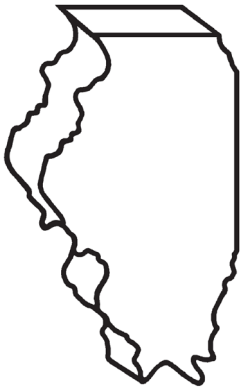

I – B Introduction to Commercial Assessment Practices

Course # 001-807

PTAX 1-B (R-01/19)

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1-B Introduction to Commercial Assessment Practices

Course Outline

Glossary

Ad valorem — according to value.

***Ad valorem* tax** — tax levied according to value.

Allowable expenses — legitimate expenses that can be deducted from effective gross income to arrive at net income.

Capitalization — a mathematical process for conversion of the net return produced by a property into an indication of value.

Capitalization Rate — **R** in the IRV formula. Consists of the Equity, Effective Tax and Mortgage/Interest rates.

> **Recapture (or Equity) rate** - Annual rate at which invested capital is returned to the investor over a specified period. Refers to income provision made to compensate for the loss of invested capital.
>
> **Effective Tax rate** - determined by multiplying the level of assessment by the aggregate tax rate supported by that property. Used to calculate property taxes by applying the effective tax rate to full market value.
>
> **Mortgage/Interest rate** – interest rate used to convert future payments or receipts into present value.

CDU rating — Condition, Desirability, and Utility of an improvement used in the Remaining Economic Life table to reflect physical, functional and economic depreciation.

Comparable — recently sold property that is similar in many aspects to a property being appraised.

Component-in-place (CIP) — the method used to value buildings by analyzing and pricing each component part of the building. These values are detailed in IDOR's Publication 127.

Cubic feet (CU) — length x width x overall height. **L x W x OH**

Data bank — an area on the PRC-4 used to detail square feet, effective perimeter, cubic feet, square feet wall area, and wall ratio of a building.

Eave height — the height of a building from grade-level to the building's eaves.

Economic life — the expected period of time over which improvements to real property contribute to property value. The economic life of an improvement could be different than its actual **physical life**.

Effective age — the typical age of a structure equivalent to the one in question with respect to its utility and condition.

Effective perimeter (EP) — the linear measurement around a building.
L + W + L + W = EP

Gross income multiplier (GIM) — a unit of comparison used in the sales comparison approach to value. Sale price divided by gross income.

Load bearing — walls of a building that support the structure.

Market value — the most probable price which a property should bring in a competitive and open market, under all conditions requisite to a fair sale, the buyer and seller are acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus.

Net Operating Income (NOI) — effective gross income, less allowable expenses and reserves for replacement.

Overall cap rate (OAR) — a capitalization rate used in the income approach to value. Net income divided by the selling price.

Party wall — common wall shared by two buildings.

Potential gross income (PGI) — income that a property can produce if 100 percent occupied for 100 percent of the time, based on market standards.

Remaining Economic Life (REL) — an estimate of the number of years an improvement is expected to contribute to the value of a property.

Replacement Cost New (RCN) — the cost to replace an improvement with a new improvement of equal utility and desirability.

Reserves for replacement (RR) — replacement or repair cost of short-lived items pro-rated as an allowable expense to be deducted from effective gross income.

Shape adjustment — adjustment used to factor for building shape when using IDOR Appraisal Publications. Necessary to account for area/perimeter ratios.

Wall height adjustment — adjustment used to factor for building wall height when using IDOR Appraisal Publications.

Wall ratio — amount of wall construction in relation to the square feet area of the building. Square footage divided by EP.

Formulas and Measurements

Income approach	$\frac{I}{R \cdot V}$	$\frac{\text{Income}}{\text{Rate x Value}}$
Net income (NOI)	EGI - Expenses	Effective gross income — Expenses
Gross income multiplier (GIM)	$\frac{SP}{GI}$	$\frac{\text{Sales Price}}{\text{Gross income}}$
Unit price	$\frac{SP}{\#\text{ of Units}}$	$\frac{\text{Sales Price}}{\#\text{ of Units}}$
Room price	$\frac{SP}{\#\text{ of Rooms}}$	$\frac{\text{Sales Price}}{\#\text{ of Rooms}}$
Adjusted sales price (Adj. SP)		Sales price (+ or -) adjustments
Wall ratio (WR)	$\frac{SFGA}{EP}$	$\frac{\text{Square foot ground area}}{\text{Effective Perimeter}}$
Cubic feet (CF)	L x W x H	Length x Width x Height

DATA BANK	
SF Ground Area	
Eff. Perimeter LF	
CF of Bldg.	
SF Wall Area	
Wall Ratio	
Story	**Schedule**

Area of a Rectangle **L x W**

Area of a Triangle $\frac{\textbf{L x W}}{\textbf{2}}$

SFGA — square feet of ground area **L x W**

EP — effective perimeter **L + W + L + W**

(Party walls are factored at 60% of the length of the wall.)

CF — cubic feet **SFGA x H**

SFWA — square feet of wall area **EP x H**

WR — wall ratio **SFGA ÷ EP**

Abbreviations

A	Attic
AC	Air conditioning
AP	Appraiser or appraisal
Apt	Apartment
Asmt	Assessment
Att	Attached
Avg	Average
B	Basement
Blk	Block
BPA	Base price adjustment
BR	Building residual
Brk	Brick
Bsmt	Basement
C	
CB	Concrete block
CCAO	Chief county assessment officer
CDU	Condition, desirability, utility
CF	Cubic feet
CIP	Component-in-place
Cntrl	Central
Col	Column
Comm	Commercial or common
Comp	Composition or comparable
Conc	Concrete
Cond	Condition
Condo	Condominium
Const	Construction
Corr	Corrugated
C/P	Carport
CY	Cubic yards
D	
Depr	Depreciation
Dia	Diameter
DW	Drywall
E	
EGI	Effective gross income
EIFS	Exterior Insulation Finished System
EMP	Enclosed masonry porch
Excl	Excellent
F	
FA	Forced air
Fac	Factor
FF	Front foot
FP	Fireproof or fireplace
Frm	Frame
Ftg	Footing
G	
Galv	Galvanized
Gar	Garage
GIM	Gross income multiplier
H	Height
Hgt	Height
HVAC	Heating, ventilating, and air conditioning
I	Income
Impr	Improvement
Ind	Industrial
K	
KW	Kilowatts
L	Length
L/B	Load-bearing
L:B	Land-to-building ratio
L & B	Land and building
LF	Linear feet
LR	Land residual
M	
MV	Market value
N	
NH	Neighborhood
O	
OC, O/C	On center
O/FP	Ordinary or Fireproof

P

P & B	Post and beam
Pchs	Porches
Plstr	Plaster
PRC	Property record card
Pre-eng	Pre-engineered
PVC	Polyvinylchloride

R	Rate
RCN	Replacement cost new
Rein	Reinforced
REL	Remaining economic life
Replc	Replacement
RFC	Reinforced concrete
Rnf	Reinforced

S

SA	Supervisor of assessments
SF	Square feet
SFFA	Square feet floor area
SFGA	Square feet ground area
SFSA	Square feet serviced area
SFWA	Square feet wall area
SS	Stainless steel
Stl	Steel
Sty	Story

U

Unfin	Unfinished
Unt	Unit

V	Value

W

WR	Wall Ratio

Where to Get Assistance

Web Links

Property Tax Division: tax.illinois.gov

Property Tax Education Unit: email: rev.proptaxed@illinois.gov

Property Tax Code (35 ILCS 200) ilga.gov

Illinois Property Tax Appeal Board: ptab.illinois.gov

Publications

Publication 126, Instructions for Commercial Schedules
tax.illinois.gov/Publications/Pubs/Pub-126.pdf

Publication 127, Instructions for Industrial Schedules
tax.illinois.gov/Publications/Pubs/Pub-127.pdf

PTAX-1004, The Illinois Property Tax System
tax.illinois.gov/Publications/LocalGovernment/PTAX1004.pdf

Unit 1- Overview

This unit provides an overview of the three approaches to value, the bundle of property rights, and the three types of depreciation.

The purpose of this unit is to provide a basic understanding of the appraisal process.

Learning objectives

After completing the assigned readings, you should be able to

- identify the three approaches to value.
- explain the formula for the sales comparison approach.
- explain the formula for the cost approach.
- understand the three types of depreciation.
- explain the formula for the income approach, and understand which approach is best to use to value different types of property.

Terms and Concepts

Market value
Highest and best use
Principle of substitution
Sales comparison, or market approach
Cost approach
Replacement cost new (RCN)
Improvements
Depreciation
Income approach
Capitalization
Capitalization rate
IRV formula
Potential gross income (PGI)
Vacancy and collection losses
Effective gross income (EGI)
Net operating income (NOI)
Allowable expenses
Reserves for replacement

Appraisal Theory

Definition of Market Value

Market value is the most probable price which a property should bring in a competitive and open market, under all conditions requisite to a fair sale, the buyer and seller are acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

1. buyer and seller are typically motivated.
2. both parties are well-informed or well-advised and acting in what they consider their best interests.
3. a reasonable time is allowed for exposure in the open market.
4. payment is made in terms of cash in United States dollars or in terms of financial arrangements comparable thereto, and
5. the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

Uniform Standards of Professional Appraisal Practice, 2016-17 edition.

Bundle of Rights

Owning real estate carries with it a traditional "bundle of legal rights" transferred with the property from seller to buyer. These are the recognized rights of the holder of title to the property and include

- **the right of possession** - the property is owned by whomever holds title.
- **the right of control** - within the laws, the owner controls the use of the property.
- **the right of exclusion** - others can be excluded from using or entering the property.
- **the right of enjoyment** - the owner can enjoy the use of the property in any legal manner.
- **the right of disposition** - the title holder can sell, rent or transfer ownership or use of the property at will.

Ownership of land is holding "title" to it. The evidence of that title is the deed. The seller executes a deed to transfer title to real property and the bundle of rights that go with it.

Principle of Highest and Best Use

You must determine a property's highest and best use before determining the property's market value. Property has its highest value at its highest and best use.

Highest and best use is defined as:

The reasonably profitable and legal use of vacant land or an improved property which is physically possible, appropriately supported, financially feasible, and that results in the highest value.

The four criteria that the highest and best use must meet are:

- legal permissibility,
- physical possibility,
- financial feasibility, and
- maximum profitability.

Principle of Substitution

The **principle of substitution** provides the basis of the **three approaches to value** and states that a buyer is not justified in paying more for a property than it would cost to acquire an equally desirable, substitute property. That is, the value of a property is established as the amount equally desirable and comparable properties are being bought and sold for in the market.

The Three Approaches to Value

The three approaches to valuing real property are:

1. **The sales comparison, or market approach** — compares properties that have recently sold to the property that is being appraised.

2. **The cost approach** — involves calculating the replacement cost of the building and subtracting depreciation.

3. **The income approach** — involves capitalizing the property's net earnings.

1. The Sales Comparison Approach

The action of the market, shown in prices paid for real property, is a highly reliable indicator of value. As a result, the value of property can be reliably estimated by observing and analyzing the selling prices of comparable properties.

The sales comparison approach is dependent on the availability of sales of comparable properties (sales comps) and the validity of the appraisers' judgments made regarding their similarities and differences.

The basis for the sales comparison, or market approach, is the principle of substitution. A buyer is not going to spend more on a property than what a similar or substitute property offering the same uses, utility, and function would sell for.

Elements of Comparison

Consideration must be given to all the tangible and intangible factors influencing value.

- location
- construction
- age
- physical features
- condition
- desirability, and usefulness or utility

In addition, utmost consideration must be given to the time and conditions of each sale. The time the sale occurred is important because the value of real estate changes over time with changing economic conditions and property conditions.

Selling prices of comparable properties set the upper and lower limits of the value range within which the subject property will fall.

Analysis of the value factors influencing each sale enables the appraiser to narrow the range to a value level that is most applicable to the subject property.

The appraiser adjusts the comparable sales to the subject property. If the comparable property that sold is superior (better) in some manner to the subject property, the sales price of the comparable property is adjusted downward (subtract) to the subject property. Likewise, if the comparable property is inferior in some manner to the subject property, the sales price of the comparable property is adjusted upward (increase) to the subject property.

Comparable Superior, Subtract (-)

Comparable Inferior, Increase (+)

Example of adjustments

The significance of this approach lies in its ability to produce estimates of value that directly reflect the opinions of buyers and sellers in the market.

For instance, an adjustment may be warranted if several comparable commercial sales are alike in every way except two are located near an interstate and the other sales are located a mile away from any major roadway. If the properties by the interstate sold for more than the non-interstate properties and the subject is by an interstate, then an upward adjustment **(Inferior = Increase)** would be required before the inferior sales can be used to estimate the value of the subject property located next to the interstate.

A downward adjustment **(Superior = Subtract)** may be necessary if a comparable sale is superior to the subject property because it has a railroad spur nearby and the subject property does not.

2. The Cost Approach

The value of a property can be estimated under the cost approach by estimating the value of the land, adding the replacement cost new (RCN) of the improvements, and subtracting the depreciation from the improvements. The cost approach is most accurate when an improvement is new and the value of the land is known.

The formula for the cost approach is:

Market Value = Land Value + (RCN - Depreciation)

MV = LV + (RCN-DEP)

Land Value

The **land value** is usually estimated by using the sales comparison, or market approach, to value. This approach is applied by comparing the subject site with sales of comparable sites that are vacant.

Replacement Cost New (RCN)

The **replacement cost new** is the current cost of constructing improvements having utility equal to the utility of the subject improvements.

It may or may not be the cost of reproducing a replica of the subject improvement. The distinction between the two is that replacement cost refers to a substitute property of equal utility and **reproduction cost** refers to an exact replica property.

In a particular situation, the two concepts may be interchangeable, but not necessarily so. Both **RCN** and **reproduction cost** have their application in the cost approach to value. The costs from Publication 126, Instructions for Commercial Schedules are replacement costs.

The RCN includes the total cost of construction incurred by the builder.

There are several acceptable methods for establishing the replacement cost new of a structure. However, only the two more popular methods are discussed: the component-in-place method and the square foot method. Both methods can be used to develop a cost manual for a specific geographic area.

The **Component-in-Place (CIP)** method is used by builders and contractors because it is very accurate. This method combines the direct and indirect costs of labor, material, and overhead for each unit in place for a portion or area of the structure. All these units are then added together to arrive at the total cost for the structure. Publication 127 is your reference guide for the CIP method. This method is used when a commercial property's square footage is larger than the values described in Publication 126 and for industrial use.

The **Square Foot** method is another widely used method for calculating the RCN. This method is based on the floor area of the structure.

Once a method is utilized by an assessor/appraiser in developing the cost of the improvements, the next step is to determine if the property suffers from any loss of value — depreciation.

Depreciation

The Cost Approach utilizes **depreciation.** The difference between RCN and the present value is **depreciation**, **the loss of value** from all causes. The third and final step in completing the cost approach is to estimate the amount of depreciation.

Three types of depreciation exist**:**

1. Physical Depreciation
2. Functional Obsolescence
3. Economic or External Obsolescence

Within the three types of depreciation are two depreciation conditions: deterioration and obsolescence. Deterioration occurs as the property declines in quality or condition. Obsolescence is an impairment of desirability and usefulness caused by new technology, changes in design, or external factors that make a property less desirable and valuable for a continued use.

Depreciation can be either **curable** or **incurable**. Depreciation is **curable** when the cost to cure will add to the market value of the structure. It is **incurable** when the cost to cure is greater than the increase in the market value of the structure.

Physical Depreciation

Physical depreciation is defined as the loss in value due to deterioration, e.g., wear and tear, time, and the action of the elements. Physical depreciation begins while a building is under construction and continues until the life of the structure has ended.

The physical life of a building is dependent on the degree of maintenance it receives, the type and quality of materials used in its construction, and the soundness of the methods of its builder. Therefore, a building that is not maintained properly or is not built to last will experience more (greater) physical depreciation.

Examples of the two types of physical depreciation:

1. **Curable** — short-lived components, such as windows, doors, floor coverings, and roofs.
2. **Incurable** — long-lived components, such as foundations, studs, and rafters.

Functional Obsolescence

Functional obsolescence refers to obsolescence resulting from conditions within the property, for instance the commercial building designed for only one specific use, or inadequate design or arrangement that lessen its usefulness or utility. For instance, a bowling alley with slanted floors does not lend itself to many other uses.

Examples of the two types of functional obsolescence:

1. **Curable** — lack of air conditioning, lack of proper electrical wiring, low hanging pipes, and absence of proper ventilation.
2. **Incurable** — extremely poor floor plan, very low or high ceilings, inadequate column spacing in a warehouse, multi-story construction in older industrial buildings, and undesirable shape or location of a commercial structure on the site.

Economic Obsolescence

Economic obsolescence refers to obsolescence caused by influences outside the property, such as physical, economic, social, and governmental changes that have an adverse effect upon the stability and quality of the neighborhood in general.

Both **functional and economic obsolescence** are defined as the loss of value due to forces, other than physical, that act upon a structure in such a way as to limit its economic life. Economic obsolescence affects the desirability of the property.

Examples of economic obsolescence (usually incurable):

1. **Location** — change in traffic pattern and noise and air pollution, detrimental property in immediate area.
2. **Economic** — high interest rates and business closings.
3. **Government** — zoning changes, poor services, and high tax rate.

Since the cost approach relies heavily on the estimate of depreciation, it is most applicable when there is little depreciation. If the improvement is new (or significantly remodeled) and well-maintained, the cost approach will give a better estimate of value than when the improvement is old and/or not adequately maintained.

When there is substantial depreciation due to other factors – such as features that no longer meet the tastes of the present buyers (few electric outlets, no air conditioning), zoning changes, or a downturn in the economy – the cost approach will not perform at its best due to the large amounts of depreciation plus the subject's rate of depreciation to take.

3. The Income Approach

Income-producing property, such as hotels, nursing homes, and offices are often valued based on the net income these properties produce for their owners.

The income approach has its widest application in the appraisal of income-producing property. Commercial property is universally bought and sold on its ability to generate and maintain a stream of income for its owner.

The value of such property is a measure of the amount, quality, and durability of the future net income the property can be expected to return to its investor.

The justified price paid for income-producing property is no more than the amount of investment required to produce a comparably desirable return. In addition, since the market can be analyzed to determine the net return anticipated by investors, it follows that the value of income-producing property can be derived from the income the property can produce.

Capitalization is the process for converting the net income produced by property into an indication of its value.

The **Capitalization Rate (R)** is accomplished by dividing the net income of the property **(I)** by the value of the property **(V).**

Market Value (V) is the actual sales price of the property.

Income (I) is usually the **Net Operating Income** or income remaining after expenses**.**

The IRV Formula

The IRV formula can be used to determine any one of the three factors of the formula if the other two factors are known.

Market value (V) = net income (I) ÷ capitalization rate (R)

To find the income of a property, cover up the "I" in the formula so you are left with "R" • "V".

Multiply the appropriate capitalization rate "R" by the value "V."

If you know the net income of a property and the value, **to find the cap rate**, cover up the "R" in the formula so you are left with "I" divided by "V".

Divide the net income "I" by the value "V" to get the capitalization rate "R."

To determine the value of the property, cover up the "V" in the formula so you are left with the income "I", and the rate "R."

Divide the net income "I" by the capitalization rate "R" to arrive at the value "V."

It can readily be seen that any one of the factors of the equation can be determined if the other two factors are known.

Unit 1- Summary

The three approaches to value are:

1. The sales comparison approach,
2. The cost approach, and
3. The income approach.

Depreciation is the loss of value from all causes. There are three types of depreciation.

1. Physical
2. Functional
3. Economic

Depreciation can be curable or incurable.

The Sales Comparison, or market approach, is a method of determining value by comparing similar properties to the subject and adjusting them to reflect similarities and dissimilarities. Its use is dependent upon the availability of sales of comparable properties and the validity of judgments made regarding similarities and dissimilarities between the comparable property and the subject property.

The value of a property can be estimated under the **Cost Approach** by estimating the value of the land, adding the RCN of the improvements, and subtracting all three forms of depreciation from the improvements.

MV= Land Value + (RCN-DEP)

The Income Approach appraises the value of income-producing property by measuring the amount, quality, and durability of the future net income the property can be expected to return to an investor.

$$\frac{I}{R \bullet V}$$

Comp Superior, Subtract (-)

Comp Inferior, Increase (+)

Capitalization is the process for converting the net income produced by property into an indication of its value.

CIP- Component-in-place. This system is used when property SF too large for Pub 126 values and for industrial properties. It is introduced in Publication127.

Unit 1- Review questions

Match these terms to the correct definition. <u>There may be more than one answer to the terms.</u>

1._____ Sales comparison

2._____ Cost approach

3._____ Income approach

4._____ Depreciation

5._____ Capitalization

A $\frac{I}{R \bullet V}$

B The loss of value due to all causes.

C MV = Land value + (RCN - depreciation).

D Approach that is most applicable when the improvement is new and is at its highest and best use.

E Conversion of the net return produced by a property into an indication of value.

F Adjust recent comparable sales to the subject.

Unit 2- Land Valuation

Learning Objectives

After completing the assigned readings, you should be able to

- calculate area for a square, rectangle, or triangle.
- calculate area for more complex shapes.
- understand various units of value and when to use them

Terms and Concepts

Front Foot
Frontage
Rectangle
Square
Right Triangle
SF
Parcel
Acre
65/35 rule

Land Valuation

A number of principles are involved in land valuation. ***Land is valued as if vacant and at its highest and best use*****,** meaning the use that will bring the greatest net return to the property over a reasonable period of time.

Highest and best use must be:

- **legal**—use must be legal and in compliance with zoning laws.
- **probable and physically possible**—use is reasonable and not speculative.
- **economically feasible**—use is in demand and with the potential of being profitable.

Land and Site

Land is raw land without amenities, such as streets, curbs, gutters, sidewalks, utilities, etc.

Site is defined as a parcel that has been made ready for its intended purpose.

Units of Value

1. **Square Foot Value**—The size is one of the most important factors in determining value and is also used to value irregular shaped lots.

2. **Front Foot Value**—The amount of frontage is often the most significant factor in determining value, particularly with commercial property.

3. **Site Value**—Location is a significant factor in determining value.

4. **Acreage**—The dollar per acre value is often the most important factor in determining rural residential land values.

The assessor must analyze the market to determine the most appropriate **unit of value** to be used. Unit value is determined by dividing the selling price of vacant land by the number of units, whether that “unit” is Front Foot, Square Foot, Site, or Acreage.

Example:

The selling price for a lot is $24,000. The lot is 80' x 150'. (For lot dimensions, the first number is always the width of the lot. The second number refers to the length of the lot.)

80' x 150' = 12,000 Square Feet

Front Foot Calculation: $24,000 ÷ 80' = $300 per Front Foot

Square Foot Calculation: $24,000 ÷ 12,000 Sq. Ft. = $2 per Front Foot

Site Value Calculation: $24,000 ÷ 1 (Lot) = $24,000 per unit (Lot)

The assessor must place a separate assessment on the land (or site) and the improvements. Common land values that are used in this process are $ per square foot values and $ per acre values. Before either dollar values can be determined, the total square footage of an area or the total acreage must be calculated.

Square Foot

To determine the total square footage of an area, multiple the length of the area by the width of the area. **L x W = Total Square Footage**

One must keep in mind that if a triangular shaped lot is being valued using square feet as the unit of comparison, the size of the lot is determined by:

$$\frac{\text{Base X height}}{2}$$

The **Square Foot** (SF) unit of comparison is commonly used **when size is the dominant factor in determining value**.

