Water			
Emergency Shower/eye Wash			

SPECIAL FEATURES										
Description	Value	ID	Use	Storv Height	Const. Type	Grade	Year Const.	Eff Age	Cond.	Base Rate
Circular 36"		01	Fast Food	1	Br	C	2004		Av	
Circular 54"		02								
Semi-circular 36"		03	Paving	2"/8"	Asph	C+1	2004		Av	\$3.37
semi-circular 54"		04								
Industrial Gang Sinks		05								
4' long, 4 man		06								
8' lone, 8 man		07								
Shower-Column		08								
Circular, 5 per		09								
semi-circular, 3 per		10								
Corner, 2 per		11								
Shower Multi-Stall		12								
Circular, 5 per		13								
Semi-circular, 3 per		14								
Corner, 2 per		15								
Gang Shower Heads		16								
Drinking Fountains		17								
Refrigerated Water Coolers		18								
.....with Hot & Cold Water										
Emergency Shower/eye Wash										

SUMMARY OF IMPROVEMENTS																		
ID	Use	Storv Height	Const. Type	Grade	Year Const.	Eff Age	Cond.	Base Rate	Features	L/M	Adj. Rate	Size or Arca	Replacement Cost	Norm. Depr.	Remainder Value	Obsol. Depr.	True Tax Value	
01	Fast Food	1	Br	C	2004		Av						\$236,410	65%	\$82,740		\$82,700	
03	Paving	2"/8"	Asph	C+1	2004		Av	\$3.37		89%	\$3.00	18000	\$54,000	80%	\$10,800		\$10,800	
Data Collector / Date													Appraiser / Date		Total True Tax Improvement Value		\$93,500	





Practice Problem #1

- The Walgreen company owns and operates a drug store which was constructed in Starke County. The building has 15,400 square feet with a perimeter of 450 feet. The drug store was built in 2012. The building is fire resistant construction and is wall type #1. The interior finish meets the criteria of the GCM General Retail model. There are a total of five commercial plumbing fixtures in the building. The building is totally sprinkled and has an average quality attached commercial canopy of 900 square feet. It has been determined the building is in average condition and is classified as a C+1 quality grade. The drug store is frame constructed.
- There is a 28,000 square feet asphalt paved parking area surrounding the building. It was constructed when the building was built and the asphalt is 2" on 5" base. The asphalt paving is C quality grade and is in average condition.
- What is the total true tax value of the improvements?



Walls	Roofing
Brick	Built - up
Stone	Metal
Concrete	Slate / Tile
Frame or Metal	Shingle
C.B. or Tile	Insulation
Framing	B
Wood Joist	
Fire Resistant	
Fire Proof Steel	
Reinf. Concrete	
Flooring	B
Concrete	
Wood	
Tile or Carpet	
Finish Type	B
Unfinished	
Semifinished	
Finished Open	
Finished Divided	
Use	B
Store	
Office	
Apartment	
Vacant or Aband.	
Heating & Air Conditioning	
No Heating	
Central Warm Air	
Hot Water or Steam	
Unit Heating	
Central Air	
Package or Unit Air	
Sprinkler	
Plumbing Fixtures	# TF
Full Bath	
Half Bath	
Extra Fixtures	
TOTAL	0

IMPROVEMENT DATA AND COMPUTATIONS

Level II Cost Approach

Practice Problem #1 (Walgreen's Drug Store)

Plumbing - \$1,600 x 5 = \$8,000

Canopy - \$28.06 x 900 = \$25,250

Actual age 12

Effective age 11

Life Expectancy 45

Circle One →	1 or A	2 or B	3 or C	4 or D				
Pricing Key	GCM Gen Retail							
S. F. Area	15,400							
Effective Perimeter	450							
P. A. R.	3							
Number of Units								
Average unit size								
Floor	Hgt.	Rate	Hgt.	Rate	Hgt.	Rate	Hgt.	Rate
Basement								
1st		\$61.19						
2nd								
3rd								
4th								
Frame Adj.	[±]							
Wall Hgt. Adj.	[±]							
Base Price	\$61.19							
B. P. A. %	100%							
Sub-total	\$61.19							
Unit Finish								
Interior Finish								
Div./Pin Walls								
Lighting								
Heating/Air Cond.								
Sprinkler		\$3.53						
S. F. Price	\$64.72							
Area	15,400							
Sub.-total	\$996.690							
Plumbing	\$8,000							
Special Features	\$25,250							
Exterior Features								
TOTAL BASE	\$1,029,940							
Location Multiplier	94%							
Grade Factor	105%							
Replacement Cost	\$1,016,550							

Other Fixtures			
Wash Fountain	G/F	ES	SS
Circular 36"			
Circular 54"			
Semi-circular 36"			
semi-circular 54"			
Industrial Gang Sinks			
4' long, 4 man			
8' long, 8 man			
Shower-Column			
Circular, 5 per			
semi-circular, 3 per			
Corner, 2 per			
Shower Multi-Stall			
Circular, 5 per			
Semi-circular, 3 per			
Corner, 2 per			
Gang Shower Heads	No. Fixtures		
Drinking Fountains			
Refrigerated Water Coolers			
.....with Hot & Cold Water			
Emergency Shower/eye Wash			

SPECIAL FEATURES																
Description	Value	ID	Use	Storv Height	Const. Type	Grade	Year Const.	Eff Age	Cond.	Base Rate	Features	L/M	Adj. Rate			
		01	GCM Gen Retail	1	Fr	C+1	2012		Av							
		02														
		03	Paving	2"/5"	Asph	C	2012		Av	\$2.57		94%	\$2.42			
		04														
		05														
		06														
		07														
		08														
		09														
		10														
		11														
		12														
		13														
		14														
		15														
		16														
		17														
		18														
Data Collector / Date										Appraiser / Date				Total True Tax Improvement Value		\$887,800

SUMMARY OF IMPROVEMENTS																				
Description	Value	ID	Use	Storv Height	Const. Type	Grade	Year Const.	Eff Age	Cond.	Base Rate	Features	L/M	Adj. Rate	Size or Area	Replacement Cost	Norm. Depr.	Remainder Value	Obsol. Depr.	True Tax Value	
		01	GCM Gen Retail	1	Fr	C+1	2012		Av						\$1,016,550	14%	\$874,230		\$874,200	
		02																		
		03	Paving	2"/5"	Asph	C	2012		Av	\$2.57		94%	\$2.42	28000	\$67,760	80%	\$13,550		\$13,600	
		04																		
		05																		
		06																		
		07																		
		08																		
		09																		
		10																		
		11																		
		12																		
		13																		
		14																		
		15																		
		16																		
		17																		
		18																		
Data Collector / Date										Appraiser / Date				Total True Tax Improvement Value		\$887,800				