Acreage

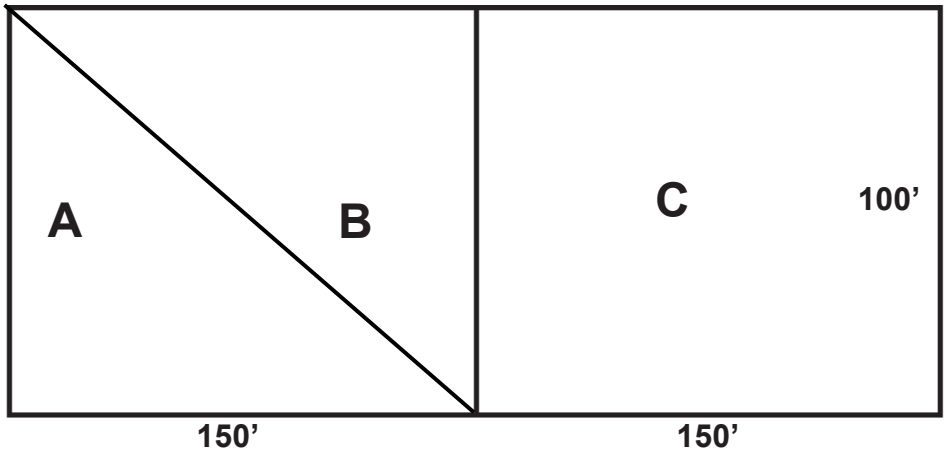
To convert total square footage into total acres, divide the total square footage of the area by 43,560 (the total square footage of 1 acre). Acreage is commonly used with rural and large commercial and industrial sites.

Note: Measuring circles is outside the scope of this class.

Exercise 2-1 Square-Foot Land Values

	Site Shape	Measurements	Square Footage	Approx. Acreage
1.	Rectangle	400’ x 800’	320,000	7.35
2.	Rectangle	320’ x 480’	_____	_____
3.	Triangle	320’ x 480’	76,800	1.76
4.	Triangle	150’ x 180’	_____	_____
5.	Square	150’ x 150’	_____	_____
6.	Triangle	600’ x 900’	_____	_____

7. Refer to the diagram below



Compute the values for the three parcels
If the square foot value is $1.00/SF

A _____
B _____
C _____

Front Foot Land Values

A **Front Foot** (FF) is a strip of land one foot wide, running from the front of the lot to the rear. When using the front foot method, all front feet that run the entire depth of the lot have the same value.

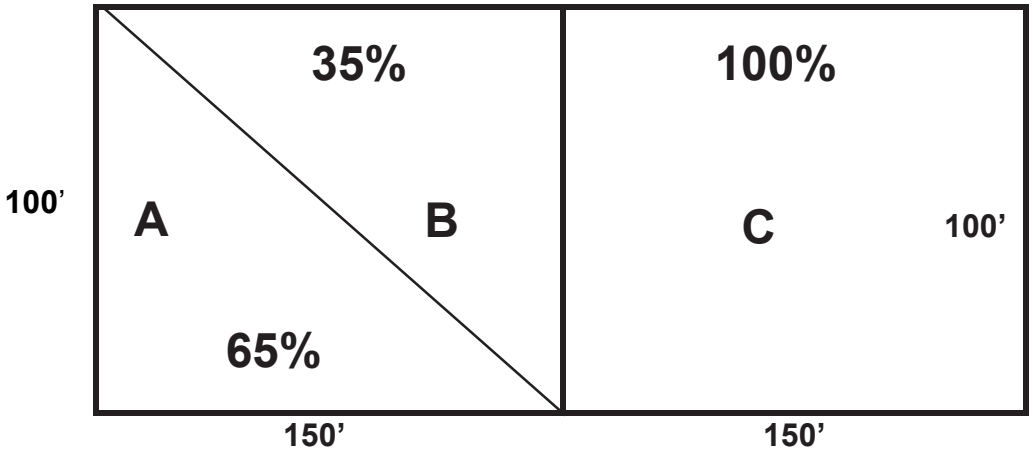
The Front Foot method is used when the amount of **Frontage** is the most important characteristic of the parcel.

Irregular lot adjustments are made when the front foot is the unit of comparison. These adjustments assume that the utility of the lot may be affected by its shape.

The most common rule for shape adjustment is the **"65-35 Rule."** It is based on the premise that a right-angle triangular shaped lot, with its base on the street, has 65 percent of the value of a rectangular lot of the same frontage. It also assumes that a right-angle triangular shaped lot with its apex, or point, on a street, has 35 percent of the value of a rectangular lot that has the frontage.

Exercise 2-2 Front Foot Values

65/35 Rule (Applies to Front Foot Only)



Compute the values for the three parcels above if the front foot value is $100/FF.

A _____
B _____
C _____

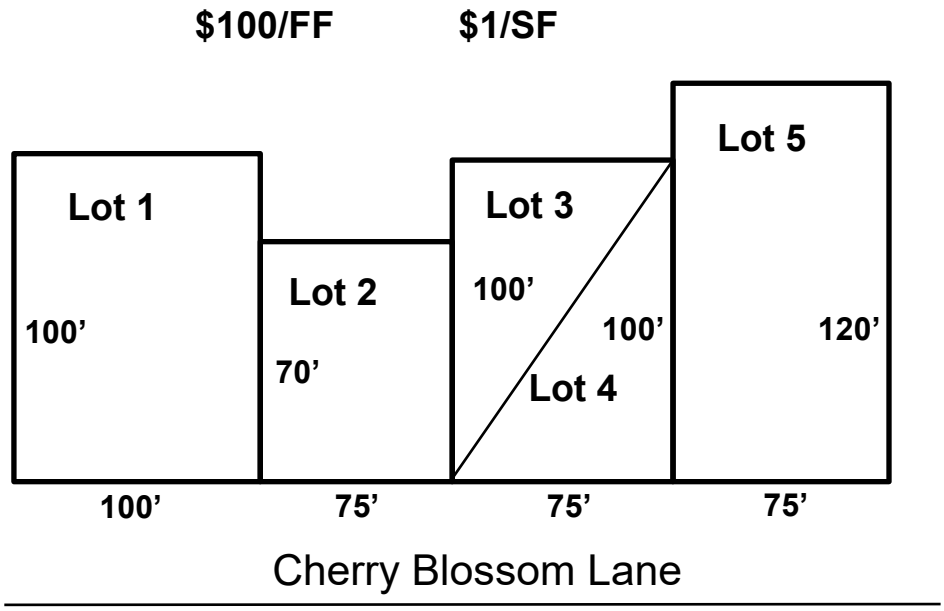
Exercise 2-3 Commercial Lots

For this exercise, the front foot unit of comparison derived from the market is $100 per front foot. The square foot value derived from the market is $1/SF.

Value the lots using the formulas below.

Front Foot: **Lot value = number of FF x $ per FF x factor for shape**

Square Foot: **Lot value = number of SF x $ per SF**



Lot 1 FF value = _____ Lot 2 FF value = _____
SF value = _____ SF value = _____

Lot 3 FF value = _____ Lot 4 FF value = _____
SF value = _____ SF value = _____

Lot 5 FF value = _____
SF value = _____

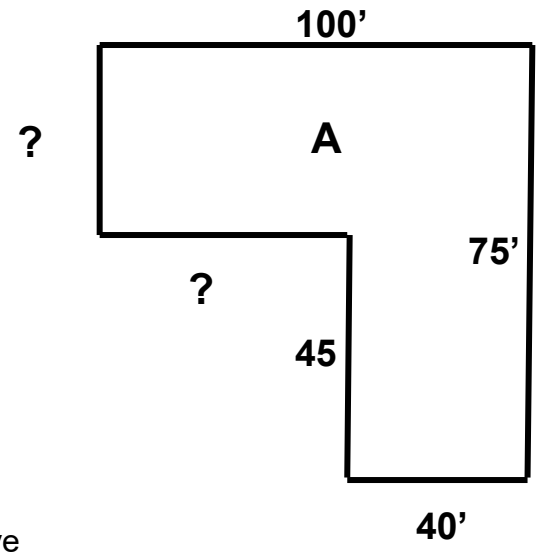
Measuring Irregular Parcels

Measuring a rectangular shaped parcel or improvement is quite straightforward. However, most parcels are not exactly rectangular. The key to measuring these irregular parcels lies in observing the parcel in terms of shapes (rectangles and triangles) that you do know how to measure. Then, these pieces are added together to make a total SF area for the irregular shape.

Example 1

By breaking down parcels into shapes we can measure easily, we can measure squares and rectangular shapes that define a property.

For instance, let's look at the shape **A.**



At first glance, it may not be apparent that there are at least three ways to approach measuring this parcel.

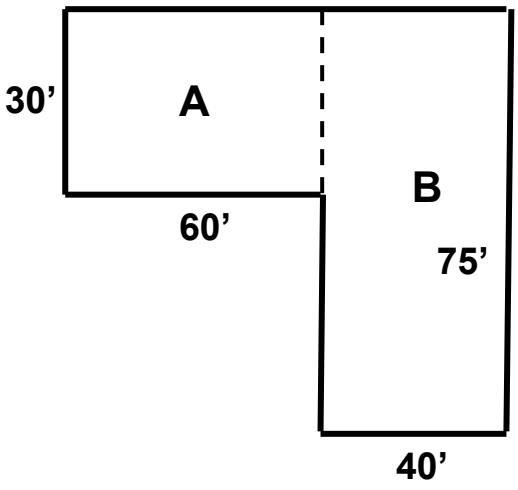
The first step is to determine the dimensions.

Notice that every measurement is not included on the diagram on the Property Record Card. It is assumed that the assessor can "fill in the blanks" if all the dimensions are not shown.

Recall that the opposite sides of a rectangle have the same measure. For instance, if the length of the northernmost line is 100', and the length of the southernmost line is 40', it can be deduced that the length of the remaining east-west line is 60' (100'-40' = 60')

This shape could be measured in a few different ways. You might select the way that you visualize most easily or the method which uses the fewest number of calculations.

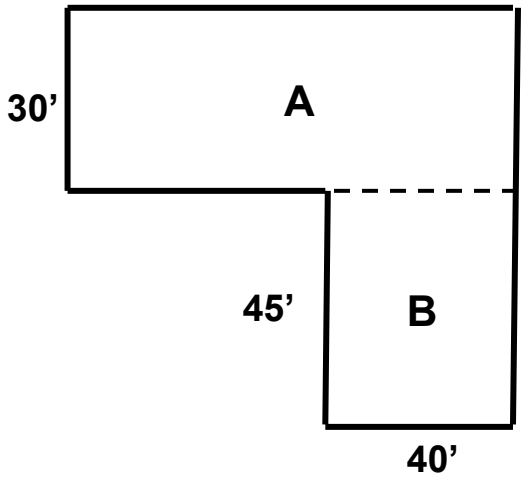
We will look at three different ways to measure this shape and find the correct number of square feet.



The shape could be divided into the shapes **A** & **B.**

A = 60’ x 30’ = 1,800 SF
B = 75’ x 40’ = 3,000 SF

1800 SF + 3,000 SF = 4,800 SF



Another way to measure this parcel
is to divide it into two rectangles this way.

The measurements would be:

A = 100 x 30 = 3,000SF
B = 40 x 45 SF = 1,800 SF

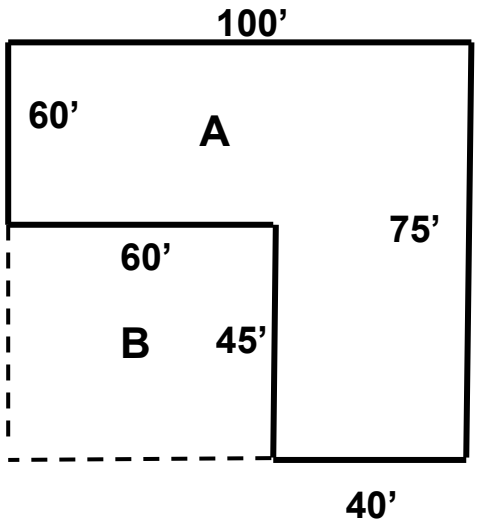
3,000 SF + 1,800 SF = 4,800 SF

Finally, yet another way to measure this parcel could be subtractive. Measure the imaginary outline of the entire rectangle and subtract the part that is “missing”.

The measurements would be:

A = 75’ x 100’ = 7,500 SF
B = 60’ x 45’ = 2,700 SF

7,500 SF – 2,700 SF = 4,800 SF



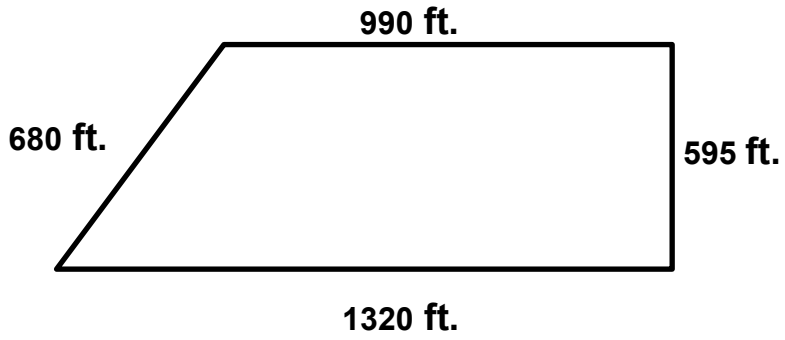
Notice that all 3 methods produce
The same result of **4,800 SF.**

To find the number of acres in this parcel, divide the number of square feet by the number of SF in an acre (43,560).

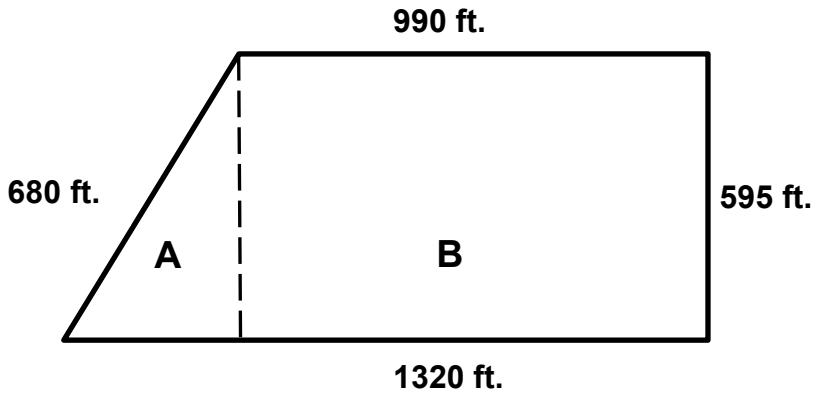
$$\frac{\textbf{4,800 SF}}{\textbf{43,560 SF}} = \textbf{.1102 Acres}$$

Example 2

By breaking down parcels into series of rectangles and triangles and using the measurements provided, you would be able to calculate the area of almost any parcel.



Step 1 **Create a rectangle**.
A right triangle (90°) can be created (triangle A) leaving rectangle B.



Step 2 In this example, the area of Rectangle B can be calculated using known values of 990 feet for the length and 595 feet for the width.

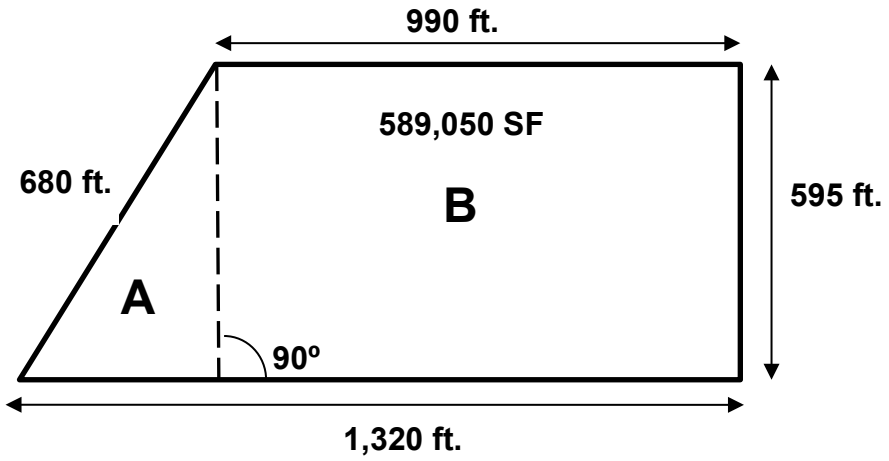
Area of the rectangle **= 990 feet x 595 feet = 589,050 square feet.**

L x W = Area

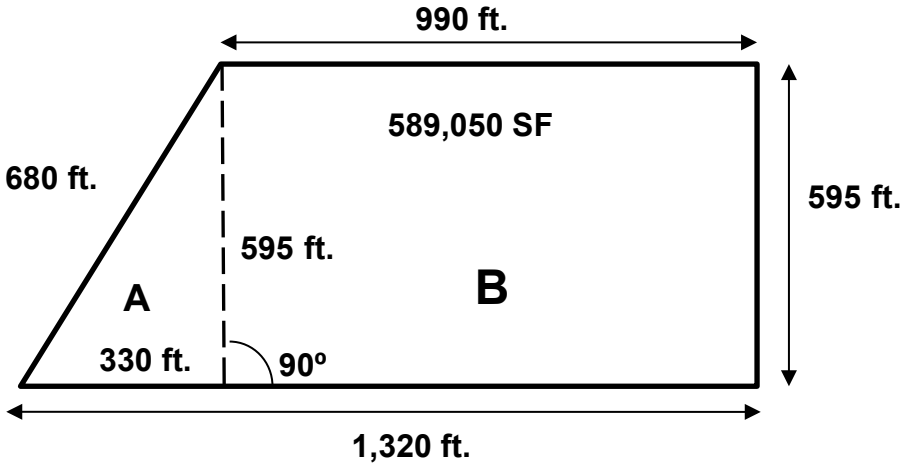
Step 3 The remaining area of the parcel is that of Right Triangle A.

However, looking at the triangle, there do not appear to be any usable values. This is a good opportunity to point out a very important note. The hypotenuse of the triangle (the long side of the triangle, in this example the line labeled as 680 ft.) is not used in calculating the area of a triangle. The area of a right triangle is calculated by multiplying

the base times the height and dividing the product by two. The hypotenuse (long side) is never used.



In this example, the base and height values must be determined from the other measurements provided. As a result, the height of Right Triangle A is the height of Rectangle B (595 feet). For the base of the triangle, that value can be determined from the existing values as well. The base of Rectangle B is 990 feet. Considering the entire length of the bottom of the parcel is 1,320 feet and knowing that Triangle A is a right triangle, then the base of Right Triangle A is 1,320 feet minus 990 feet, or 330 feet.



Therefore, the area of Right Triangle A is: $\frac{595 \text{ ft.} \times 330 \text{ ft.}}{2}$ = **98,175 square feet.**

Step 4 Calculate the total acreage of the parcel. By taking the square footage of Right Triangle A, which equals 98,175, and adding the square footage of Rectangle B, which equals 589,050, we arrive at a total of 687,225 SF for the parcel. By dividing the total area of the parcel (687,225 SF by 43,560 SF) we arrive at a total of **15.78** acres for the parcel.

$$\textbf{589,050 SF + 98,175 SF} = \frac{\textbf{687,225 SF}}{\textbf{43,560 SF}} = \textbf{15.78 AC}$$

Unit 2- Summary

Land is always valued as if vacant and at its highest and best use.

The methods to value land are

- Square Foot- used when Size is most important
- Front Foot- used when Frontage is most important
- Site Value- used when Location is most important
- Acreage- used for rural land and large commercial and industrial locations

One acre is equal to 43,560 Square Feet.

Regular rectangular or square parcels can be measured by multiplying the length by the width.

Triangular parcels can be measured by multiplying the base by the height and dividing by 2.

Irregular parcels can often be measured by dividing up the parcel into measurable shapes like rectangles and triangles and adding those together.

A front foot is a section of land facing a frontage of road or water divided into 1-ft strips which are valued the same for the length of the parcel. This is different from the square foot method.

The 65-35 rule is a rule applying to triangular **front foot** lots. This appraisal technique gives the triangular shaped lot with its base on the frontage 65% of the value of entire front footage, and the triangular shaped portion with its point, or apex, on the frontage a value of 35% of the entire front footage value.

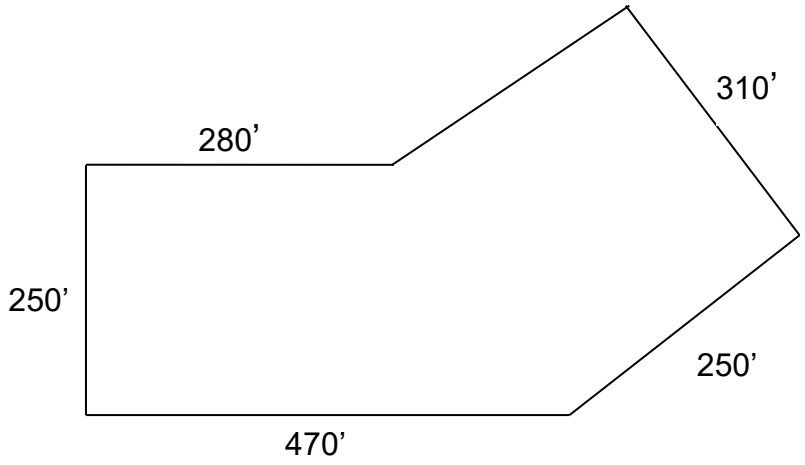
Review Exercise 2-1

Compute the square footage and the acreage for the following (assume all triangles are right triangles). Don't forget there are 43,560 SF in an acre.

Parcel shape	Measurements	Square footage	Acreage
1. Square	1,528 ft. x 1,528 ft.	_____	_____
2. Square	680 ft. each side	_____	_____
3. Rectangle	1,250 ft. x 1,000 ft.	_____	_____
4. Rectangle	125 ft. x 75 ft.	_____	_____
5. Square	65 ft. x 65 ft.	_____	_____
6. Triangle	475 ft. x 986 ft.	_____	_____
7. Triangle	680 ft. x 360 ft.	_____	_____

Review Exercise 2-2

Find the area (in square feet and acres) of the figure below.



Number of Square Feet _____

Number of Acres _____

Unit 3- Mass Appraisal System

This unit covers the mass appraisal system and the various factors used to adapt a mass appraisal system to local jurisdictions.

The purpose of this unit is to provide a basic understanding of a mass appraisal system and its use.

In addition, the unit explains how mass appraisal systems can be modified to fit local markets.

Learning objectives

After completing the assigned readings, you should be able to:

- define a mass appraisal system.
- identify the various factors used to adjust the IDOR Appraisal Publications.
- explain how the various factors are obtained and used.

Terms and concepts

Ad valorem
Cost factor
Quality grade
Design factor
Appraiser factor
Neighborhood factor
Remaining economic life (REL)
Depreciation
Actual age
Effective age
CDU (condition, desirability, and utility) rating

Mass Appraisal

Mass appraisal is the valuation of many properties using standard procedures that provide uniformity.

The purpose of mass appraisal is to produce equitable and efficient appraisals of all property in a jurisdiction for **ad valorem** (according to value) tax purposes. A mass appraisal system should incorporate all three approaches to value, but most systems are primarily based on the cost approach.

Various cost schedule publications are produced by the Illinois Department of Revenue (IDOR) and provided free to assessment officials. The IDOR schedules are a mass appraisal system. They are available on our website at tax.illinois.gov. Publications 126 and 127 are specifically designed for use for commercial and industrial properties.

The Job of the Assessor

Simply stated, the job or responsibility of the assessor is to place an assessed value in his or her column of the assessment books for each of the properties in the jurisdiction. This job is complex and requires a great deal of time and effort from the assessor. The assessor's professional judgement still greatly affects the outcome of this system.

There are four steps the assessor must complete for each property in the jurisdiction. The assessor must:

1. **Discover** — Find and inventory all real property using tax maps and property index numbers. Find newly constructed property by observation, reviewing building permits, and other methods.

2. **List** — Describe the characteristics of land and improvements on property record cards, including measuring improvements.

3. **Value** — Estimate the value of all real properties in the jurisdiction and ensure uniformity and equity in the methods used and the market values produced.

4. **Assess** — Apply an assessment level to these market values; arrive at an assessed value for each of the properties in the jurisdiction; ensure that the assessed values reflect a uniform level of assessments and that the assessed values are derived from current market values.

Unlike an independent appraiser, who has the time to carefully analyze the various approaches to value before arriving at an estimate of value for a single property, the assessor must estimate values for hundreds, or even thousands of properties within a relatively short period of time. The assessor is a mass appraiser.

The Appraisal Publications are designed for mass appraisal.

The cost schedules are used to apply the cost approach to value in a mass appraisal system. It is unreasonable to expect that every building value obtained using these schedules will be exact. However, it is expected that the value estimates produced will be well within tolerable limits.

The outcome of this system still depends greatly on the professional judgment of the assessor. This is especially true when an assessor must use factors that will adjust various values before arriving at the final value of the subject property. There are guidelines that can be used to establish factors, but assessors must continually rely on their skill and experience when assigning individual factors to each property.

Factors used with the IDOR Appraisal Publications

There are 6 Factors that we will commonly use in this class to adjust values: Cost, Quality, Design, Appraiser, Neighborhood and REL/Depreciation.

1. Cost Factor

The commercial and industrial cost tables produced by IDOR are developed from data obtained in the central Illinois area.

The use of a **cost factor** may be necessary for any assessor whose jurisdiction is not similar to this area. A cost factor is designed to adjust the **Replacement Cost New (RCN)** value to reflect the local cost of labor and materials.

2. Quality Grade

Quality grade represents the quality of construction, the workmanship, and the type of materials used. The quality of workmanship and materials can greatly affect the cost of construction and the value of the improvement.

Most improvements fall within a definite class of construction involving average quality of workmanship and materials. This type of construction is designated as grade “C” which carries a factor of 100 percent or 1.00.

The cost tables in the IDOR cost publications represent typical quality grades for that specific type of property. Some localities will never have an excellent quality building while in some localities it will be difficult to build a low cost or cheap building because of code requirements.

An assessor may use a different quality grade factor if he or she determines that the subject property was not built using average quality materials and workmanship for that jurisdiction.

The accuracy of an RCN obtained from the IDOR Appraisal Publications is greatly affected by proper quality grading.

There are six basic quality grades in the IDOR Appraisal Publications:

Grade	Quality	Factor
AA	Superior	225 %
A	Excellent	150 %
B	Good	122 %
C	Average	100 %
D	Inferior	82 %
E	Poor	50 %

One or two variations between the description of quality given in the Appraisal Publications and the structure being evaluated are considered normal and should not alter the quality grade. However, if a structure clearly falls between two different quality levels, the assessor can fine tune these adjustments by using pluses and minuses after the letter grade. For example, a C+ 10 grade improvement would have a grade factor of 10 percent above “C” and have a factor of 110 percent.

A quality grade must be assigned to each improvement and should be established during construction if possible.

Quality grade may change based on the materials and construction standards used in cost schedule descriptions to establish the base cost for the RCN. It is possible for the quality grade to change several times during the life of the improvement as materials, technology, and construction standards improve or evolve.

The assessor must be cautious not to confuse quality and condition. Condition refers to the physical condition of the improvement. Condition changes due to depreciation, such as wear and tear, use, and abuse.

Quality Grade Descriptions

AA Grade	Buildings generally having an outstanding or exceptional architectural style and design, constructed with the finest quality materials and workmanship. Superior quality interior finish, built-in features, deluxe heating system, plumbing and lighting fixtures.
A Grade	Architecturally attractive buildings constructed with excellent quality materials and workmanship throughout. High quality interior finish and built-in features. Deluxe heating system and very good grade plumbing and lighting fixtures.
B Grade	Buildings constructed with good quality materials and above average workmanship throughout. Moderate architectural treatment. Good quality interior finish and built-in features. Good grade heating, plumbing and lighting fixtures.
C Grade	Buildings constructed with average quality materials and workmanship throughout, conforming to the base specifications used to develop the pricing schedule. Minimal architectural treatment. Average quality interior finish and built-in features. Standard grade heating, plumbing and lighting fixtures.
D Grade	Buildings constructed with economy quality materials and fair workmanship throughout. Void of architectural treatment. Cheap quality interior finish and built-in features. Low grade heating, plumbing and lighting fixtures.
E Grade	Buildings constructed with a very cheap grade of materials, usually “culls” and “seconds” and very poor-quality workmanship resulting from unskilled, inexperienced, “do-it-yourself” type labor. Low grade heating, plumbing, and lighting fixtures.

3. Design Factor

Another factor that may be used to adjust a building's RCN is the **design factor**.

The IDOR Appraisal Publications are designed for use in determining RCN values for conventional, rectangular shaped structures of compact, efficient design. Architectural designs have become more diverse. There is an increased cost associated with a unique or unconventional structure due to the need for more materials and the need for more labor per square foot.

The following should be considered in determining whether to use a design factor.

- extensive use of costly materials in public areas, such as marble and rare woods.
- aesthetics that are used to attract and sell future tenants.
- design and operation of a mixed-use building because each use may require a different set of structural and operating requirements, such as individual entrances, elevator systems, and mechanical requirements.

In taller buildings, wind bracing, elevators, and waste removal facilities are some of the factors that affect design and cost consideration.

The design factor is assigned to individual buildings and should remain unchanged during the life of the structure.

A design factor is more commonly used in quality grades "B," "A," and "AA" improvements, although it may be required for grade "C" construction.

4. Appraiser Factor

A jurisdiction may have more than one assessor or may employ field appraisers. Even though quality grades should be based upon an established standard, it is possible that quality grades may differ between appraisers in that jurisdiction.

An **appraiser factor** may be needed to bring buildings valued by that particular individual in line with the value of all buildings in the jurisdiction. This factor is applied to all the parcels listed by the individual assessor.

5. Neighborhood Factor

The neighborhood where the property is located has a direct effect on the value. For instance, the neighborhood of a property may be defined by a natural boundary formed by rivers, or political boundaries formed by zoning to protect the common use in an area. The assessor can analyze the neighborhood to determine if the area is in a stage of growth, stability, or decline to estimate the future use and value.

All the factors can be combined to result in one factor, or a **Combined Factor**.

Quality grade factor x Cost factor x Design factor x Neighborhood factor x Appraiser factor = Combined factor

Exercise 3-1

An average structure has a value of $700,000 in central Illinois. The subject is of good quality and is in an area where construction costs are higher. What is the combined factor if the cost factor is 1.06 and the quality grade factor is 1.22? _____
What is the new calculated value? $_____

6. REL/Depreciation

The final factor that is applied to all improvements is a **Remaining Economic Life (REL) factor**. This factor is applied to the true RCN to arrive at a full market value, which now reflects the adjustment made for depreciation.

Depreciation is the loss in value due to all factors. Remember, depreciation is placed into three categories: physical, functional, and external or economic depreciation.

All depreciating forces act concurrently. Within the IDOR Appraisal Publications, the **Commercial REL Depreciation Table** is developed to adjust for the differing rates of depreciation. This enables the assessor to fine tune the value of each individual property within a specific neighborhood. Please note that the Commercial REL Depreciation Table is not the same as the Residential depreciation table found in Publication 124.

Effective Age

Effective Age as defined by IAAO is "The typical age of a structure equivalent to the one in question with respect to its utility and condition. Knowing the effective age of an old, rehabilitated structure or a building with substantial deferred maintenance is generally more informative than knowing its chronological age." (Property Appraisal and Assessment Administration; Eckert, Gloudemans & Almy.)

Effective Age is an efficient and accurate method for applying an appropriate amount of depreciation to a structure.

The Effective Age of a structure reflects the amount of deterioration or depreciation. It is a measure of how old the structure is in effective terms as opposed to chronologically. **Any repair, remodel or renovation will tend to reduce the effective age.**

The starting point for determination of Effective Age is to have a professional understanding of the **typical** aging of an improvement. It is from that benchmark or basis that you can look at a structure and make a determination as to its effective age.

As an example, if you are looking at two properties each of which are 20 years old chronologically they may not have the same Effective Age. For instance, if they had wood siding and one of them had never been painted and was showing considerable deferred maintenance and deterioration compared to the typical deterioration of a maintained structure, that would increase the Effective Age of the structure. If the other structure had been cared for in a typical manner, it would likely have a normal amount of depreciation and its **Effective Age would be close to its chronological age.** By contrast, an exceptionally well-maintained property would normally have less deterioration or depreciation and would thus have a lower Effective Age.

One other factor to remember is that while you are determining an effective age for the structure as a whole it is typical for the various components to deteriorate at different rates. For example, the typical life of a roof may be 30 years while carpets may have only a 10 to 15-year life.

The Effective Age of a property is its age in years as compared with other properties performing similar functions. This is the actual age minus the age which has been taken off by face-lifting, remodeling or structural reconstruction, and removal of functional inadequacies.

Effective age is an age which reflects a true remaining life for the property considering the typical life of similar buildings.

Remaining Economic Life = Economic Life – Effective Age

Economic Life

Economic Life is the period over which improvements to real property contribute to value. For instance, if the expected economic life value for a typical new commercial building is 50 years, this means on average, with average maintenance and average quality, this building will continue to have value for 50 years. This economic life can be affected by depreciation which can reduce its economic life or it can be updated and meticulously maintained which can increase its economic life. The economic life of an improvement could be different than its actual **physical life.**

Physical Life

The total period an improvement lasts or is expected to last.

Remaining Economic Life

The estimated period over which existing improvements are expected to continue to contribute economically to the property value. In other words, the expected economic life minus the effective age (age accounting for other typical improvements plus depreciation).

Using the Commercial REL Depreciation Table

Schedule A — This schedule considers the actual age of the improvement, and what is referred to as the CDU rating of the improvement, to arrive at the **Effective Age.** This effective age is then used to find the REL factor, which is applied to the true RCN.

The **CDU rating** is assigned by the assessor to each property by comparing the subject property's physical condition "C," desirability "D," and utility "U" to other properties within the neighborhood, or jurisdiction if neighborhoods have not been established.

The CDU rating is the assessor's method of determining a rate of depreciation. **Condition** refers to physical depreciation, such as wear and tear and action of the elements that has taken place. **Desirability** refers to the economic or external depreciation, such as lack of appeal due to location, or some type of adverse influences outside the boundary lines of the property. **Utility** refers to functional obsolescence, such as lack of loading docks, too low or too high ceiling height, no parking for trucks or customers, lack of proper electrical feeds, and any super-adequacy or inadequacy that may be present.

The CDU rating (shown on Schedule A) is broken down into five classifications.

E	Excellent	Superior condition
G	Good	Better than average condition
A	Average	Normal wear and tear for area
P	Poor	Definitely below average condition
U	Unsound	Excessively deteriorated condition

Commercial REL Table

Schedule A						Schedule B	
Age* considering physical condition	CDU Rating					REL	
	E	G	A	P	U	Eff. age	REL
1	1	1	1	6	11	1	98
2	1	1	2	7	12	2	96
3	1	1	3	8	13	3	94
4	1	1	4	9	14	4	92
5	1	1	5	10	15	5	90
6	1	1	6	11	16	6	88
7	1	2	7	12	17	7	86
8	1	3	8	13	18	8	84
9	1	4	9	14	19	9	82
10	1	5	10	15	20	10	80
11	1	6	11	16	21	11	78
12	2	7	12	17	22	12	76
13	3	8	13	18	23	13	74
14	4	9	14	19	24	14	72
15	5	10	15	20	25	15	70
16	6	11	16	21	26	16	68
17	7	12	17	22	27	17	66
18	8	13	18	23	28	18	64
19	9	14	19	24	29	19	62
20	10	15	20	25	30	20	60

Schedule A-Actual Age and CDU

Actual age and effective age are the same when the physical condition of improvement is average. Assume the physical condition is average for this class.

Step 1 Locate the age of the improvement in the "AGE" column.

Step 2 Determine the CDU of the subject and trace its age to its intersection for the effective age.
Example: If a property's age is "10," and the CDU "good," the effective age is "5."

Schedule B- Effective Age

Step 3 This effective age is then located in the Eff. Age column and the percentage factor indicated is in the "REL: (REL factor) column. The REL factor is then applied to the true **Replacement Cost New (RCN),** which depreciates the value to reflect full market value. REL is directly related to depreciation. For example: a commercial structure with an effective age of "5" has an REL factor of "90" percent.

REL (%) + DEP (%) = 100%

100% - REL (%) = Depreciation

The assessor must carefully review CDU ratings over time because the CDU rating of each property may change for a variety of reasons. Because each property is assigned an individual CDU rating, a change of one CDU may not require a change in the CDU ratings of other properties.

Exercise 3-2

Find the 2nd effective age, REL factor, and depreciation for the following:

1. A structure whose 1st effective age is 10, and has a CDU of "P".

   2nd Effective Age_____ REL_____ Depreciation_____%

2. An average structure, 5 years old, with a CDU of "A".

   2nd Effective Age_____ REL_____ Depreciation_____%

3. A structure with an actual age of 20, but 1st effective age of 10 with a CDU of "E".

   2nd Effective Age_____ REL_____ Depreciation_____%

Unit 3- Summary

The purpose of **mass appraisal** is to produce equitable and efficient appraisals of all property in a jurisdiction for *ad valorem* tax purposes.

Mass appraisal systems provide quickly obtained value estimates with reasonable substantiation in the records. A mass appraisal system should incorporate all three approaches to value, but most systems are primarily based on the cost approach.

The **IDOR Appraisal Publications** are designed for mass appraisal.

The **effective age** of an improvement is the current age reflected by downward by depreciation or upward due to remodeling, facelift or other improvements.

A **cost factor** is designed to adjust the IDOR Appraisal Publications' replacement cost new (RCN) value to reflect the local cost of labor and materials.

The **quality grade** represents quality of construction, the workmanship, and the type of materials used. The quality of workmanship and materials can greatly affect cost.

A **design factor** adjusts for an increased cost associated with a structure with significant design features due to the need for more materials and the need for more labor per square foot. The design factor is handled in the same manner as a quality grade factor. It is assigned to individual properties and should remain unchanged during the life of the structure.

An **appraiser factor** can be used to adjust quality grade of all buildings valued by one appraiser in line with the value of all buildings in that jurisdiction.

A **neighborhood factor** can be applied to adjust all values in one defined neighborhood.

The **economic life** of an improvement is the period that improvements to real property contribute to value.

The **remaining economic life (REL)** is the estimated period over which existing improvements are expected to continue to contribute economically to the property value. This factor is applied to the true RCN to arrive at a full market value, which then reflects the adjustment made for depreciation.

The **replacement cost new (RCN)** is the current cost of constructing improvements having equal utility to the utility of the subject improvements before adjusting for depreciation.

The various factors can be multiplied together (chain multiplied) to calculate a single, overall **adjustment factor**.

Unit 3- Review questions

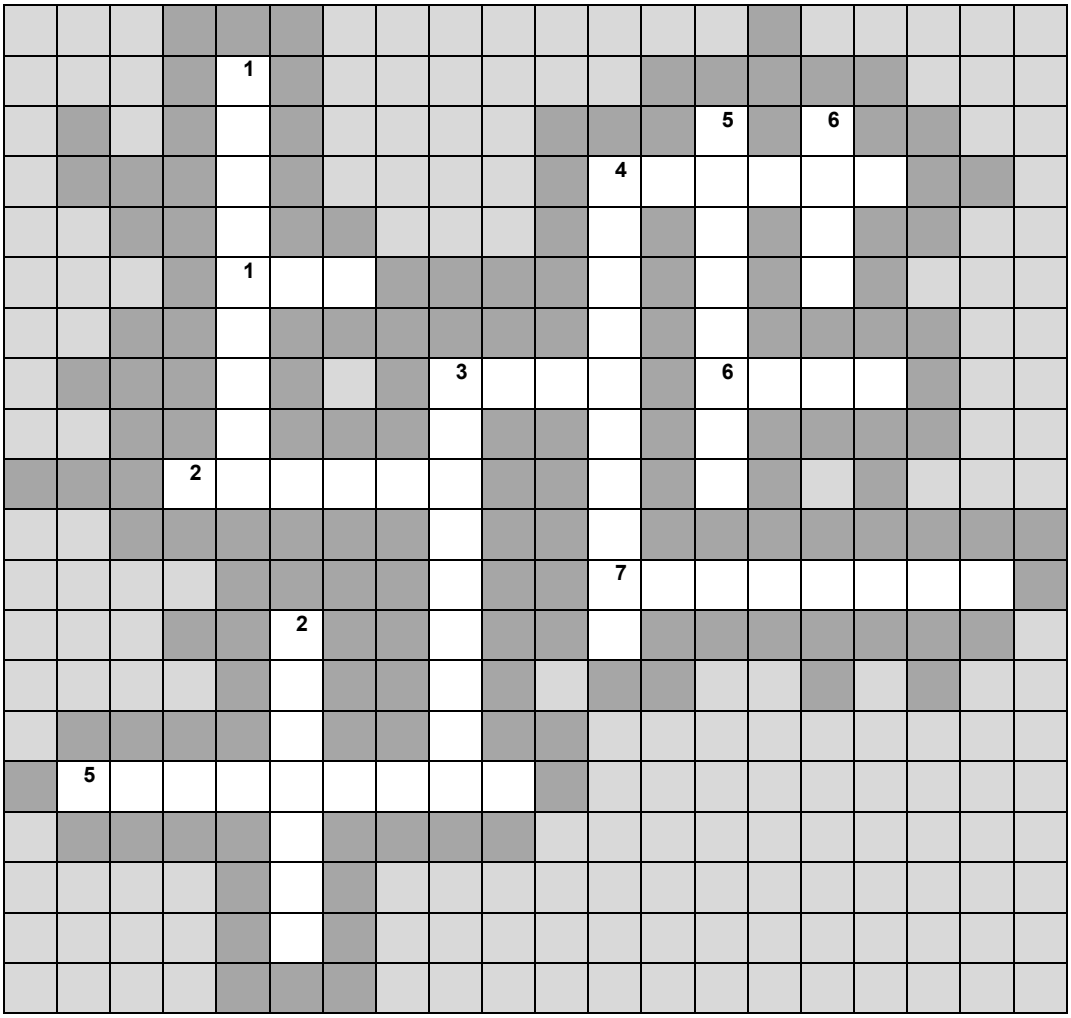
Complete the following crossword puzzle.

Across

1 _____ratings are assigned in relation to other structures within the neighborhood.
2 _____ factors adjust the appraisal publication values to account for unusual architectural designs.
3 _____factors adjust manual to current local labor and material rates.
4 A _____adjusts values by applying an increase or decrease.
5 A quality grade of “A” is considered _____.
6 An assessor is a _____ appraiser.
7 To place a value upon.

Down

1 This age helps determine REL.
2 Factor that may remain the same for the life of the improvement.
3 Physical depreciation refers to the_____ of the structure.
4 Type of depreciation that occurs when a structure has features like low ceilings, lack of air conditioning, etc.
5 type of depreciation that is outside the property boundaries.
6 A not-so-great category under Schedule A



Unit 4- Completing the Data Bank on Property Record Card 4

This unit explains the computations and use of the data bank, located on the commercial property record card (PRC-4).

The purpose of this unit is to provide a basic understanding of how the values in the data bank are used to determine RCN values.

Learning objectives

After completing the assigned readings, you should be able to:

- identify data bank components on the PRC-4.
- calculate values for each data bank component.
- understand the relationship between data bank values and various cost values and adjustment factors.

Terms and concepts

Data bank
Square feet of ground area (SFGA)
Effective perimeter (EP)
Party wall
Cubic feet (CF)
Height (H)
Square feet of wall area (SFWA)
Wall ratio (WR)
Elevation
Wall height adjustment factor
Shape adjustment factor
Square feet of floor area (SFFA)
PRC-3
PRC-4

PRC- 4

Property Record — Commercial — Industrial

Construction Specifications						
Foundation						
Sprd. Ftg.		Pile				
Caisson		Other				
Wall Framing	B	1	2	3	A	
Wood						
Steel O/FP						
Reinf. Concrete						
Load Bearing						
Frame Bay - Bay Area						SF
Floors						
Wood						
Steel O/FP						
Reinf. Concrete						
Frame	Wood		Steel		Conc.	
Exterior Walls						
Siding						
Masonry Blk./Brk.						
Steel						
Glass						
Finish						
Unfinished						
Finished Open						
Finished Divd.						
Heat						
Cent. Wm. Air						
Ht. Wt/Steam						
Unit Heaters						
None						
Air Conditioning						
Central						
Unit						
None						
Roofing						
Composition		Shingle				
Slate		Metal				
Frame	Wood		Steel		Conc.	
Plumbing Type						
1		2				
3		4				
	Sprinkler					

Use					
Store		Office		Vacant	
Apt.		WH		Abandoned	
Factory					
No. of Units					
Avg. Unit Size					
No. Rooms Per Unit					
Prorated @ _____% with:					

Data Bank	
SF Ground Area	
Eff. Perim LF	
CF of Bldg.	
SF Wall Area	
Wall Ratio	
Sty. Sched.	

Description	Computation
Flr. Price x Ht. Adj.	WH
	Bsmt.
	1st Floor
	2nd Floor
	3rd Floor
Size _____ x Shape _____ x Weight _____	Base Price
	BPA
	Adj. Base Price
	Heat
	A/C
	Electrical Light
	Sprinkler
	SF Price
	SF
	Subtotal
	Plumbing
	Partitions
	Front
	Canopy
	Dock
S C M I Grade	Total
C&D G NH	A = FAC
Eff. Age / Eff. Age / CDU / Age	Replacement Cost New
Depreciation =	REL
	Full Value

Summary of Other Buildings

Type	No.	Construction	Size	Rate	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value

Listed by:	Total full value other buildings
Date:	Total full value all buildings

PRC-4 (R-6/99) (opposite PRC-3)

PRC-3 Property Record — Commercial — Industrial

Ownership and Mailing Address

Property Address

Township	Volume	Tax Code	Area	Sect.	Block	Parcel	Unit

Property Class	Land Use	Zoning	NH Code	Card No. ____of ____	Condo. Comm.

Record of Ownership	Date	Deed Stamps	Sale Price

Street		Neighborhood		Utilities		Topo.		Division
Private Rd.		Improved		Water		Level		
Cul-de-sac		Static		Sewer		High		
Alley		Decline		Gas		Low		
Traffic Lt.		Blighted		Electric		Rolling		
Traffic Heavy						View		

Memo

Building Permit Record

Date	Number	Amount	Year Assessed	N/C	P/U Year	Purpose

Summary of Assessed Values

	Orig. Assessment.: Year ____			Rev. by: Year ____		
	Full Value	Assess. Level	Assessed Value	Full Value	Assess. Level	Assessed Value
Land						
Bldgs.						
Total						

	Rev. by: Year ____			Rev. by: Year ____		
	Full Value	Assess. Level	Assessed Value	Full Value	Assess. Level	Assessed Value
Land						
Bldgs.						
Total						

	Rev. by: Year ____			Rev. by: Year ____		
	Full Value	Assess. Level	Assessed Value	Full Value	Assessment Level	Assessed Value
Land						
Bldgs.						
Total						

Land Computations

Unit Type	No. Units	Depth	Unit Value	D. Fac.	I. Fac.	Full Value

Commercial Property Record Card (PRC-4)

Each commercial property record card (PRC-4) must be completed in detail before the assessor can accurately compute the improvement's upper limit of value, or it's RCN.

The assessor first lists the data regarding the physical construction of the building on PRC-4. Working with PRC-4 and appropriate Appraisal Publications, including the subsidiary schedules and/or the component-in-place (CIP) schedules, the assessor should cost out each floor of the improvement. Then, adjustments can be made to the cost values when applicable, as well as adding various components found in the building. This allows the assessor to arrive at a full value of the improvement.

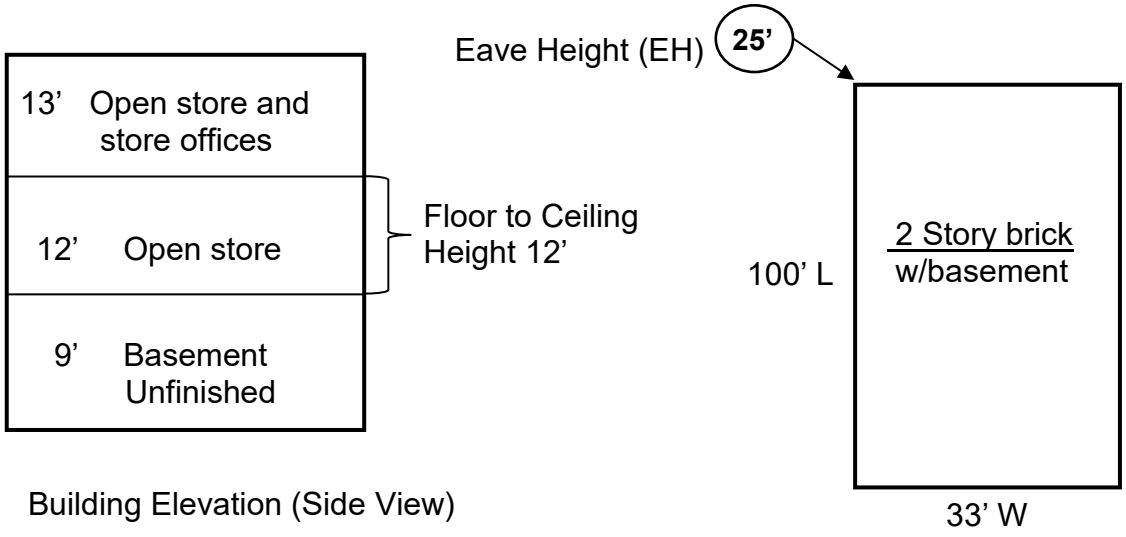
A thorough understanding of the relationship between the PRC-4 and the cost schedules is necessary for the assessor to calculate a valid RCN value.

Data Bank

Data bank values impact the final value of the improvement. Consequently, it is very important that these values are accurately computed.

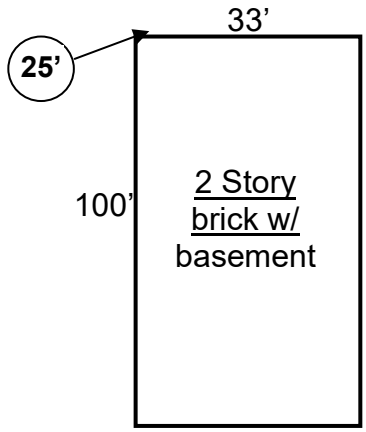
DATA BANK	
SF Ground Area	
Eff. Perim LF	
CF of Bldg.	
SF Wall Area	
Wall Ratio	

Building dimensions are found on the building and floor diagrams



Building Elevation (Side View)

SFGA- Square Feet of Ground Area **SFGA = L X W**



The square feet of ground area (SFGA) is the first component of the data bank. This value is obtained by multiplying the length of the building by the width of the building.

Length x Width = Square Feet of Ground Area

33' x 100' = 3,300 SFGA

Much of the cost is directly related to the SFGA.

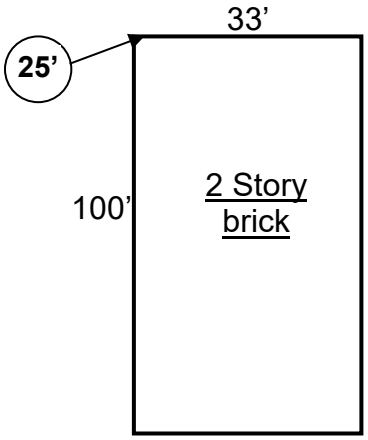
EP- Effective Perimeter

The second component of the data bank is the effective perimeter (EP). This is the linear measurement around the outside boundaries of the ground floor.

EP = L + W + L +W

In the example, the structure is 33' x 100'.

(33' + 100' + 33'+ 100' = 266’) 266’ is the Effective Perimeter



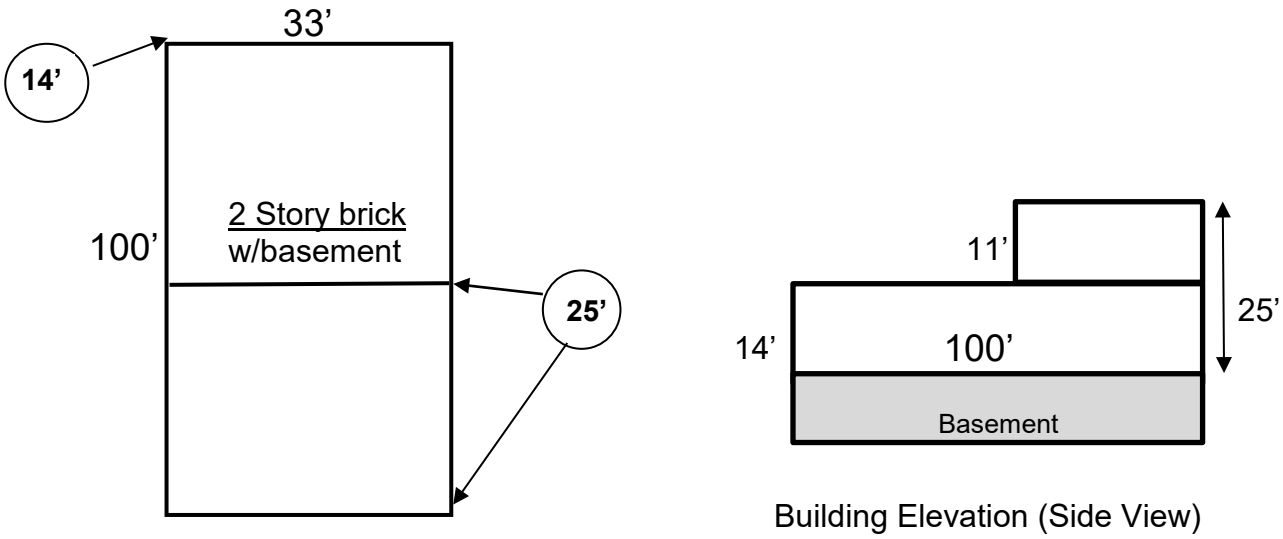
L + W + L + W = EP

EH, H or OH- Eave Height, Height, or Overall Height

Although not an official component of the Data Bank, the eave height, height, or overall height is the height of all the above ground stories. It is indicated by a circle and an arrow pointing to the corner of each change in height. If eave height is not given, add the floor-to-ceiling heights of all above-ground floors. This measurement is used in calculating cubic feet and square foot wall area components of the data bank.

Structures with stories of unequal square footage

Some structures have ground floors with larger square footage than upper stories. A diagram of a building of this type may look something like this:



Building Elevation (Side View)

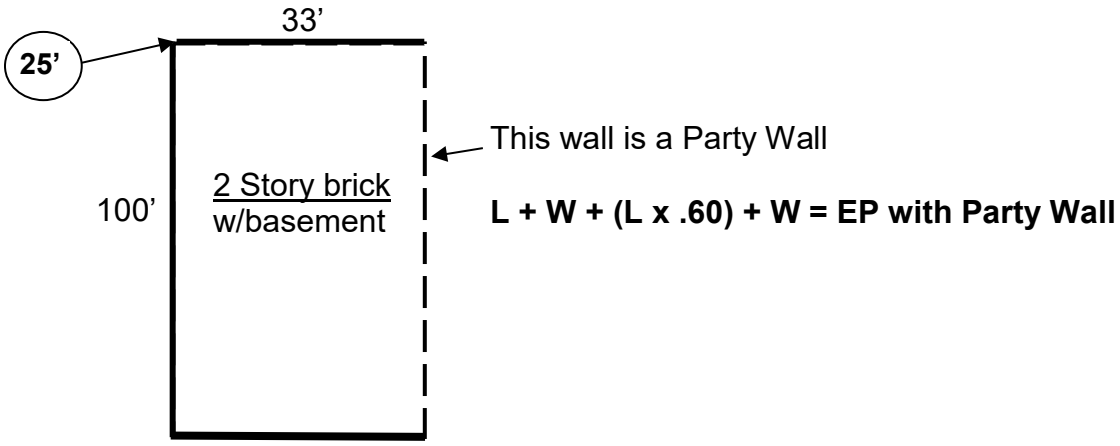
The illustration indicates an eave height on part of the building is higher than the eave height indicated on another part of the structure. This configuration would not change the SFGA or the ground floor effective perimeter. It would, however, change other components in the data bank, like the SFWA, CF and WR.

Where's the Party? Party Walls

There may be instances when the subject building shares a common wall or walls with another building. This type of wall is referred to as a **Party Wall**. Party walls are often found in older downtown commercial structures. Years ago, the first commercial structure was built with four walls. When the adjoining structure was constructed, rather than building four exterior walls for the structure, only three walls were constructed and the builder tied in to the existing wall of the previously constructed building for the fourth wall. Due to building standard restrictions, this practice is no longer as widespread as it once was.

If a structure contains a party wall**, the length of the shared wall is reduced by 60 percent (.60)** when calculating an EP. For example, if one of the 100' walls of the subject building were a shared or party wall, that wall would be factored at 60 percent of the 100’ or 60' instead of 100'.

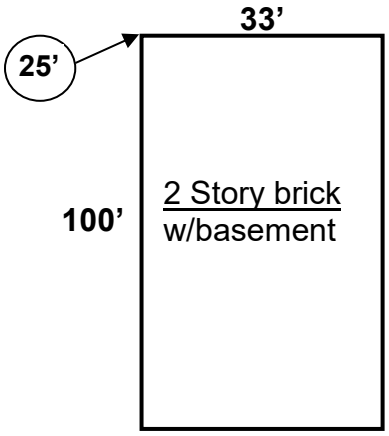
To calculate the EP, add 100'+ 33' + 60' + 33’. This structure, if it had a party wall, would have an EP of 226' instead of 266'. On drawings, a party wall is indicated by a broken line.



Cubic Feet

The third component of the data bank is the **Cubic Feet** of the building **(CF)**. This is computed by multiplying the square feet of the ground area **(SFGA)** by the **Eave Height (H)**, which is the height from the ground level to the eaves.

CF = SFGA x H



In this example, the square feet ground area is 3,300 square feet. The height of the structure is 25' (12' first floor + 13' second floor).

CF = SFGA x H **3,300 x 25 = 82,500**

Square Feet Wall Area (SFWA)

The **Square Feet of Wall Area (SFWA)** is the fourth component of the data bank. This value is found by multiplying the EP by the eave height (H). An easy way to remember this definition is to envision a person hanging wallpaper in a room. The wallpaper covers the square feet wall area.

SFWA = EP x H **266' x 25' = 6650**

The final component of the data bank is the **Wall Ratio (WR**) found by dividing the SFGA of the structure by the EP.

WR = SFGA ÷ EP Carry this figure 2 decimal places.

In this example, the SFGA is 3,300 and the EP is 266'.
The WR for the structure is **12.41 (3,300 ÷ 266).**

The WR value is used in conjunction with the commercial cost schedule to determine the **Shape Adjustment Factor** for the subject building.

Retail building shape adjustment table
Wall ratio = avg. SFA ÷ avg. effective perimeter

Wall ratio	7	7.5	8	8.5	9	9.5	10	10.5	11	12
Adjustment factor	1.350	1.322	1.283	1.256	1.239	1.211	1.183	1.166	1.148	1.115
Wall ratio	13	14	15	16	17	18	19	20	22	24
Adjustment factor	1.083	1.060	1.042	1.025	1.000	0.992	0.981	0.969	0.950	0.931
Wall ratio	26	28	30	32	34	36	38	40		
Adjustment factor	0.917	0.901	0.892	0.883	0.874	0.866	0.860	0.854		

The Wall Ratio is correlated to a **Factor** (like Cost or Quality Grade Factors) that can be used to adjust base cost values. Find the ratio on the appropriate shape adjustment table and **use the ratio closest to your wall ratio**. For instance, in this exercise, the WR is 12.41, and if the building is a retail building, 12.41 is closest to 12, corresponding to a shape adjustment factor of 1.115. A shape adjustment factor is not applied to every style of commercial building-refer to Publication126.

Exercise 4-1 Completing the Data Bank

This exercise walks us through completing the data on the following page. Read through the first example for structure **"A"** and then complete the three remaining columns of the data bank for structures **"B-D"** listed at the top of each column.

Structure A has a length of 36', a width of 40', and a height of 28'. Since no other information is given regarding height, assume that the height given is the eave height for the purposes of these calculations.

1. To compute the **SFGA**, multiply the length of 36', by the width of 40', for a total of 1,440 square feet for the structure.

2. To compute the **EP**, add the length of 36', the width of 40', the length of 36', and the width of 40', for a total of 152' EP for the structure.

3. To compute the **CF**, chain multiply the length of 36', by the width of 40', by the eave H of 28', for a total of 40,320 CF for the structure.

4. To compute the **SFWA**, multiple the EP of 152', by the eave H of 28', for a total of 4,256 SFWA for the structure.

5. To compute the **WR**, divide the SFGA of 1,440 by the EP of 152 feet, for a WR of 9.47.

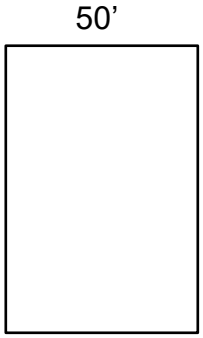
Exercise 4-1

1. Complete the remaining three columns. L is length, W is width and H is overall height of all above-ground floors.

Structure	**A**	**B**	**C**	**D**
Description	**2-Story L36 W40 H28**	**2-Story L48 W50 H28**	**2-Story L44 W50 H28**	**3-Story L72 W48 H42**
S/F ground area **(SFGA)**	**1,440**			
Effective Perim. L/F **(EP)**	**152**			
C/F of bldg. **(CF)**	**40,320**			
S/F wall area **(SFWA)**	**4,256**			
Wall Ratio **(WR)**	**9.47**			
Shape Adjustment Factor	**1.211**			

2. Complete the Data Bank

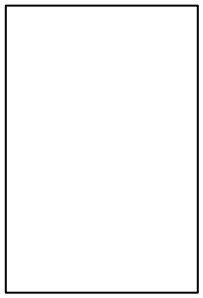
13’	Open store
14’	Open store
9’	Basement Unfinished



DATA BANK	
SF Ground Area	
Eff. Perim LF	
CF of Bldg.	
SF Wall Area	
Wall Ratio	

3. Complete the Data Bank

13’	Open store
13’	Open store
14’	Open store
9’	Basement Unfinished



DATA BANK	
SF Ground Area	
Eff. Perim LF	
CF of Bldg.	
SF Wall Area	
Wall Ratio	

Unit 4- Summary

The collection of data is one of the most important steps in determining value. This information is used to calculate the replacement cost of a structure and can be used in the market approach for comparative sales data development. You should be familiar with the data bank, along with the formulas associated with the data bank below.

1. Square feet of ground area **SFGA = L x W**
2. Effective perimeter **EP = L + W + L + W**
   (party walls are factored at 60 percent)
3. Cubic feet **CF = SFGA x H**
4. Square feet of wall area **SFWA = EP x H**
5. Wall ratio **WR = SFGA ÷ EP**

A party wall is calculated at 60% of the length of the attached wall. This accounts for the reduction in building and material costs for a 3-sided box (structure) as compares to a 4-sided box (structure).

The Property Record Card 4 (PRC-4) is used to value commercial and industrial property.

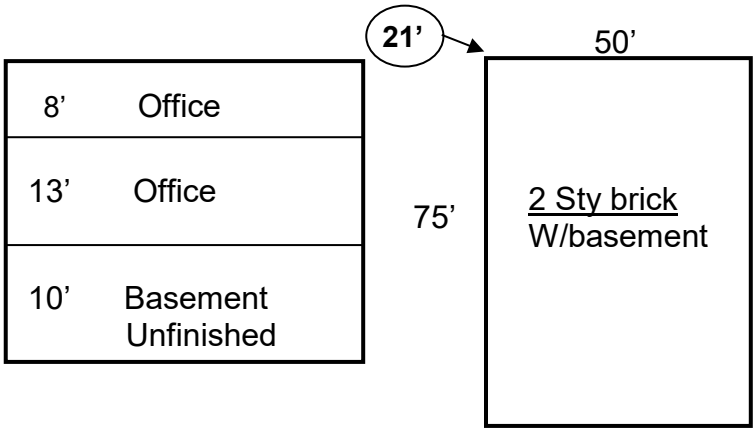
The Property Record Card 3 (PRC-3) is the front page of the PRC-4 and contains owner names and mailing address, sales dates, PIN, land valuation, etc.

The Square foot of floor area (SFFA) is the measurement of the **total floor area** (measured in **square feet**) of all **floors** in the **building** that you would like considered in your valuation.

Unit 4- Review questions

Compute the following items in the data bank for this 2-story commercial building with a full basement.

DATA BANK	
SF Ground Area	
Eff. Perim LF	
CF of Bldg.	
SF Wall Area	
Wall Ratio	



1. Compute the EP if one of the 75' walls is a party wall. _____

2. Compute the EP if both of the 75' walls are party walls. _____

3. Calculate the data bank for the following structures.

	2-Story L52 W36 H26	3-Story L40 W50 H42	2-Story L150 W75 H28
S/F ground area			
Eff. Perimeter			
C/F of building			
S/F wall area			
Wall ratio			

4. Calculate the data bank for the following structures, if 1 wall of the length is a party wall.

	2-Story L40 W40 H26	3-Story L40 W40 H42	2-Story L50 W40 H28
S/F ground area			
Eff. perimeter			
C/F of building			
S/F wall area			
Wall ratio			

Unit 5- IDOR Publication 126
Commercial Square Foot Schedules

This unit explains the use of the commercial square foot and subsidiary cost schedules found in the IDOR Publication 126, “Instructions for Commercial Schedules.”

The purpose of this unit is to provide a basic understanding of the format, values, and various adjustment factors found in Publication 126.

Learning Objectives

After completing the assigned readings, you should be able to

- locate base costs for the basement, first floor, and upper floors in the commercial schedules.
- locate and apply the wall height and shape adjustment factors.
- locate costs for plumbing, air conditioning, and sprinklers in the commercial supplemental cost schedules.
- identify pertinent construction specifications found on the PRC-4.
- determine the REL of a commercial improvement.
- arrive at a correct estimate of market value using the commercial square foot schedules.

Terms and Concepts

Base cost
Base price adjustment (BPA) factor
Construction specifications
Effective Age
Wall height adjustment factor
Shape factor
Remaining economic life (REL)
Computation ladder
Actual, or Chronological age

Overview to Using the Commercial Cost Schedules (also called Cost Schedules, Appraisal schedules, and Publication 126).

The Commercial Cost Schedules are a collection of data based on construction costs in Central Illinois. They are used to help assessors value certain types of commercial properties using a step-by step process to complete a commercial property record card (PRC-4).

The basic process is as follows:

1. determine the size, type, age and use of the building.
2. find the base cost based on the construction type.
3. add and subtract values for features not included in the base cost.
4. apply various applicable factors to adjust the value.
5. determine the Replacement Cost New of the structure.
6. apply a factor representing depreciation (REL), and
7. determine the Full Value of the building today.

The commercial schedules in IDOR Publication 126 are based on construction costs in Central Illinois. The values given are also based on construction using average or typical quality for that occupancy, materials and workmanship. As discussed earlier, there are various factors that can be applied to adjust Publication 126 costs to reflect the values in various jurisdictions.

The Commercial Square Foot Schedules were developed for pricing typical retail buildings (1-5 stories), office buildings (1-10 stories), and various other building types.

For larger commercial buildings (above the sizes found in the cost schedules) and high-rise office complexes, the Component-in-Place (CIP) method from Publication 127 should be used.

It is important to use the appropriate schedule. As with any cost schedule, the assessor must be aware of the items that are included in the base cost, so as not to include them twice in the calculations. Before using a schedule, read all the information on the schedules.

How to complete a Commercial Property Record Card

1. The IDOR Publication 126 buildings are classified by occupancy or use (Office, Retail, etc.) The first step is identifying the structure's correct occupancy or use **per floor level** of the structure. Record this in the **Use** Section on the top left of the PRC.

2. If the **Construction Specifications** are not indicated, those attributes are indicated on a per floor basis by placing an "X" in the appropriate box. This area is located on the left side of the PRC.

3. Next fill out the data bank on the property record card. It is located at the top center of the PRC. You will be able to determine the measurements based on the narrative or the drawing and elevation located on the PRC. A description of the measurements and abbreviations was given in the previous unit

4. Refer to the building construction based upon framing and exterior wall cover. Using the correct schedule in Pub 126 based on occupancy or use, record the price per SF in the **Description** area on the upper right of the PRC. SF prices will differ **per floor level** of the building. Find and record the corresponding value for each floor based on its square footage and exterior construction features. If the square footage falls between the listed floor area sizes, (3,000, 4,000, 5,000 and so on) use the nearest value. For instance, if your actual square footage is 3,300, use the corresponding SF value for 3,000 SF.

5. If the floor-to-floor height differs from the typical height indicated on the base cost schedule, an adjustment will need to be made. This adjustment is called a **Wall Height Adjustment.** This factor is a percent increase or decrease in height per floor as indicated on the bottom of the base cost schedule. Multiply this factor by each of the individual floor prices you recorded in the **Description** Section.

6. Add the adjusted floor prices together and record the total on the **Base Price** line on the upper right section of the PRC.

7. Next, an adjustment for shape may be needed to account for area/perimeter ratio variations. The **Wall Ratio and Shape Adjustment Factor** account for the amount of wall area to floor area in a building. Generally, the more exterior wall to floor area in a building, the more the building costs. This shape adjustment is necessary for offices, retail stores, supermarkets, discount stores and senior housing. It is not needed for other building occupancies. Multiply the shape adjustment factor by the Base Price to derive the Adjusted Base Price.

8. Next, begin to work the Computation Ladder.

9. Heat, a/c, electrical lights, and sprinklers may need to be adjusted in this section of the ladder. Add or subtract those square foot costs. If any of those square foot costs are a deduction, the SF cost must be adjusted by both the Wall Height Adjustment Factor and Base Price Adjustment (Shape Adjustment) Factor as well.

10. Total all the above to get a new Square Foot Price. Multiply this value by the actual number of SF Ground Area (because you have already accounted for each floor separately and calculated a new Base Price) to arrive at a **Subtotal.**

11. Now you are on the lower section of the ladder, which is where you enter additions or deductions for plumbing fixtures, store fronts, walk-in coolers, signs, etc. as needed. Add or subtract any items to calculate a **Tota**l.

12. Add the items and calculate a **Total**. Account for any cost, neighborhood, design, appraiser or quality grade factors by multiplying any factors together to get one factor. Multiply that factor by the **Total.** You have now determined the **Replacement Cost New (RCN).**

13. Next you will account for depreciation by calculating the **Remaining Economic Life (REL)** of the structure. Using the Commercial REL Table, Schedule A, determine the effective age of the structure. The effective age is the actual age of the improvement, adjusted to reflect condition, desirability and utility as compared to other similar properties. Use Schedule B to determine the **REL factor**.

14. Multiply the REL factor by the new total (RCN), and this will give you a **Full Value** for the improvement.

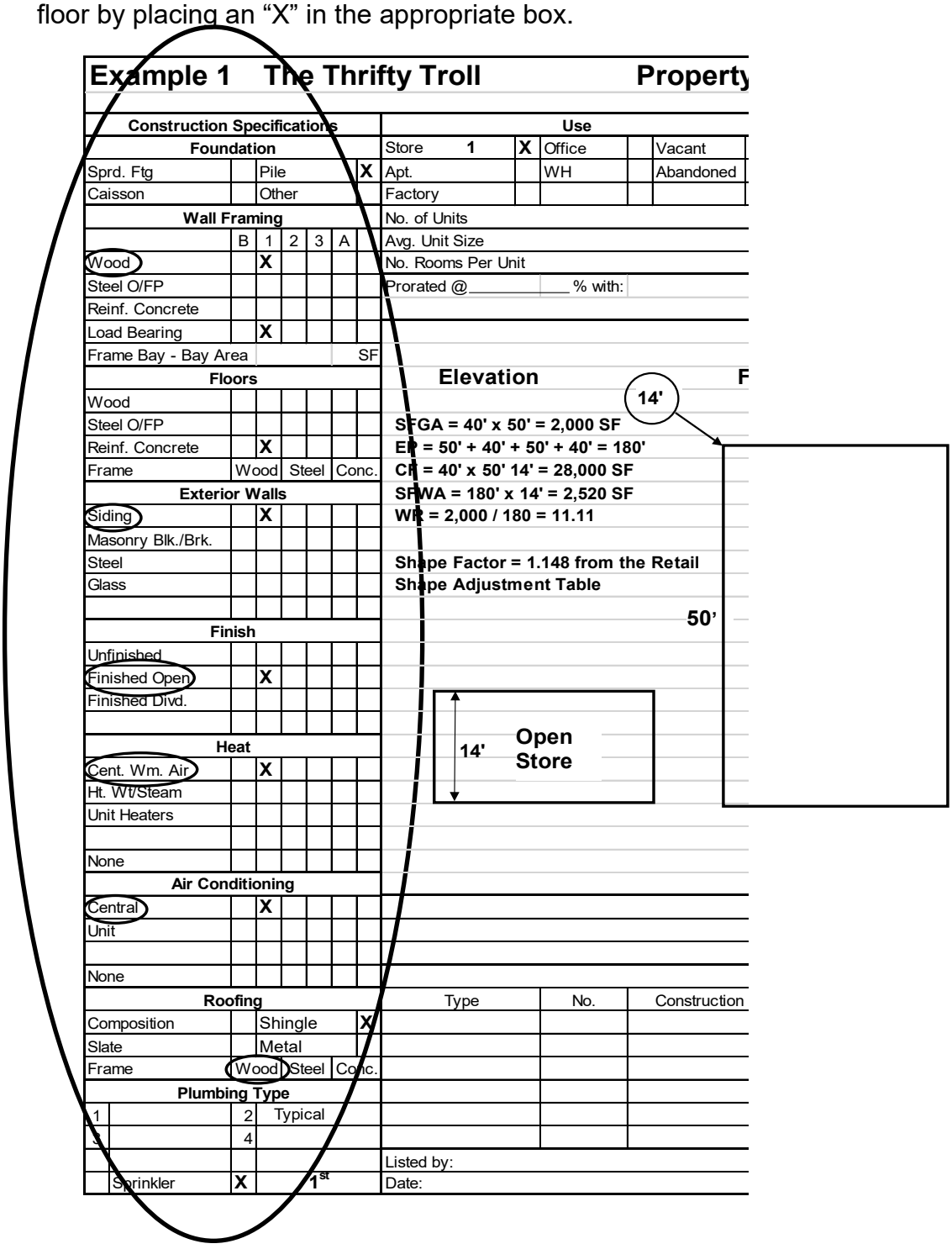
15. You will now add other buildings, parking lots, and other detached structures etc. to the lowest portion of the PRC entitled “Summary of Other Buildings”. Be sure to apply the correct CDU, quality grade, and other factors that you applied to the main structure. Determine a RCN for each and don’t forget to multiply each by the applicable REL factor (because those items have depreciated as well). This number will be the **Total Full Value of Other Buildings** on the PRC.

16. Finally, add the “Summary of Other Buildings’ total full value other buildings to the full value total of the subject improvement to determine the **Total Full Value All Buildings.**

Map of the Property Record Card 4 (PRC-4)

On the PRC-4, the left portion of the card is used for listing construction specifications and use of the building.

Construction specifications include foundation, framing, floors, exterior wall construction, interior finish, heat, air conditioning, roofing, and plumbing. The attributes are indicated per floor by placing an “X” in the appropriate box.



Example 1 The Thrifty Troll Property

Construction Specifications								
Foundation								
Sprd. Ftg		Pile				X		
Caisson		Other						
Wall Framing								
	B	1	2	3	A			
Wood		X						
Steel O/FP								
Reinf. Concrete								
Load Bearing		X						
Frame Bay - Bay Area					SF			
Floors								
Wood								
Steel O/FP								
Reinf. Concrete		X						
Frame	Wood	Steel	Conc.					
Exterior Walls								
Siding		X						
Masonry Blk./Brk.								
Steel								
Glass								
Finish								
Unfinished								
Finished Open		X						
Finished Divd.								
Heat								
Cent. Wm. Air		X						
Ht. Wt/Steam								
Unit Heaters								
None								
Air Conditioning								
Central		X						
Unit								
None								
Roofing								
Composition		Shingle				X		
Slate		Metal						
Frame	Wood	Steel	Conc.					
Plumbing Type								
1		2	Typical					
3		4						
	Sprinkler	X		1st				

Use						
Store 1	X	Office		Vacant		
Apt.		WH		Abandoned		
Factory						

No. of Units

Avg. Unit Size

No. Rooms Per Unit

Prorated @ _____ % with:

Elevation **F**

14'

SFGA = 40' x 50' = 2,000 SF

EP = 50' + 40' + 50' + 40' = 180'

CP = 40' x 50' 14' = 28,000 SF

SFWA = 180' x 14' = 2,520 SF

WR = 2,000 / 180 = 11.11

Shape Factor = 1.148 from the Retail Shape Adjustment Table

50’

14'

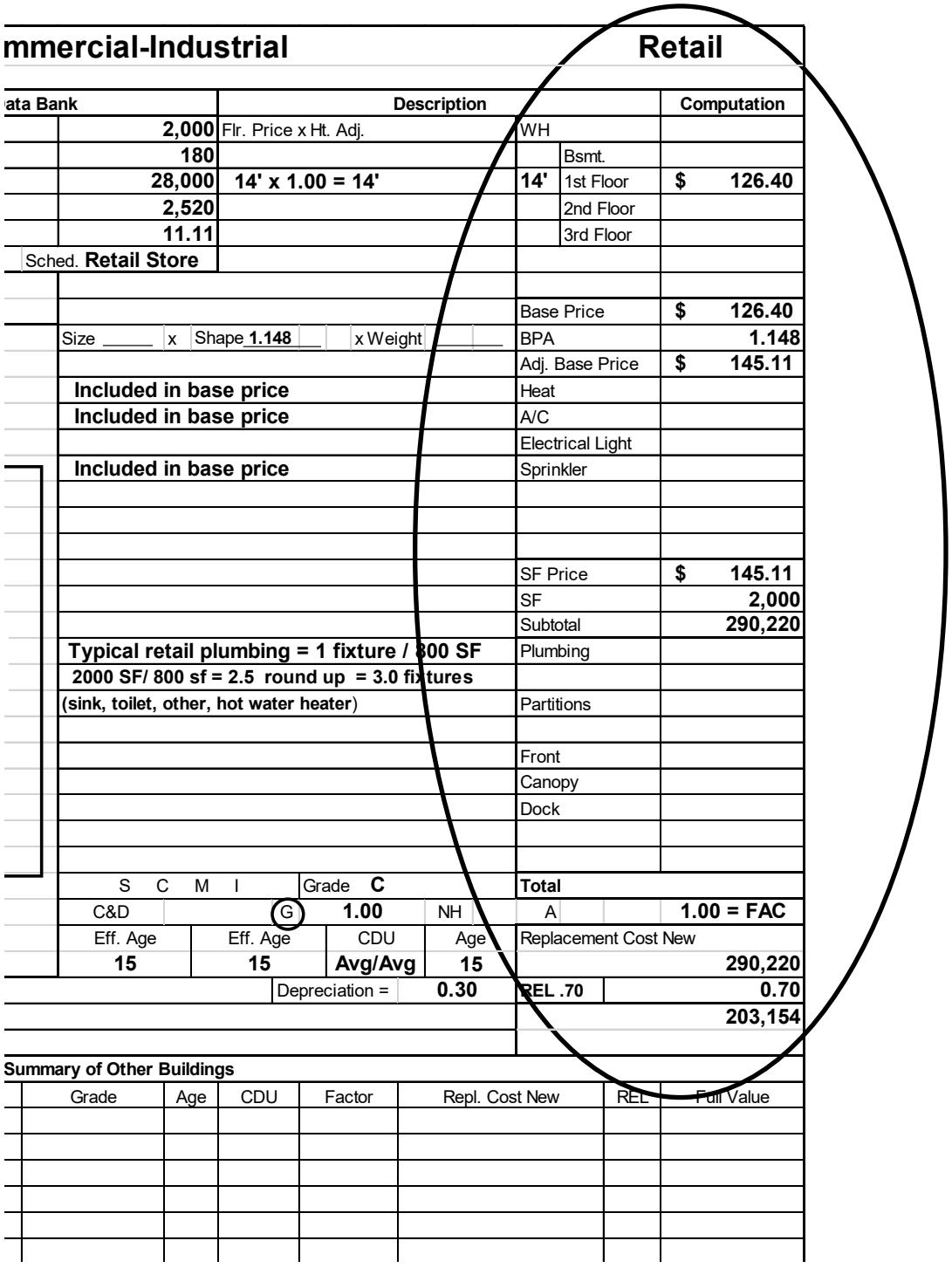
Open Store

Type	No.	Construction

Listed by:

Date:

Next, the right column on the PRC-4 is used for computing the full value of the structure. This column is called **the computation ladder**.



mmercial-Industrial — Retail

ata Bank		Description			Computation
2,000	Flr. Price x Ht. Adj.		WH		
180			Bsmt.		
28,000	14' x 1.00 = 14'	14'	1st Floor	$	126.40
2,520			2nd Floor		
11.11			3rd Floor		
Sched. Retail Store					
			Base Price	$	126.40
Size _____ x	Shape 1.148 x Weight		BPA		1.148
			Adj. Base Price	$	145.11
Included in base price			Heat		
Included in base price			A/C		
			Electrical Light		
Included in base price			Sprinkler		
			SF Price	$	145.11
			SF		2,000
			Subtotal		290,220
Typical retail plumbing = 1 fixture / 800 SF			Plumbing		
2000 SF/ 800 sf = 2.5 round up = 3.0 fixtures					
(sink, toilet, other, hot water heater)			Partitions		
			Front		
			Canopy		
			Dock		
S C M I	Grade C		Total		
C&D	(G) 1.00	NH	A		1.00 = FAC
Eff. Age	Eff. Age	CDU	Age	Replacement Cost New	
15	15	Avg/Avg	15		290,220
	Depreciation =	0.30	REL .70		0.70
					203,154

Summary of Other Buildings

	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value

Commercial REL Table

Schedule A						Schedule B	
Age* considering physical condition	Effective age considering desirability and utility					REL	
	E	G	A	P	U	Eff. age	REL
1	1	1	1	6	11	1	98
2	1	1	2	7	12	2	96
3	1	1	3	8	13	3	94
4	1	1	4	9	14	4	92
5	1	1	5	10	15	5	90
6	1	1	6	11	16	6	88
7	1	2	7	12	17	7	86
8	1	3	8	13	18	8	84
9	1	4	9	14	19	9	82
10	1	5	10	15	20	10	80
11	1	6	11	16	21	11	78
12	2	7	12	17	22	12	76
13	3	8	13	18	23	13	74
14	4	9	14	19	24	14	72
15	5	10	15	20	25	15	70
16	6	11	16	21	26	16	68
17	7	12	17	22	27	17	66
18	8	13	18	23	28	18	64
19	9	14	19	24	29	19	62
20	10	15	20	25	30	20	60
21	11	16	21	26	31	21	58
22	12	17	22	27	32	22	56
23	13	18	23	28	33	23	54
24	14	19	24	29	34	24	52
25	15	20	25	30	35	25	50
26	16	21	26	31	36	26	48
27	17	22	27	32	37	27	46
28	18	23	28	33	38	28	44
29	19	24	29	34	39	29	42
30	20	25	30	35	40	30	40
31	21	26	31	36	41	31	38
32	22	27	32	37	42	32	36
33	23	28	33	38	43	33	34
34	24	29	34	39	44	34	32
35	25	30	35	40	45	35	30
36	26	31	36	41	—	36	28
37	27	32	37	42	—	37	26
38	28	33	38	43	—	38	24
39	29	34	39	44	—	39	22
40	30	35	40	45	—	40	20
41	31	36	41	—	—	41	18
42	32	37	42	—	—	42	16
43	33	38	43	—	—	43	14
44	34	39	44	—	—	44	12
45	35	40	45	—	—	45	10
46	36	41	—	—	—	over 45	10
47	37	42	—	—	—		
48	38	43	—	—	—		
49	39	44	—	—	—		
50	40	45	—	—	—		

*Actual age and effective age are the same when physical condition of improvement is average.

IDOR Costing Methods

The Square Foot (SF) method presented is the primary method for valuing common commercial and industrial properties. **The square foot method is used when size is the most important factor in determining value**. The component-in-place method in Publication 127 is the best application for larger structures, more complex structures, or when more detail is required in the pricing. The Commercial Square Foot Schedule values provide SF costs for various typical buildings, together with modifiers for common deviations from the typical buildings. Component-in-Place **(CIP)** costs provide costs for each of the building components within the property. The schedules can also be used to adjust the SF costs and to price miscellaneous items.

Getting Started

In IDOR Publications 126 and 127 buildings are classified by occupancy or use. The initial step in SF estimation is determination of correct occupancy or use.

The following is a list of commercial property uses valued in the SF method in Publication 126:

Offices	Apartments	Retail store
Motel/Hotel	Discount store	Supermarket
Branch bank	Convenience store	Fast food restaurant
Senior housing	Assisted living	

In the first example, The Thrifty Troll property, we will be using the schedules in Publication 126 in order to complete our first property record card. The card indicates that The Thrifty Troll is a retail store, so we must use the Retail Base Cost Schedule on page 6 of Publication 126.

Please remove the following pages for the property record card as we go through the steps for valuing The Thrifty Troll.

Example 1 The Thrifty Troll 1-Story Retail

The subject property is a 1-story retail store known as The Thrifty Troll. It is 2,000 SF and built on a wood frame with vinyl siding on a reinforced concrete slab. The property operates as a “lightly used items for re-sale” store. It has one typical employee bathroom.

The structure is 15 years old with a quality grade of “C” and the physical condition is average. The desirability and utility are also average. It has central HVAC and a typical sprinkling system.

Foundation	Reinforced concrete
Wall Framing	Load-bearing wood with some interior supports
Floors	Reinforced concrete
Exterior Walls	Average grade commercial vinyl siding
Interior Finish	Typical with average grade finish
HVAC	Typical with both central heat and cooling
Roof	Roof structure is wood deck with shingles
Plumbing	Typical 3 plumbing fixtures, type 2 and a hot water heater.
Sprinklers	Yes, ordinary hazard wet pipe system

Example 1 The Thrifty Troll — Property Record-Commercial-Industrial — Retail

Construction Specifications							Use						Data Bank		Description			Computation
Foundation							Store 1	X	Office		Vacant		SF Ground Area	2,000	Flr. Price x Ht. Adj.	WH		
Sprd. Ftg		Pile		X			Apt.		WH		Abandoned		Eff. Perim LF	180			Bsmt.	
Caisson		Other					Factory						CF of Bldg.	28,000	14' x 1.00 = 14'	14'	1st Floor	$ 126.40
Wall Framing							No. of Units						SF Wall Area	2,520			2nd Floor	
	B	1	2	3	A		Avg. Unit Size						Wall Ratio	11.11			3rd Floor	
Wood		X					No. Rooms Per Unit						1-Story	Fr	Sched. Retail Store			
Steel O/FP							Prorated @_____ % with:											
Reinf. Concrete																	Base Price	$ 126.40
Load Bearing		X													Size _____ x Shape 1.148 x Weight _____		BPA	1.148
Frame Bay - Bay Area					SF												Adj. Base Price	$ 145.11
Floors							**Elevation**						**Floor Diagram**		**Included in base price (Heat)**		Heat	
Wood															**Included in base price (A/C)**		A/C	
Steel O/FP							**SFGA = 40' x 50' = 2,000 SF**										Electrical Light	
Reinf. Concrete		X					**EP = 50' + 40' + 50' + 40' = 180'**								**Included in base price (Sprinkler)**		Sprinkler	
Frame	Wood		Steel		Conc.		**CF = 40' x 50' 14' = 28,000 SF**											
Exterior Walls							**SFWA = 180' x 14' = 2,520 SF**											
Siding		X					**WR = 2,000 / 180 = 11.11**											
Masonry Blk./Brk.																	SF Price	$ 145.11
Steel							**Shape Factor = 1.148 from the Retail**										SF	2,000
Glass							**Shape Adjustment Table**										Subtotal	290,220
															Typical retail plumbing = 1 fixture / 800 SF		Plumbing	
Finish															**2000 SF/ 800 sf = 2.5 round up = 3.0 fixtures**			
Unfinished															**(sink, toilet, other, hot water heater)**		Partitions	
Finished Open		X																
Finished Divd.																	Front	
																	Canopy	
Heat																	Dock	
Cent. Wm. Air		X																
Ht. Wt/Steam																		
Unit Heaters															S C M I	Grade C	Total	290,220
															C&D	G 1.00 NH	A	1.00 = FAC
None															Eff. Age	Eff. Age / CDU / Age	Replacement Cost New	
Air Conditioning															15	15 Avg/Avg 15		290,220
Central		X														Depreciation = 0.30	REL .70	0.70
Unit																		203,154
None																		

Elevation

14'

Floor Diagram

40'

50'

1-story Vinyl on Slab

14' Open Store

Summary of Other Buildings

Type	No.	Construction	Size	Rate	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value

Roofing							Plumbing Type					
Composition		Shingle		X			1		2	Typical		
Slate		Metal					3		4			
Frame	Wood	Steel	Conc.									
	Sprinkler	X	1st									

Listed by:

Date:

Total full value other buildings

Total full value all buildings 203,154

Retail Store Schedules

The **Base Cost** listed in the schedules represents the cost of construction per square foot of the structure. The base cost schedules include:

- normal amounts for excavation, foundations, footings and framing.
- exterior wall construction.
- floor construction and roof construction.
- interior construction and finish including typical plumbing, insulation, heating and lighting.
- air conditioning and sprinklers for most types of buildings, but not all.

The information regarding what the base cost includes and excludes is printed at the top of the various occupancy schedules. If you are not sure which items are included in the base price, refer to the information on the schedule

Base Costs

The base price includes amounts for excavation, foundation, footings, framing, exterior wall construction, floor construction, roof construction, interior construction and finish, insulation, heating/air conditioning, sprinkler system, and lighting. Typical, standard plumbing exists of water heater and one fixture for every 800 square feet. Other features are to be priced from the subsidiary schedules or the CIP schedules. A shape or size adjustment is necessary for store use class. The given price is to be adjusted by a factor from the building shape adjustment table.

Story	Wall height	Construction type	Average per floor area					
			2,000	3,000	4,000	5,000	6,000	8,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70	36.25	35.40
		Finished store	73.20	72.10	71.70	71.25	70.85	70.55
First floor	14'	Brick veneer on wood studs	131.15	119.95	115.50	108.05	102.15	93.20
		Siding on wood frame	126.40	112.05	108.80	106.90	104.90	102.95
		Brick on conc. blk/ joists	161.10	148.45	143.35	138.25	133.15	127.50
		Stucco on concrete block	158.95	140.40	139.20	127.55	124.05	116.00
		Decorative or split face concrete block	179.45	155.75	143.30	137.60	131.90	115.10
		Precast or tilt-up conc.	147.05	140.30	134.15	128.35	122.55	110.95
		Painted reinforced concrete	142.25	135.60	129.65	124.00	118.35	107.05
		Common brick	160.00	146.35	140.90	131.80	124.60	113.70
Second floor	12'	Brick veneer on wood studs	103.25	94.45	90.95	85.10	80.43	73.40
		Siding on wood frame	99.55	88.25	85.65	84.15	82.60	81.05
		Brick on conc. blk /joists	126.85	116.90	112.85	108.85	104.85	100.40
		Stucco on concrete block	125.15	110.55	109.60	100.45	97.70	91.35
		Decorative or split face concrete block	141.30	122.65	112.85	108.35	103.85	90.65
		Precast or tilt-up concrete	115.80	110.45	105.65	101.05	96.50	87.35
		Painted reinforced concrete	112.00	106.75	102.10	97.65	93.20	84.30
		Common brick	125.00	114.25	110.95	103.80	98.10	89.55
Third floor	12'	Brick veneer on wood studs	97.05	88.75	85.45	79.95	75.60	68.95
		Brick on conc. blk/steel joists	119.20	109.85	106.10	102.30	98.55	94.35

If a building has construction features other than those included in the base cost schedules, adjustments to the base cost must be made. Other additions may include such items as additional plumbing fixtures, air conditioning, sprinkler systems, etc. These costs are found in the **Commercial Subsidiary Schedules** beginning on page 10 in Publication 126.

Commercial Subsidiary Schedules

Additions

Item	Cost
Plumbing (per each existing fixture)	
Residential (type 1)	$ 1,795
Commercial (type 2)	2,600
Special (refer to CIP Schedule Pub. 127)	
Air conditioning (per SF service area)	
Apartments*	$ 17.35
Retail store	7.80
Office	16.50
*For buildings and heating systems that do not require ducts, add 40%	
Sprinkler system (per SF service area)	
Apartments	$ 3.00
Office	3.90
Retail Store	3.85
Supermarket	3.40
Discount Store	2.70

Mezzanines (cost per SF floor area)

Mezzanine costs include the framing support, the floor system, stairways, and lighting. Where applicable, typical partitioning, floor, wall, and ceiling finishes are also included. A height adjustment is not applicable to the mezzanine cost.

Mezzanine finish	Construction	
	Steel framed	Wood framed
Unfinished/storage	$ 38.10	$ 24.75
Store display (finished open)	64.00	41.65
Office (finished divided)	85.85	55.80

Yard paving (per SFGA)	
Asphalt	$ 4.35
Concrete parking	5.50
Concrete truck drive	6.60
Crushed stone	3.60

Store Fronts

Type	Per SF Display Area
Wood framed glass & trim with:	
Wood siding	$ 32.65
Brick	41.25
Ceramic	43.60
Marble or granite	79.25
Steel framed glass & aluminum trim with:	
Brick	52.20
Ceramic	55.95
Marble or granite	91.60
Steel framed glass & stainless steel trim with:	
Brick	73.70
Ceramic	76.10
Marble or granite	111.70

The basic retail store square foot price includes a basic store front and entrance accounting for 10% of the entire store wall area. Use this table for any additional store front area over the 10%. In calculating the total display area include surface area of all glass, sign, and bulkhead areas, including entranceway, islands, etc.

Additions to store fronts

Display platforms (per SF)	$ 8.10
Display ceiling (per SF)	4.90
Display back (per SF)	8.50
Entrance doors	
Revolving door, each	$ 41,100
Hinged aluminum & glass, each	1,600
Hinged stainless steel or bronze, each	3,400
Add for automatic door opener (per door)	6,050
Sliding automatic glass & stainless steel	16,750
Security gates (per SF of gate area)	
Scissor type folding gate steel	$ 21.50
Roll-up grille, aluminum, manual	38.15
Add for motorized operation, each	1,525
Marquees (cost per SF)	
Metal, ornamental steel framed	$ 45.05
Metal, plain, steel framed	35.00
Metal, plain, wood framed	32.60
Wood or stucco, wood framed	28.35
Sign, illuminated plastic, single face	93.95

Step 2 Complete the Data Bank for The Thrifty Troll

After completing the construction specification and use portion of the PRC-4, the next step is determining a RCN for the structure is to complete the data bank. It is found at the top center of the PRC.

DATA BANK		
SF Ground Area	2,000	L x W
Eff. Perim LF	180	L + W + L + W
CF of Bldg.	28,000	L x W x H
SF Wall Area	2,520	EP x H
Wall Ratio	11.11	SFGA ÷ EP

Step 3 Identify the Construction

The next step in costing is to identify the building construction based upon framing and exterior wall cover. Below is a sample for the **Retail** cost schedule. Notice the various kinds of construction. The Thrifty Troll is constructed of vinyl siding on a wood frame.

Story	Wall height	Construction type	Average per floor are			
			2,000	3,000	4,000	5,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70
		Finished store	73.20	72.10	71.70	71.25
First floor	14'	Brick veneer on wood studs	131.15	119.95	115.50	108.05
		Siding on wood frame	126.40	112.05	108.80	106.90
		Brick on conc. blk/ joists	161.10	148.45	143.35	138.25
		Stucco on concrete block	158.95	140.40	139.20	127.55
		Decorative or split face concrete block	179.45	155.75	143.30	137.60
		Precast or tilt-up conc.	147.05	140.30	134.15	128.35
		Painted reinforced concrete	142.25	135.60	129.65	124.00
		Common brick	160.00	146.35	140.90	131.80
Second floor	12'	Brick veneer on wood studs	103.25	94.45	90.95	85.10
		Siding on wood frame	99.55	88.25	85.65	84.15
		Brick on conc. blk /joists	126.85	116.90	112.85	108.85

Step 4 Find the cost per Square Foot

Once you have determined the building's use and construction type, select the base square foot cost from the appropriate floor area column. You will use the SFGA number from your data bank. Find the corresponding dollar amount based on the construction type. **Each level of the structure will have its own SF Cost**.

The base cost for the First Floor would be $126.40 per square foot.

If a structure has a SF value other than those on the schedule, the square footage should be **rounded up or down to the closest SF value**. A 2,400 SF building would round down to 2,000 SF and a 2,700 SF building would be rounded to 3,000 SF

Step 5 Base Cost Adjustments

Wall Height Adjustment

Square foot costs for a building with a floor to floor height that is different from the model used to calculate the base cost should be adjusted to reflect the actual building or floor height. This is referred to as a **Wall Height Adjustment.**

A wall height adjustment may be needed when costing out an individual floor. The retail schedule includes a standard wall height of 14' for the 1st story, 12' for upper stories, and 9' for basements. If a subject building's wall height varies from these dimensions, an adjustment to the base cost is necessary.

Story	Wall height	Construction type	Average per floor area				
			2,000	3,000	4,000	5,000	6,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70	36.25
		Finished store	73.20	72.10	71.70	71.25	70.85
First floor	14'	Brick veneer on wood studs	131.15	119.95	115.50	108.05	102.15
		Siding on wood frame	126.40	112.05	108.80	106.90	104.90
		Brick on conc. blk/ joists	161.10	148.45	143.35	138.25	133.15
		Stucco on concrete block	158.95	140.40	139.20	127.55	124.05
		Decorative or split face concrete block	179.45	155.75	143.30	137.60	131.90
		Precast or tilt-up conc.	147.05	140.30	134.15	128.35	122.55
		Painted reinforced concrete	142.25	135.60	129.65	124.00	118.35
		Common brick	160.00	146.35	140.90	131.80	124.60
Second floor	12'	Brick veneer on wood studs	103.25	94.45	90.95	85.10	80.43
		Siding on wood frame	99.55	88.25	85.65	84.15	82.60
		Brick on conc. blk /joists	126.85	116.90	112.85	108.85	104.85
		Stucco on concrete block	125.15	110.55	109.60	100.45	97.70
		Decorative or split face concrete block	141.30	122.65	112.85	108.35	103.85
		Precast or tilt-up concrete	115.80	110.45	105.65	101.05	96.50
Story Ht. adj., add or deduct per 1 foot			2%	2%	2%	2%	2%

Look at the bottom of the base cost schedule page and you will find a "Story Height Adjustment" listed of 2%. That means a first floor with a height of 12', would need to

have its base cost reduced by 4%, since our cost schedules are based on a first-floor height of 14 feet. It would cost less to build a 12' high structure than it would to build a 14' high structure. **14 – 2 = 2 feet x .02 = .04 or 4 %**

If the wall height of the floor is less than the wall height indicated on the schedules, you must make a **minus adjustment** and lower the values to account for the decrease in price for materials not needed.

If the wall height of the floor is greater than the wall height indicated on the schedules, you must make a **plus adjustment** and raise the values because additional construction materials are used.

The Thrifty Troll has a 1st floor wall height of 14', so no adjustment is necessary.

Wall Ratio and Shape Adjustment Factor

An adjustment for shape is necessary to account for area/perimeter ratio variations. The **wall ratio factor** accounts for the amount of wall area to floor area in a building. **Generally, the more exterior wall to floor area in a building, the more the building costs**. Conversely, the smaller the ratio the more floor space is available to be used or rented. It is possible that the wall ratio factor is the only adjustment that may need to be made on a building.

The wall ratio is then assigned a Shape Adjustment Factor from the applicable table.

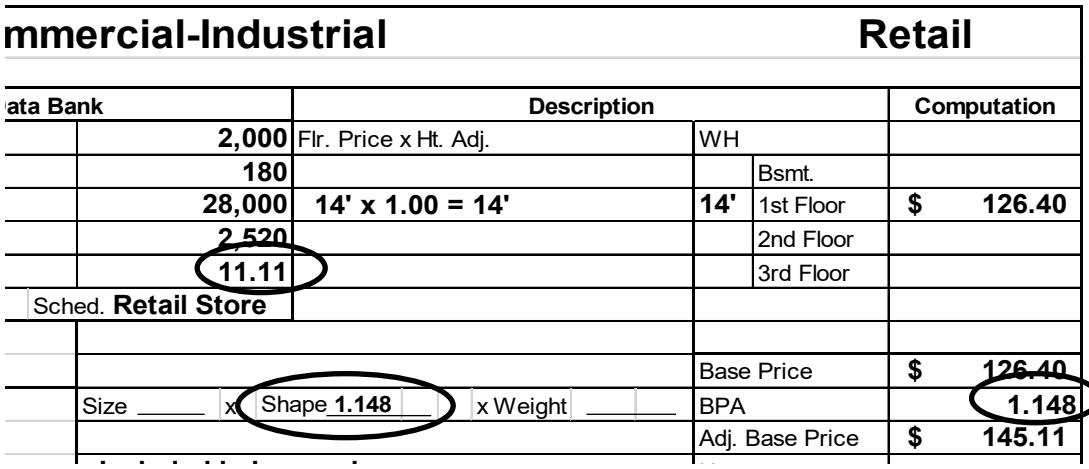
Retail building shape adjustment table
Wall ratio = avg. SFA ÷ avg. effective perimeter

Wall ratio	7	7.5	8	8.5	9	9.5	10	10.5	11	12
Adjustment factor	1.350	1.322	1.283	1.256	1.239	1.211	1.183	1.166	1.148	1.115
Wall ratio	13	14	15	16	17	18	19	20	22	24
Adjustment factor	1.083	1.060	1.042	1.025	1.000	0.992	0.981	0.969	0.950	0.931
Wall ratio	26	28	30	32	34	36	38	40		
Adjustment factor	0.917	0.901	0.892	0.883	0.874	0.866	0.860	0.854		

The wall ratio for The Thrifty Troll is 11.11. Since there is no 11.11 on the table but there are values for 11 and 12, we will round to the nearest wall ratio. Using the wall ratio of 11 on the table gives a **shape adjustment factor of 1.148**. This will be entered in the Shape cell on the PRC.

Base Price Adjustment (BPA) factor

The shape adjustment factor becomes the base price adjustment (BPA) factor. Multiply the BPA by the total base price (which has already been adjusted for height variances) to arrive at an adjusted base price.



mmercial-Industrial					Retail
ata Bank		Description			Computation
	2,000	Flr. Price x Ht. Adj.	WH		
	180			Bsmt.	
	28,000	14' x 1.00 = 14'	14'	1st Floor	$ 126.40
	2,520			2nd Floor	
	11.11			3rd Floor	
Sched.	Retail Store				
			Base Price		$ 126.40
	Size _____ x	Shape 1.148	x Weight _____	BPA	1.148
				Adj. Base Price	$ 145.11

Exercise 5-1

Referring to the retail shape adjustment table below, indicate the appropriate shape adjustment factor for the following wall ratios.

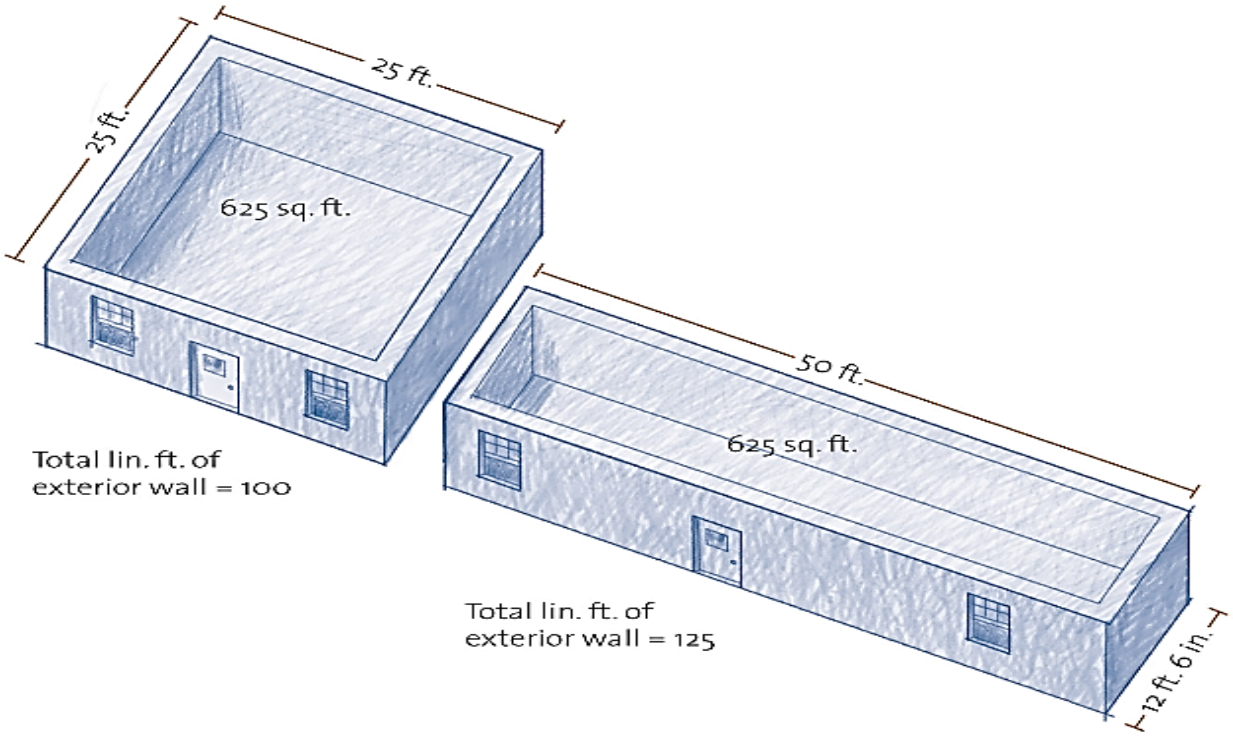
8	_____	**22.00**	_____
10.5	_____	**20.75**	_____
35.80	_____	**14.6**	_____

Retail building shape adjustment table
Wall ratio = avg. SFA ÷ avg. effective perimeter

Wall ratio	7	7.5	8	8.5	9	9.5	10	10.5	11	12
Adjustment factor	1.350	1.322	1.283	1.256	1.239	1.211	1.183	1.166	1.148	1.115
Wall ratio	13	14	15	16	17	18	19	20	22	24
Adjustment factor	1.083	1.060	1.042	1.025	1.000	0.992	0.981	0.969	0.950	0.931
Wall ratio	26	28	30	32	34	36	38	40		
Adjustment factor	0.917	0.901	0.892	0.883	0.874	0.866	0.860	0.854		

WHY SQUARE SHAPES WORK

The square box contains 625 sq. ft. of floor space within 100 ft. of exterior wall, while the rectangular box encloses the same 625 sq. ft. but requires 125 ft. of wall. The rectangular box costs approximately 25% more to build.



625 SF/100 LF = 6.25 WR
625 SF/125 LF = 5.0 WR

Step 6 Commercial Subsidiary Schedules

Additions or subtractions to the base price, now the **adjusted base price**, may be necessary if the building has features that are not included in the base cost from the schedule or if items are included in the schedule base cost that the building does not have.

Heat

The next item in the computation ladder is heat. Heating is included in the base price. If the structure has no heat on a floor, a minus adjustment must be made. If the structure is heated no adjustment is necessary. Our example, the Thrifty Troll, needs no adjustment.

Many items are found in the subsidiary schedules. If an item is not found there, the assessor may have to refer to CIP schedules in IDOR Publication 127 Instructions for Industrial Schedules to obtain a cost value.

These values are then entered in the appropriate area on the computation ladder and added to or subtracted from the adjusted base cost. Some features are priced based on the square feet of the floor area, such as sprinklers and air conditioning (A/C). The values are entered on the computation ladder, above the S/F price line, and represent a cost per square foot of ground area. The cost of each of these features added to, or subtracted from, the adjusted base prices provide a total square foot price for the building.

Items located below the Subtotal line on the computation ladder are actual dollar values to be added to the subtotal.

Air Conditioning and Sprinkling Systems

Air conditioning, heat and sprinklers are included in the base price of retail buildings. However, not all structures have heat, air conditioning and sprinkling on all above ground floors. These SF values must be adjusted to reflect the lack of air conditioning and/or sprinkling on an above ground floor or floors. If a feature is absent, a minus adjustment must be made. The property record card for The Thrifty Troll indicates all three are present in this example, so no adjustment is needed.

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Air conditioning (A/C)

Air conditioning is priced in all building uses in IDOR Publication 126. If air conditioning does not exist in the subject building being valued, then a **deduction** must be made based on the use of the floor.

First obtain a cost for each floor that is **not** air conditioned based on its use. Then, add the values for each floor to get a total cost. This amount, after adjustments, is entered on the computation ladder under A/C as a **deduction.** It is a dollar per SF adjustment.

Air conditioning (per SF service area)	
Apartments*	$ 17.35
Retail store	7.80
Office	16.50

Do not consider air conditioning for the basement.

Sprinkler system

The sprinkler cost is also based on the use of the floor. Refer to the sprinkler schedule to determine a square foot cost for each floor sprinkled.

Sprinkler system (per SF service area)	
Apartments	$ 3.00
Office	3.90
Retail Store	3.85
Supermarket	3.40
Discount Store	2.70

The base cost section of the retail store schedule includes a sprinkling system. Since the retail store example has a sprinkling system, no deductions will have to be made**.** It is a dollar per SF adjustment.

Do not consider the basement for sprinkler adjustments.

Important!

If you adjusted the base cost by a wall height adjustment and/or a Base Price Adjustment factor, that same factor **must** be applied to any **subtractions.**

Do not apply the wall height adjustment and/or BPA to additions to the computation ladder.

Exercise 5-2 Air Conditioning System Worksheet

Calculate the adjustments needed if air conditioning is not present in the following structures. You will also be using the Office schedules from Publication 126.

All Wall Height Adjustment factors are **+ or - 2% per foot of height difference**
Wall Ratios have been calculated for you and a Shape Adjustment Factor is indicated by the initials **SAF**

No A/C Air conditioning adjustment

1-Story Retail
L52 W36 H13 **SAF 1.166**
1st floor store (14') **WH = -2% or .98** **$ -7.80 x .98 x 1.166 = - $ 8.53**
Total Adjustment to Base Price **$ _____**

2-Story Retail
L40 W40 H26 **SAF 1.183**
1st floor store (14') **WH = _____%** _____
2nd floor store (12') **WH = _____%** _____
Total Adjustment to Base Price **$ _____**

3-Story Office
L40 W40 H44 **SAF 1.105**
1st floor office (14') **WH = _____%** _____
2nd floor office (14') **WH = _____%** _____
3rd floor office (16') **WH = _____%** _____
Total Adjustment to Base Price **$_____**

2-Story Retail
L50 W40 H28 **SAF 1.148**
1st floor store (14') **WH = _____%** _____
2nd floor store (14') **WH = _____%** _____
Total Adjustment to Base Price **$_____**

3-Story Retail & Office
L100 W 60 H40 **BPA .981**
1st floor store (12') **WH = _____%** _____
2nd floor store (14') **WH = _____%** _____
3rd floor office (14') **WH = _____%** _____
Total Adjustment to Base Price **$_____**

Plumbing Adjustments

Plumbing — Plumbing costs are based on the number of existing fixtures and the type of fixtures. These costs include the piping, installation, etc.

Additions	
Item	**Cost**
Plumbing (per each existing fixture)	
Residential (type 1)	$ 1,795
Commercial (type 2)	2,600
Special (refer to CIP Schedule Pub. 127)	

Typical plumbing by occupancy or use is included in the base cost. Plumbing must be adjusted if the number of fixtures in the building being valued varies from that included in the base cost.

If the base cost schedule includes “typical plumbing,” do not adjust for plumbing. Assume the number of fixtures in the building is typical.

There are two types of fixtures listed in the schedule, “residential type 1” and “commercial type 2.” Commercial fixtures are of better construction than residential fixtures. Refer to the base cost schedule for the occupancy or use to determine the number of plumbing fixtures included in the base cost. This will vary depending on what is typical for a specific building type.

What is typical for a Retail structure? Look at the base cost schedule.

Base Costs

The base price includes amounts for excavation, foundation, footings, framing, exterior wall construction, floor construction, standard plumbing exists of water heater and one fixture for every 800 square feet. be adjusted by a factor from the building shape adjustment table.

For example, the subject The Thrifty Troll retail property has 1 story of 2,000 SF. It has typical “type 2” fixtures. How many are typically included in a 2,000 SF structure? You would refer to your retail base cost schedule for any adjustments.

The total number of fixtures in the building would be located on the PRC under the Plumbing section of the Construction Specifications column.

Plumbing Type			
1		2	Typical
3		4	
	Sprinkler	X	1

Remember, do not include the basement when calculating total square footage!

Plumbing Fixture Calculation

How many fixtures are typical?

Unless there is a number indicated next to the "Type 2" plumbing type, no calculation is necessary. However, if the number of fixtures is indicated, discovering what is "typical" is the first step in determining the dollar amount of the adjustment.

In our example of The Thrifty Troll, the Retail Base Cost schedule provides the starting point. The schedule states there is 1 fixture per 800 SF plus one water heater. Begin with the building SF.

2,000 SF (1 floor x 2,000 SF) ÷ 800 = 2.50. Since plumbing fixtures are whole units, **always round up** to the nearest whole number **(3)**. The base cost includes **3 fixtures + 1 water heater or a total of 4 plumbing fixtures for this building**. This is the number of fixtures that are considered "typical". If there is nothing indicated on the PRC or the narrative to indicate the number of fixtures, or it just says "typical" there is no need to make an adjustment. There are no plumbing adjustments for The Thrifty Troll.

The following examples illustrate the calculations if the number of plumbing fixtures are greater or less than the number that is typical.

Actual Plumbing <u>Fixtures Greater than</u> Base Schedule

Example 4-A

2-story retail store has 2,000 SF on each floor and has a total of 10 fixtures. What should the adjustment be for the number of plumbing fixtures?

2,000 SF x 2 stories = 4,000 SF Total
4,000 ÷ 800 = 5 fixtures PLUS 1 water heater or a total of 6 fixtures.

If our property has 10 fixtures total, it means it has 9 fixtures and 1 water heater.
The correct number of fixtures to be adjusted would be **4 fixtures: 9 – 5 = 4 or 10 – 6 = 4**

Assume the fixtures are Type 2 unless otherwise noted. Type 2 fixtures have a value of $2,600 each.

4 x 2,600 = + $10,400 addition

Actual Plumbing <u>Fixtures Less than</u> Base Cost Schedule

Example 4-B- Actual number of plumbing fixtures is **less than** base schedule allows:

The same retail store has only 4 fixtures. What is the adjustment?

2,000 SF x 2 = 4,000 SF Total 4,000 ÷ 800 = 5 fixtures PLUS 1 water heater or 6 fixtures total.

Our property has a total of 4 fixtures; it means it has 3 fixtures and 1 water heater. So, the correct number of fixtures to be adjusted would be **2 fixtures: 5 – 3 = 2 or 6 – 4 = 2**

2 x 2,600 = - $5,200 subtraction

Please continue to the next exercise for more practice on making plumbing adjustments.

Exercise 5-3 Plumbing Adjustment Worksheet

Base Cost- The typical number of fixtures per SFFA plus one water heater per property.

- **Retail Base Cost**- 1 fixture per 800 SFFA is typical plus one water heater per property.
- **Office Base Cost**- 1 fixture per 1300 SFFA is typical plus one water heater per property.

*For this exercise only, all multi-story buildings are assumed to have the same SF on each floor. If the number of fixtures expected is fractional, always round up. You can't have half of a sink. *Number of Fixtures on PRC already have the H2O heater included.*

Description	SFGA	# Fix. Expected	+	H2O Heater	=	# Fix. Total	-	*# Fix. PRC	=	Diff. # Fix.	x $2,600 =	+-$ Adj.
1-Story **Retail**	**6,000**	**8**		**1**		**9**		**6**		**- 3**	**x $2,600 =**	**- $7,800**
2-Story **Retail**	**4,000**							**12**			x $2,600 =	
3-Story **Retail**	**5,000**							**9**			x $2,600 =	
1-Story **Office**	**5,000**							**7**			x $2,600 =	
2-Story **Office**	**3,000**							**16**			x $2,600 =	
3-Story **Office**	**6,000**							**23**			x $2,600 =	
3-Story **Office 3rd Flrs. 1&2 Retail**	**4,000**							**11**			x $2,600 =	

Step 7 Factors

Cost, Design, Quality grade, Neighborhood, and Appraiser factors can be chain-multiplied to determine a single factor placed in the computation ladder. See the discussion in Unit 2.

If a structure has a quality grade of "C," due to the average materials and workmanship used in its construction, it is considered to be of **average** quality

The factor for a "C" grade is 100 percent, or 1.00. Multiply the Total Value by the Factor (or factors if more than one chain Is multiplied together). This number will be the **Replacement Cost New, or RCN**.

Quality					
	+50	338%	C		100%
	+25	281%		-5	95%
	+10	248%		±10	90%
AA		225%		+5	86%
	+40	210%	D		82%
	+30	195%		-5	78%
	+20	180%		-10	74%
	+10	165%		-20	66%
	+5	158%		-30	57%
A		150%	E		50%
	-5	143%		-10	45%
	±10	135%		-20	40%
	+5	128%		-30	35%
B		122%		-40	30%
	-5	116%		-50	25%
	±10	110%			
	+5	105%			

This is the value of the structure if it were built today and no depreciation had yet occurred.

					Front	
					Canopy	
					Dock	
S C M L		Grade **C**			**Total**	**290,220**
C&D		G **1.00**		NH	A	**1.00 = FAC**
Eff. Age	Eff. Age	CDU	Age		Replacement Cost New	
15	**15**	**Avg/Avg**	**15**			**290,220**
	Depreciation =	**0.30**			**REL .70**	**0.70**
						203,154

Step 8 Commercial Remaining Economic Life Table

However, our property is 15 years old. Thus, depreciation has most likely occurred. We must account for that using the **REL, Remaining Economic Life factor**. The REL is found by determining the **Replacement Cost New (RCN)** and adjusting for depreciation with the REL factor. These factors can be found on the **Commercial REL Table** on the next page.

Determine the Remaining Economic Life (REL) by finding the age based on condition known as the **First Effective Age.**

The **Actual age** and the **Effective age** are the same when the physical condition of the improvement is **Average**.

So, the first column of the REL table indicates “Age considering physical condition”. This is also referred to as the **First Effective Age.** For The Thrifty Troll it is “15”.

Commercial REL Table

Schedule A						Schedule B	
Age* considering physical condition	Effective age considering desirability and utility					REL	
	E	G	A	P	U	Eff. age	REL
1	1	1	1	6	11	1	98
2	1	1	2	7	12	2	96
3	1	1	3	8	13	3	94
4	1	1	4	9	14	4	92
5	1	1	5	10	15	5	90
6	1	1	6	11	16	6	88
7	1	2	7	12	17	7	86
8	1	3	8	13	18	8	84
9	1	4	9	14	19	9	82
10	1	5	10	15	20	10	80
11	1	6	11	16	21	11	78
12	2	7	12	17	22	12	76
13	3	8	13	18	23	13	74
14	4	9	14	19	24	14	72
15	5	10	15	20	25	15	70
16	6	11	16	21	26	16	68
17	7	12	17	22	27	17	66
18	8	13	18	23	28	18	64
19	9	14	19	24	29	19	62
20	10	15	20	25	30	20	60
21	11	16	21	26	31	21	58
22	12	17	22	27	32	22	56
23	13	18	23	28	33	23	54
24	14	19	24	29	34	24	52
25	15	20	25	30	35	25	50

The next step is to determine the **D**esirability and **U**tility of the **CDU.**

Structures can be rated as excellent (E), good (G), average (A), poor (P), or unsound (undesirable) (U). The condition refers to physical depreciation, such as wear and tear and action of the elements that has taken place. The desirability refers to the economic or external depreciation, such as lack of appeal due to location, or some type of adverse influences outside the boundary lines of the property. The utility refers to functional obsolescence, such as inefficient and impractical arrangement of rooms and any super-adequacy or inadequacy that may be present. The effective age is determined based upon the condition, desirability and utility of the subject property in comparison to other similar buildings within the jurisdiction. Once you have determined the effective age, move over to

Schedule B. Schedule B lists the effective age and the number next to it is the REL factor that will be used to adjust the value in the computation ladder.

For “A”, Average, the corresponding 2nd effective age is also “15” in Schedule A. This 2nd effective age is carried over to Schedule B to also reflect “15”. The REL factor that corresponds to the 2nd effective age of 15 is **.70**. This number is entered on the PRC as shown below:

				Front	
				Canopy	
				Dock	
S C M I		Grade **C**		**Total**	**290,220**
C&D	G	**1.00**	NH	A	**1.00 = FAC**
Eff. Age	Eff. Age	CDU	Age	Replacement Cost New	
15	**15**	**Avg/Avg**	**15**		**290,220**
	Depreciation =		**0.30**	**REL .70**	**0.70**
					203,154

Finally, The Replacement Cost New is multiplied by the REL factor to determine the Full Value of the Structure.

The Full Value of the main structure for The Thrifty Troll is $ 203,154.

There are no other buildings, so it is not necessary to fill out the Summary of Other Buildings portion of the PRC-4. Therefore, the Full Value of entire property is $ 203,154.

Example 2- Olde Towne Place

The subject improvement is **Olde Towne Place**, a 2-story commercial **retail building** with a **brick veneer exterior with wood studs and wood joists**. The building is 40 years old and in average condition. The desirability and utility are poor. It has a quality grade of “C” which is the average quality grade.

The basement (9' wall height) is unfinished. The first floor (13' wall height) is average finished open and used as a store. The second story (13’ wall height) is used as a store with a small manager’s office. The base square footage is 4,000 (50 x 80).

Foundation	Reinforced concrete with spread footing
Wall Framing	Load bearing wood frame
Floors	Wood
Exterior Walls	Brick veneer
Interior Finish	Typical with average grade finish
Roof	Wood deck with rolled rubber
Plumbing	Typical plumbing, type 2
Sprinkling	Wet pipe on first and second floors

Example 2 Olde Towne Place — Property Record - Commercial - Industrial — 2- Story RETAIL STORE

Construction Specifications

Foundation			
Sprd. Ftg (circled)	X	Pile	
Caisson		Other	

Wall Framing	B	1	2	3	A
Wood		X	X		
Steel O/FP					
Reinf. Concrete	X				
Load Bearing	X	X	X		
Frame Bay - Bay Area					SF

Floors	B	1	2	3	A
Wood		X	X		
Steel O/FP					
Reinf. Concrete	X				
Frame	Wood (circled)	Steel	Conc.		

Exterior Walls	B	1	2	3	A
Siding					
Masonry Blk./Brk. (Brk. circled)		X	X		
Steel					
Glass					

Finish	B	1	2	3	A
Unfinished	X				
Finished Open		X	X		
Finished Divd.					

Heat	B	1	2	3	A
Cent. Wm. Air		X	X		
Ht. Wt/Steam					
Unit Heaters					
None	X				

Air Conditioning	B	1	2	3	A
Central		X	X		
Unit					
None	X				

Roofing				
Composition	X	Shingle		
Slate		Metal		
Frame	Wood (circled)	Steel	Conc.	

Plumbing Type	
1	2 (circled)
3	4
Sprinkler	X — 1st & 2nd

Use

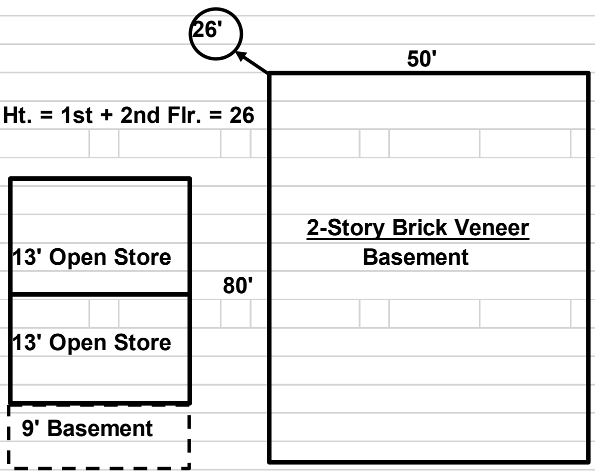
Store 1,2	X	Office		Vacant	
Apt.		WH		Abandoned	
Factory					
No. of Units					
Avg. Unit Size					
No. Rooms Per Unit					

Prorated @__________% with:

Data Bank

SF Ground Area	4,000
Eff. Perim LF	260
CF of Bldg.	104,000
SF Wall Area	6,760
Wall Ratio	15.38
2 Sty.	Sched. RETAIL

Eave Ht. = 1st + 2nd Flr. = 26



SFGA = 80' x 50' = 4000 SF
EP = 80' + 50' + 80' + 50' = 260 FT
CF = 80' x 50' x 26' = 104,000
SFWA = 260' x 26' = 6,760
WR = 4000 / 260 = 15.38

Description / Computation

Flr. Price x Ht. Adj.	WH		Computation
37.25 N/C	9	Bsmt.	37.25
115.5 x .98 = 113.19	13	1st Floor	113.19
90.95 x 1.02 = 92.77	13	2nd Floor	92.77
		3rd Floor	

Size ______ x Shape 1.042 x Weight ______

Base Price	243.21
BPA	1.042
Adj. Base Price	253.42
Heat	
A/C	
Electrical Light	
Sprinkler	
SF Price	253.42
SF	4000
Subtotal	1,013,680
Plumbing	
Partitions	
Front	
Canopy	
Dock	

S C M I		Grade C		
C&D	G	1.00	NH	
Eff. Age	Eff. Age	CDU	Age	
40	45	Poor	40	

Depreciation = 0.90

A	=FAC
Replacement Cost New	1,013,680
REL .10	0.10
	101,368

Summary of Other Buildings

Type	No.	Construction	Size	Rate	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value

Listed by:
Date:

Total full value other buildings	
Total full value all buildings	101,368

Example 2 Olde Towne Place

Construction Type

The basement floor is “Reinforced Concrete”. Framing” for the 1st and 2nd floors is marked as “Wood.” Also, the “Floors” section indicates “Wood” joists for floors 1 & 2.

On the base cost schedule, we will use “Brick Veneer on Wood framing” for the construction type

Story	Wall height	Construction type
Basement	9’	Unfinished storage Finished store
First floor	14’	Brick veneer on wood studs Siding on wood frame Brick on conc. blk/ joists Stucco on concrete block Decorative or split face concrete block Precast or tilt-up conc. Painted reinforced concrete Common brick
Second floor	12’	Brick veneer on wood studs Siding on wood frame Brick on conc. blk /joists

The Data Bank

Fill out the data bank.

Data Bank	
SF Ground Area	4,000
Eff. Perim LF	260
CF of Bldg.	104,000
SF Wall Area	6,760
Wall Ratio	15.38
2 Stv.	Sched. RETAIL

(Example 2 Olde Towne Place, cont.)

Determine the Base Cost for each floor

Determine the cost for the basement.

Base Costs

The base price includes amounts for excavation, foundation, footings, framing, exterior wall construction, floor construction, roof construction, interior construction and finish, insulation, heating/air conditioning, sprinkler system, and lighting. Typical, standard plumbing exists of water heater and one fixture for every 800 square feet. Other features are to be priced from the subsidiary schedules or the CIP schedules. A shape or size adjustment is necessary for store use class. The given price is to be adjusted by a factor from the building shape adjustment table.

Story	Wall height	Construction type	Average per floor area					
			2,000	3,000	4,000	5,000	6,000	8,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70	36.25	35.40
		Finished store	73.20	72.10	71.70	71.25	70.85	70.55
First floor	14'	Brick veneer on wood studs	131.15	119.95	115.50	108.05	102.15	93.20
		Siding on wood frame	126.40	112.05	108.80	106.90	104.90	102.95
		Brick on conc. blk/ joists	161.10	148.45	143.35	138.25	133.15	127.50
		Stucco on concrete block	158.95	140.40	139.20	127.55	124.05	116.00
		Decorative or split face concrete block	179.45	155.75	143.30	137.60	131.90	115.10
		Precast or tilt-up conc.	147.05	140.30	134.15	128.35	122.55	110.95
		Painted reinforced concrete	142.25	135.60	129.65	124.00	118.35	107.05
		Common brick	160.00	146.35	140.90	131.80	124.60	113.70
Second floor	12'	Brick veneer on wood studs	103.25	94.45	90.95	85.10	80.43	73.40
		Siding on wood frame	99.55	88.25	85.65	84.15	82.60	81.05
		Brick on conc. blk /joists	126.85	116.90	112.85	108.85	104.85	100.40
		Stucco on concrete block	125.15	110.55	109.60	100.45	97.70	91.35
		Decorative or split face concrete block	141.30	122.65	112.85	108.35	103.85	90.65
		Precast or tilt-up concrete	115.80	110.45	105.65	101.05	96.50	87.35
		Painted reinforced concrete	112.00	106.75	102.10	97.65	93.20	84.30
		Common brick	125.00	114.25	110.95	103.80	98.10	89.55

The base price of the basement is $37.25.

(Example 2 Olde Towne Place, cont.)

Next, determine the base price for the first floor.

Base Costs

The base price includes amounts for excavation, foundation, footings, framing, exterior wall construction, floor construction, roof construction, interior construction and finish, insulation, heating/air conditioning, sprinkler system, and lighting. Typical, standard plumbing exists of water heater and one fixture for every 800 square feet. Other features are to be priced from the subsidiary schedules or the CIP schedules. A shape or size adjustment is necessary for store use class. The given price is to be adjusted by a factor from the building shape adjustment table.

Story	Wall height	Construction type	Average per floor area					
			2,000	3,000	4,000	5,000	6,000	8,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70	36.25	35.40
		Finished store	73.20	72.10	71.70	71.25	70.85	70.55
First floor	14'	Brick veneer on wood studs	131.15	119.95	115.50	108.05	102.15	93.20
		Siding on wood frame	126.40	112.05	108.80	106.90	104.90	102.95
		Brick on conc. blk/ joists	161.10	148.45	143.35	138.25	133.15	127.50
		Stucco on concrete block	158.95	140.40	139.20	127.55	124.05	116.00
		Decorative or split face concrete block	179.45	155.75	143.30	137.60	131.90	115.10
		Precast or tilt-up conc.	147.05	140.30	134.15	128.35	122.55	110.95
		Painted reinforced concrete	142.25	135.60	129.65	124.00	118.35	107.05
		Common brick	160.00	146.35	140.90	131.80	124.60	113.70

The base price of the first floor is $115.50.

Now, determine the base price of the second floor.

Story	Wall height	Construction type	Average per floor area					
			2,000	3,000	4,000	5,000	6,000	8,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70	36.25	35.40
		Finished store	73.20	72.10	71.70	71.25	70.85	70.55
First floor	14'	Brick veneer on wood studs	131.15	119.95	115.50	108.05	102.15	93.20
		Siding on wood frame	126.40	112.05	108.80	106.90	104.90	102.95
		Brick on conc. blk/ joists	161.10	148.45	143.35	138.25	133.15	127.50
		Stucco on concrete block	158.95	140.40	139.20	127.55	124.05	116.00
		Decorative or split face concrete block	179.45	155.75	143.30	137.60	131.90	115.10
		Precast or tilt-up conc.	147.05	140.30	134.15	128.35	122.55	110.95
		Painted reinforced concrete	142.25	135.60	129.65	124.00	118.35	107.05
		Common brick	160.00	146.35	140.90	131.80	124.60	113.70
Second floor	12'	Brick veneer on wood studs	103.25	94.45	90.95	85.10	80.43	73.40
		Siding on wood frame	99.55	88.25	85.65	84.15	82.60	81.05
		Brick on conc. blk /joists	126.85	116.90	112.85	108.85	104.85	100.40
		Stucco on concrete block	125.15	110.55	109.60	100.45	97.70	91.35
		Decorative or split face concrete block	141.30	122.65	112.85	108.35	103.85	90.65
		Precast or tilt-up concrete	115.80	110.45	105.65	101.05	96.50	87.35
		Painted reinforced concrete	112.00	106.75	102.10	97.65	93.20	84.30
		Common brick	125.00	114.25	110.95	103.80	98.10	89.55

The base price of the second floor is $ 90.95.

(Example 2 Olde Towne Place, cont.)

Wall Height Adjustment Factor

Each floor value is listed on the computation ladder and the individual values could be subject to an adjustment for height variance and wall ratio, if necessary.

The wall height adjustment can be found at the bottom of the base cost schedule. It indicates an adjustment to the base cost of plus or minus 2% for each 1-foot difference in wall height from the listed wall height.

Story	Wall height	Construction type	Average per floor area					
			2,000	3,000	4,000	5,000	6,000	8,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70	36.25	35.40
		Finished store	73.20	72.10	71.70	71.25	70.85	70.55
First floor	14'	Brick veneer on wood studs	131.15	119.95	115.50	108.05	102.15	93.20
		Siding on wood frame	126.40	112.05	108.80	106.90	104.90	102.95
		Brick on conc. blk/ joists	161.10	148.45	143.35	138.25	133.15	127.50
		Stucco on concrete block	158.95	140.40	139.20	127.55	124.05	116.00
		Decorative or split face concrete block	179.45	155.75	143.30	137.60	131.90	115.10
		Precast or tilt-up conc.	147.05	140.30	134.15	128.35	122.55	110.95
		Painted reinforced concrete	142.25	135.60	129.65	124.00	118.35	107.05
		Common brick	160.00	146.35	140.90	131.80	124.60	113.70
Second floor	12'	Brick veneer on wood studs	103.25	94.45	90.95	85.10	80.43	73.40
		Siding on wood frame	99.55	88.25	85.65	84.15	82.60	81.05
		Brick on conc. blk /joists	126.85	116.90	112.85	108.85	104.85	100.40
		Stucco on concrete block	125.15	110.55	109.60	100.45	97.70	91.35

For example, the basement height is 9 feet. The basement height that is typical and listed on the cost schedule for retail stores is 9 feet. The base cost schedule would not be adjusted for a different wall height.

Story	Wall height	Construction type	Average per floor area				
			2,000	3,000	4,000	5,000	6,000
Basement	9'	Unfinished storage	38.60	37.75	37.25	36.70	36.25
		Finished store	73.20	72.10	71.70	71.25	70.85
Third floor	12'	Brick veneer on wood studs	97.05	88.75	85.45	79.95	75.60
		Brick on conc. blk/steel joists	119.20	109.85	106.10	102.30	98.55
		Stucco on concrete block	117.60	103.90	103.00	94.40	91.95
		Decorative or split face concrete block	132.80	115.25	106.05	101.80	97.60
		Precast concrete	108.80	103.80	99.25	95.00	90.70
		Common brick	118.40	108.30	104.00	97.90	92.25
Upper floors 4 & 5	12'	Brick on conc. blk/steel joists	118.00	108.75	105.00	101.30	97.55
		Precast concrete on steel	107.75	108.75	105.00	101.30	97.55
		Common brick	116.00	107.50	103.70	100.00	96.90
Story Ht. adj., add or deduct per 1 foot			2%	2%	2%	2%	2%

Example 2 Olde Towne Place, cont.

The first-floor height is 13', and the typical wall height indicated on the base cost schedule is 14'. Using a 2% adjustment for each 1-foot of height difference would lead to an adjustment of .98, or 100% - 2%. It would cost less to build a 13-foot high wall than it would to build a 14-foot wall, therefore the cost would need to be reduced by applying a factor less than 1.00.

The 1st floor base cost of $115.50 would be multiplied by .98 to arrive at a new base cost of $113.90 per square foot of the first floor.

Description			**Computation**
	WH		
37.25 x 1.00 = 37.25	9	Basement	37.25
115.50 x .98 = 113.19	13	1st floor	113.19
90.95 x 1.02 = 92.77	13	2nd floor	92.77
Total			**243.21**

The second floor of our property is also 13-feet in height. The manual indicates costs based on a second-floor height of 12 feet. So, the cost must be increased from the manual cost for the 1-foot difference in height by increasing the second-floor base cost by of $90.95 by 2%. $90.95 x 1.02 = $92.77 for the second floor adjusted for wall height. The total of the floors adjusted for height is $243.92 base price.

Enter these amounts on the right-hand side on your computation ladder and place the Total in the space for the **Base Price.**

Shape Adjustment Factor

An adjustment for shape is necessary to account for area/perimeter ratio variations. It costs less to build a square box than a rectangular box of the same area because the rectangular box has a greater wall area.

The building shape adjustment table is provided to adjust the base price for these variations in floor to wall area ratio. The table can be found on the second page of the retail base cost schedule.

The shape adjustment factor is based on the wall ratio that you calculated in the data bank. To compute the wall ratio, divide the square feet ground area of the structure by the lineal feet of the effective perimeter.

WR = SFGA ÷ EP 4000 ÷ 260 = 15.38

(Example 2 Olde Towne Place, cont.)

Since 15.38 is not a wall ratio shown on the table, use the closest value to 15.38, or 15. The adjustment factor that corresponds to a wall ratio of 15 is **1.042.**

Retail building shape adjustment table Wall ratio = avg. SFA ÷ avg. effective perimeter										
Wall ratio	7	7.5	8	8.5	9	9.5	10	10.5	11	12
Adjustment factor	1.350	1.322	1.283	1.256	1.239	1.211	1.183	1.166	1.148	1.115
Wall ratio	13	14	15	16	17	18	19	20	22	24
Adjustment factor	1.083	1.060	1.042	1.025	1.000	0.992	0.981	0.969	0.950	0.931
Wall ratio	26	28	30	32	34	36	38	40		
Adjustment factor	0.917	0.901	0.892	0.883	0.874	0.866	0.860	0.854		

Multiply the factor **(1.042)** by the total Base Price **($243.21)** on the computation ladder. The shape factor becomes the **BPA** (Base Price Adjustment) and the resulting number is now the **Adjusted Base Price** on the ladder. **($243.21 x 1.042 = $253.42)**

Referring to the construction specifications on the left-hand column of the property record card, determine if there are any other adjustments to be made.

The building appears to be heated, air conditioned, sprinkled and has typical plumbing features, so no further adjustment is needed.

We can now arrive at a new adjusted SF price. No adjustments were made to the **$253.42** price found above, so we multiply that price by the square footage **($253.42 x 4,000)** to get **$1,013,680** in the Subtotal Column of the PRC.

Base Price	$243.21
BPA	1.042
Adj. Base Price	$253.42
Heat	
A/C	
Electrical Light	
Sprinkler	
SF Price	$253.42
SF	4,000
Subtotal	$ 1,013,680

The narrative did indicate that our structure is 40 years old, which means we will have to account for **Depreciation**.

Commercial REL Depreciation Table

Our subject property example has an actual age of 40 and the age considering condition is 40. Desirability and Utility are “poor” resulting in an effective age of 45. Schedule B indicates an REL factor for a building with a 45-year effective age of **10 percent (0.10)**.

Schedule A						Schedule B	
Age* considering physical condition	Effective age considering desirability and utility					REL	
	E	G	A	P	U	Eff. age	REL
36	26	31	36	41	—	36	28
37	27	32	37	42	—	37	26
38	28	33	38	43	—	38	24
39	29	34	39	44	—	39	22
40	30	35	40	45	—	40	20
41	31	36	41	—	—	41	18
42	32	37	42	—	—	42	16
43	33	38	43	—	—	43	14
44	34	39	44	—	—	44	12
45	35	40	45	—	—	45	10
46	36	41	—	—	—	over 45	10

Multiply the replacement cost new (RCN) by 0.10 for a **Full Value of $101,368**

$1,013,680 x 0.10 = $101,368

Plumbing	
Partitions	
Front	
Canopy	
Dock	
Total	$ 1,013,680
A	=FAC
Replacement Cost New	$1,013,680
REL	.10
Full Value	$101,368

There are no other buildings, so it is not necessary to fill out the Summary of Other Buildings portion of the PRC-4. **Therefore, the Full Value of all Buildings for Olde Towne Place is $101,368.** This completes the valuation.

Example 3 The Fashion House

The subject property is a 1-story common brick retail store building known as The Fashion House. The first floor is used as a clothing store. The building is 12 years old, has a quality grade of “C,” and its physical condition is average. The desirability and utility are also average. There is an unfinished basement used for storage.

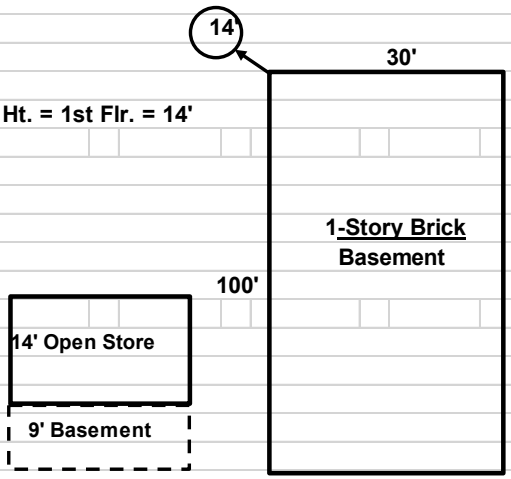
In addition, there is an asphalt parking lot on the north side of the building, approx. 50’ x 35’ in size, as well as a 12’ x 20’ asphalt drive.

Foundation	concrete spread footing and masonry foundation
Wall framing	wood frame
Floors	wood joist and wood sub-floor with typical, average grade finish
Exterior walls	4” solid common brick
Interior finish	typical, average grade according to use
Heating/central A/C	first floor has central warm air heat and air-conditioning system
Roof	wood frame with wood deck and built-up composition cover
Plumbing/sprinkler	7 plumbing fixtures, type 2. The first story is sprinkled with a wet pipe system
Parking Lot	Asphalt, average condition and same age as building
Drive	Asphalt, average condition and same age as building
Quality Grade	C

Remove the following Property Record Card (Example 3) to complete the exercise.

Example 3 — **The Fashion House** — **Property Record - Commercial - Industrial** — **Retail**

Construction Specifications							Use						Data Bank		Description			Computation
Foundation							Store 1	X	Office		Vacant		SF Ground Area		Flr. Price x Ht. Adj.	WH		
Sprd. Ftg	X	Pile					Apt.		WH		Abandoned		Eff. Perim LF				Bsmt.	
Caisson		Other					Factory						CF of Bldg.				1st Floor	
Wall Framing							No. of Units						SF Wall Area				2nd Floor	
	B	1	2	3	A		Avg. Unit Size						Wall Ratio				3rd Floor	
Wood		X					No. Rooms Per Unit						1 Sty. Brk. Sched. Retail					
Steel O/FP							Prorated @_____ % with:											
Reinf. Concrete	X															Base Price		
Load Bearing	X	X													Size _____ x Shape_____ x Weight _____	BPA		
Frame Bay - Bay Area						SF										Adj. Base Price		
Floors															Included in base price	Heat		
Wood		X													Included in base price	A/C		
Steel O/FP																Electrical Light		
Reinf. Concrete	X														Included in base price	Sprinkler		
Frame	Wood		Steel		Conc.													
Exterior Walls																		
Siding																		
Masonry Blk./Brk.		X														SF Price		
Steel																SF		
Glass																Subtotal		
Common brick		X														Plumbing		
Finish																		
Unfinished	X															Partitions		
Finished Open		X																
Finished Divd.																Front		
																Canopy		
Heat																Dock		
Cent. Wm. Air		X																
Ht. Wt/Steam																		
Unit Heaters															S C M I	Grade	Total	
															C&D G	NH	A	=FAC
None	X														Eff. Age / Eff. Age / CDU / Age		Replacement Cost New	
Air Conditioning																		
Central		X														Depreciation =	REL	
Unit																	Full Value	
None	X																	



Summary of Other Buildings

Type	No.	Construction	Size	Rate	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value
Parking											
Drive											

Roofing					
Composition		Shingle	X		
Slate		Metal			
Frame	Wood	Steel	Conc.		

Plumbing Type			
1		2	7
3		4	

	Sprinkler	X	1st

Listed by:

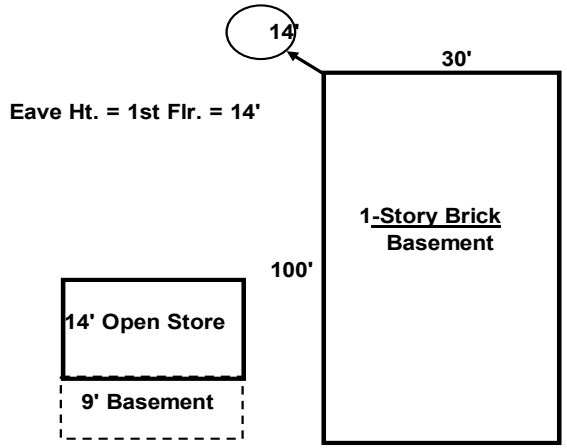
Date:

Total full value other buildings

Total full value all buildings

Example 3 The Fashion House — Property Record - Commercial - Industrial — 1-Story Retail

Construction Specifications							Use						Data Bank		Description			Computation
Foundation							Store **1**	X	Office		Vacant		SF Ground Area	3,000	Flr. Price x Ht. Adj.	WH		
Sprd. Ftg	X	Pile					Apt.		WH		Abandoned		Eff. Perim LF	260	**37.75 x 1.00 = 37.75**	9	Bsmt.	37.75
Caisson		Other					Factory						CF of Bldg.	42,000	**146.35 x 1.00 = 146.35**	14	1st Floor	146.35
Wall Framing							No. of Units						SF Wall Area	3,640			2nd Floor	
	B	1	2	3	A		Avg. Unit Size						Wall Ratio	11.54			3rd Floor	
Wood		X					No. Rooms Per Unit						**1** Sty. **Brk.** Sched. **Retail**					
Steel O/FP							Prorated @_____ % with:											
Reinf. Concrete	X															Base Price		184.10
Load Bearing	X	X											Size _____ x Shape **1.115** x Weight _____			BPA		1.115
Frame Bay - Bay Area						SF										Adj. Base Price		205.27
Floors													**Included in base price**			Heat		
Wood		X											**Included in base price**			A/C		
Steel O/FP																Electrical Light		
Reinf. Concrete	X												**Included in base price**			Sprinkler		
Frame	Wood		Steel		Conc.													
Exterior Walls																		
Siding																		
Masonry Blk./Brk.		X														SF Price		205.27
Steel																SF		3,000
Glass																Subtotal		615,810
Common Brick		X											**Typical retail plumbing is 1 fixture / SF =**			Plumbing		5,200
Finish													**3,000 / 800 = 3.75 rounded up to 4, plus the**					
Unfinished	X												**water heater, so 5 total. It has 7 fixtures total.**			Partitions		
Finished Open		X											**7 - 5 = 2 fixtures 2 x 2,600 = 5,200**					
Finished Divd.																Front		
																Canopy		
Heat																Dock		
Cent. Wm. Air		X																
Ht. Wt/Steam																		
Unit Heaters													S C M I		Grade **C**	**Total**		621,010
													C&D	G **1.00**	NH	A		=FAC
None	X												Eff. Age **12**	Eff. Age **12**	CDU **Avg.**	Age **12**	Replacement Cost New	621,010
Air Conditioning															Depreciation = **0.24**		REL	0.76
Central		X																471,968
Unit																		
None	X																	



Roofing					
Composition		Shingle		X	
Slate		Metal			
Frame	Wood	Steel	Conc.		

Plumbing Type			
1		2	7
3		4	

	Sprinkler	X	1st

Summary of Other Buildings

Type	No.	Construction	Size	Rate	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value
Parking Lot	**1**	**Asphalt**	**1,750**	**4.35**	**C**	**12**	**A**	**1.00**	**7,613**	**0.76**	**5,786**
Drive	**1**	**Asphalt**	**240**	**4.35**	**C**	**12**	**A**	**1.00**	**1,044**	**0.76**	**793**

Listed by: — Total full value other buildings: **6,579**

Date: — Total full value all buildings: **478,547**

Example 4 Fun to Frugal Retail Store

Note on air conditioning and wall height

If the subject has air conditioning, which is included in the base cost, no adjustment would be necessary.

However, if the retail store example does **not** have air conditioning, a deduction per SF would have to be made.

Do not consider air conditioning for the basement.

First floor used as a store	$7.80
Second floor used as a store	$7.80
Third floor used as a store	$7.80

If you adjusted the base cost by a shape and/or wall height adjustment, that factor must be applied to the **subtraction** of those items from the base cost.

In this exercise, only the first floor is air conditioned, so we will have to deduct for the lack of air conditioning for the second and third floors.

In this example, we will make both height adjustments and shape (BPA) adjustments, so we must consider both adjustments in subtracting out air conditioning from the base cost.

Since the height adjustments for the first and second floors are different we must account for that difference by **factoring the two floors separately**:

Second floor no a/c	$7.80 x Wall Height Adjustment x Wall Ratio = Floor 2 Total
Third floor no a/c	$7.80 x Wall Height Adjustment x Wall Ratio = Floor 3 Total

If you adjusted the base cost by a wall height adjustment and/or a Base Price Adjustment factor, that same factor **must** be applied to any **subtractions.**

Do not apply the wall height adjustment and/or BPA to additions to the computation ladder.

Example 4 Fun to Frugal

The subject property is a 3-story retail store with a full basement. There is a party wall found on the east side of the building that extends from the basement floor up to the eaves. The first floor is a toy and game store, the second floor is an antique shop, and the third floor is a thrift store. The structure is 30 years old, has a quality grade of “C,” its physical condition is average. The desirability and utility are poor. The cost factor derived from the market study for this jurisdiction is 1.10.

Foundation	Concrete spread footing and brick foundation
Wall framing	Load bearing with some interior supports
Floors	Wood joists and wood sub-floor
Exterior walls	Brick Veneer on wood
Interior finish	Typical with average grade finish
Heating/ AC	All floors above grade are centrally heated with forced warm air. Only the first floor has central air conditioning.
Roof	Roof structure is wood deck with built-up composition cover.
Plumbing	6 plumbing fixtures, type 2. All three floors above grade are equipped with a wet pipe sprinkler system (ordinary hazard).

Remove the following PRC to complete the Example 4 Fun to Frugal.

Example 4 Fun to Frugal

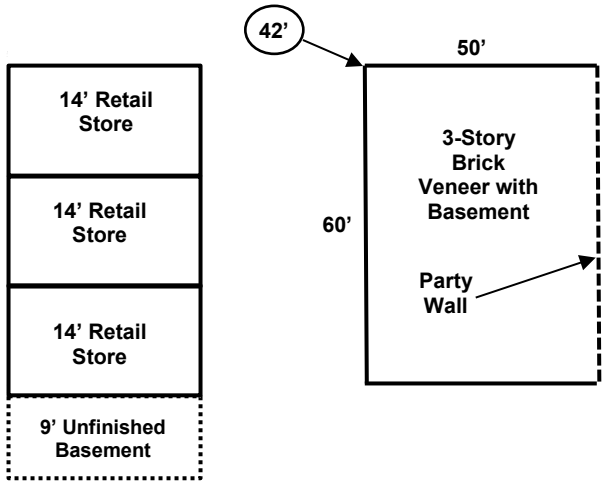
Property Record – Commercial – Industrial

Retail

Construction Specifications						
Foundation						
Sprd. Ftg	X	Pile				
Caisson		Other **BK**		X		
Wall Framing	B	1	2	3	A	
Wood		X	X	X		
Steel O/FP						
Reinf. Concrete						
Load Bearing	X	X	X	X		
Frame Bay – Bay Area					SF	
Floors						
Wood		X	X	X		
Steel O/FP						
Reinf. Concrete	X					
Frame	Wood		Steel		Conc	
Exterior Walls						
Siding						
Masonry Blk/Brk		X	X	X		
Steel						
Glass						
Finish						
Unfinished	X					
Finished Open		X	X	X		
Finished Divd.						
Heat						
Cent. Wm. Air		X	X	X		
Ht. Wt/Steam						
Unit Heaters						
None	X					
Air Conditioning						
Central		X				
Unit						
None	X		X	X		
Roofing						
Composition		Shingle		X		
Slate		Metal				
Frame	Wood		Steel		Conc	
Plumbing Type						
1		2	6			
3		4				
	Sprinkler	X	1, 2, 3			

Use					
Store	X	Office		Vacant	B
Apt		WH		Aband	
Factory					
No. of Units					
Avg. Unit Size					
No. Rooms Per Unit					
Prorated @		% with:			

Data Bank	
SF Ground Area	
Eff. Perim LF	
CF of Bldg	
SF Wall Area	
Wall Ratio	
3 Sty **Brk** Sched. **Retail**	



Description		Computation
Flr. Price x Ht. Adj.	WH	
	Bsmt	
	1st Floor	
	2nd Floor	
	3rd Floor	
	Base Price	
Size x Shape x Weight	BPA	
	Adj. Base Price	
	Heat	
	A/C	
	Electrical Light	
	Sprinkler	
	SF Price	
	SF	
	Subtotal	
	Plumbing	
	Partitions	
	Front	
	Canopy	
	Dock	
S C M I Grade	**Total**	
C&D G NH	A = FAC	
Eff. Age / Eff. Age / CDU / Age	Replacement Cost New	
Depreciation =	REL	
	Full Value	

Summary of Other Buildings

Type	No.	Construction	Size	Rate	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value
Listed by:								Total full value other buildings			
Date:								Total full value all buildings			

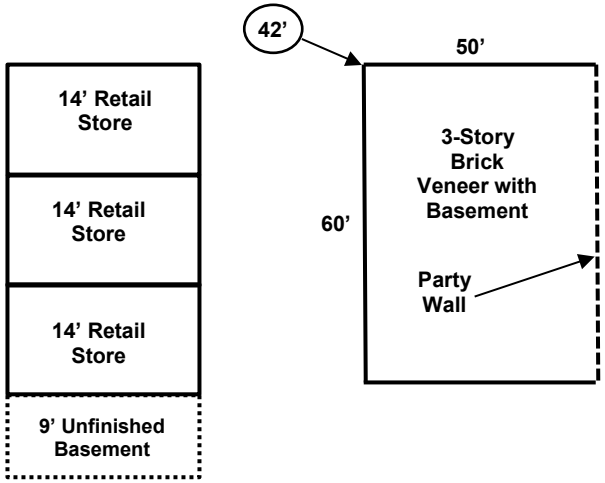
Example 4 Fun to Frugal

Property Record – Commercial – Industrial

Construction Specifications						
Foundation						
Sprd. Ftg	X	Pile				
Caisson		Other **BK**				X
Wall Framing	B	1	2	3	A	
Wood		X	X	X		
Steel O/FP						
Reinf. Concrete						
Load Bearing	X	X	X	X		
Frame Bay – Bay Area					SF	
Floors						
Wood		X	X	X		
Steel O/FP						
Reinf. Concrete	X					
Frame	Wood		Steel		Conc	
Exterior Walls						
Siding						
Masonry Blk/Brk		X	X	X		
Steel						
Glass						
Finish						
Unfinished	X					
Finished Open		X	X	X		
Finished Divd.						
Heat						
Cent. Wm. Air		X	X	X		
Ht. Wt/Steam						
Unit Heaters						
None	X					
Air Conditioning						
Central		X				
Unit						
None	X		X	X		
Roofing						
Composition		Shingle				X
Slate		Metal				
Frame	Wood		Steel		Conc	
Plumbing Type						
1		2	**6**			
3		4				
	Sprinkler	X	**1, 2, 3**			

Use					
Store	X	Office		Vacant	B
Apt		WH		Aband	
Factory					
No. of Units					
Avg. Unit Size					
No. Rooms Per Unit					
Prorated @		% with:			

Data Bank	
SF Ground Area	**3,000**
Eff. Perim LF	**196**
CF of Bldg	**126,000**
SF Wall Area	**8232**
Wall Ratio	**15.31**
3 Sty **Brk** Sched.	**Retail**



Description		Computation
Flr. Price x Ht. Adj.	WH	
37.75 x 1.00	**9** Bsmt	**$ 37.75**
119.95 x 1.00	**14** 1st Floor	**119.95**
94.45 x 1.04	**14** 2nd Floor	**98.23**
88.75 x 1.04	**14** 3rd Floor	**92.30**
	Base Price	**$348.23**
Size x Shape **1.042** x Weight	BPA	**1.042**
	Adj. Base Price	**362.86**
2nd Floor missing A/C -7.80 x 1.04 x 1.042 = 8.45	Heat	
3rd Floor missing A/C -7.80 x 1.04 x 1.042 = 8.45	A/C	**-16.90**
8.45 + 8.45 = 16.90	Electrical Light	
	Sprinkler	
	SF Price	**$345.96**
	SF	**3,000**
	Subtotal	**1,037,880**
3,000 x 3 Floors = 9,000 / 800 = 11.25 = 12.00 +	Plumbing	**-$ 18,200**
water heater = 13		
13 – 6 = 7 fixtures x 2,600	Partitions	
	Front	
	Canopy	
	Dock	
	Total	**$1,019,680**
S C M I Grade	A **1.10**	= FAC
C&D **1.10** G NH	Replacement Cost New	**$1,121,648**
Eff. Age **30** / Eff. Age **35** / CDU **P** / Age **30**	REL	**.30**
Depreciation = **70%**	**Full Value**	**$336,494**

Summary of Other Buildings

Type	No.	Construction	Size	Rate	Grade	Age	CDU	Factor	Repl. Cost New	REL	Full Value

Listed by: — Total full value other buildings

Date: — Total full value all buildings

Unit 5- Summary

The Appraisal Publications assist with a mass appraisal system.

The schedules in the manual are based on construction costs in central Illinois.

The values given are also based on construction using average quality materials and workmanship.

There are various factors that can be applied to adjust Publication 126 to reflect the values in various jurisdictions.

The Commercial Square Foot Schedules have been developed for pricing the typical mercantile building, office building, apartment building, supermarket, and discount center, as well as convenience stores with gas stations, fast food restaurants, assisted living facilities, branch banks, etc.

For buildings larger than what the schedules allow, Publication 127 and the component-in-place (CIP) method should be used.

The base cost is the cost indicated in the schedules representing the cost of construction per square foot of the structure.

Other features not included in the base cost should be priced from the subsidiary schedules or applicable CIP schedules.

Common adjustments could include the following.

- Wall height
- Wall ratios
- Air conditioning
- Sprinklers
- Plumbing

There can be features outside the main building structure such as the following.

- Signage
- Parking lots
- Sidewalks and other concrete work
- Outbuildings, etc.

The commercial schedules are used in conjunction with the commercial property record cards (PRCs).

PRC-4 is used for listing construction specifications, property use, and for computing building values.
PRC-3 (on the opposite side of PRC-4) is used for valuing commercial or industrial land.

If a building has construction features other than those included in the base cost schedules, adjustments to the base cost must be made.

Unit 5- Review questions

Use Publication 126, Instructions for Commercial Schedules, to answer the following questions.

1. T or F An office building is 70’ x 100’. The first floor has a wall height of 16’. The wall height adjustment would be .98.

2. T or F A 2-story retail building with a full basement has a width of 40’ and a length of 80’. The first-floor wall height is 16’, basement height is 9’, and the second story wall height is 14'. The square feet of wall area would be 9,360.

3. T or F Using the building specifications above, the wall ratio would be 13.33.

4. T or F Always adjust your square feet of ground area (SFGA) by the eave height to arrive at the cubic foot.

5. An office building with a width of 100' and a length of 200' and an overall height of 12’ would have

   a. shape adjustment of .925
   b. wall height adjustment of 1.00
   c. a wall ratio of 33.33
   d. a size adjustment of 1.05

DATA BANK	
SF Ground Area	
Eff. Perimeter LF	
CF of Bldg.	
SF Wall Area	
Wall Ratio	
Sty	Schl

6. A 2-story retail building on a slab with a length of 70’ and a width of 50’ is fully sprinkled. What is the sprinkler adjustment?

   a. sprinkler costs are included in base price
   b. sprinkler cost of $26,950
   c. sprinkler cost of $3.90 per square foot
   d. sprinkler cost of $7.70 per square foot

7. Using the same dimensions above, what would be the air conditioning adjustment amount placed in the computation ladder if building did **not** have air conditioning? The two stories are each at the standard height.

   a. –$7.80 per square foot
   b. –$16.26 per square foot
   c. $15.60 per square foot
   d. $56,910

Unit 6- The Income Approach

This unit covers the ways in which the IRV formula is used to calculate the income of a property, the capitalization rate for a property, and the market value for a property. It also demonstrates how to derive the net operating income of a property to more accurately determine value.

The purpose of this unit is to provide a basic understanding of how the IRV formula can be utilized in the assessment process of income producing properties.

Learning Objectives

After completing the assigned readings, you should be able to determine

- the capitalization rate for a property when given the net income and the value.
- the value for a property when given the cap rate and income.
- the income for a property when given the cap rate and value.
- the potential gross income (PGI) for a property.
- the vacancy and collection losses for a property when given the market standard percentage.
- the effective gross income.
- allowable expenses.
- the net operating income.

Terms and Concepts

IRV Formula
Building capitalization rate
Land capitalization rate
Net income
Market value
Potential gross income (PGI)
Vacancy and collection losses
Effective gross income (EGI)
Allowable expenses
Please **V**iew **M**y **E**lectronic **E**mail **R**ight **N**ow
Market or Economic rent
Contract rent

The Income Approach

Income-producing properties, such as hotels, nursing homes, apartments, and offices are often valued based on the net income these properties produce for their owners.

The **Income Approach** has its widest application in the appraisal of income-producing property. Commercial property is usually bought and sold on its ability to generate and maintain a stream of income for its owner.

The value of such property is a measure of the amount, quality, and durability of the future net income the property can be expected to return to its owner.

The justified price paid for income-producing property is no more than the amount of investment required to produce a comparably desirable return. In addition, since the market can be analyzed to determine the net return anticipated by investors, it follows that the value of income-producing property can be derived from the income the property can produce, or its potential gross income.

Capitalization

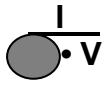
The process for converting the net income produced by property into an indication of its value is called capitalization.

The capitalization rate can be determined by dividing the income a property produces by the market value of the property.

Market value (V) = net income (I) ÷ capitalization rate (R) $\frac{I}{R \cdot V}$

Income

If you know the net income of a property and the value, to find the appropriate capitalization rate, cover up the “R” in the formula so you are left with I divided by V.



Divide the net income “I” by the value “V” to get the capitalization rate “R.”

Net Operating Income

Net operating income is basically the gross income received minus the expenses. It represents the “net”, or “return” to the investor.

To arrive at net operating income, use the following formula:

Potential Gross Income (PGI)
— **V**acancy and collection losses
+ **M**iscellaneous income
= Effective Gross Income (EGI)
— Allowable **E**xpenses
— **R**eserves for replacements **(RR)**
= Net Operating Income (NOI)

The **Potential Gross Income (PGI)** is the **economic rent** for a property at 100 percent occupancy, 100 percent of the time.

When estimating the PGI, it is important to base it on economic, or **market rent**, which may not be the same as contract rent.

Economic or market rent is rent based on market standards, or the rent of similar properties in the area.

Contract rent is the rent the property is actually receiving, based on a lease or other agreement.

For instance, an investor of the subject 10-unit apartment building leases the 1-bedroom units for $700/month. In this area, other investors are typically leasing their 1-bedroom units for $800/month. To determine the Potential Gross Income for the Subject Property, the $800/month figure would be used as the PGI ($800 x 10 units x 12 months), not the actual $700. The owner of the subject building could be (potentially) receiving rents of $800/month.

Vacancy and Collection Loss

It is highly unlikely that a property will be rented to 100 percent capacity at all times, so a deduction for “vacancy loss” is allowed. The amount of the deduction is based on market standards, or the vacancy rate typical for the area. At least some vacancy is to be expected for the repair and maintenance downtime between tenants.

Deductions are also allowed for “collection losses.” Collection losses are losses that result from tenants’ failure to pay rent. These losses are also based on market standards, or collection losses typical for the area.

Amounts deducted for both vacancy and collection losses will be a **percent of the PGI**.

Miscellaneous Income

Income property can also generate income from sources other than rent. For example, an apartment building may have laundry facilities, vending machines, or locked storage areas. The owner may also receive monies for parking spaces. This **Miscellaneous Income** is an addition to the potential gross income resulting in the **Effective Gross Income.**

Effective Gross Income

The Effective Gross Income (EGI) is calculated by estimating the PGI, subtracting the appropriate amounts for vacancy and collection losses, and adding any miscellaneous income.

From the EGI, the allowable expenses and reserves for replacements are subtracted to arrive at the Net Operating Income (NOI).

Allowable Expenses

Allowable expenses are the expenses necessary for the operation of the business to keep it competitive with other properties in the area. Some examples of allowable expenses are

- salaries,
- utilities,
- management,
- insurance,
- supplies,
- materials,
- repairs, and
- maintenance.

For assessment purposes, certain expenses are not allowed when calculating the net operation income. They include:

- property taxes,
- debt service (mortgage and interest), taken into consideration in the capitalization rate,
- income taxes,
- depreciation,
- capital improvements, and
- owner’s business expenses that are not necessary for maintaining the rent produced by the property.

Reserves for Replacements

The final deduction is for **Reserves for Replacements.** The parts of a structure that must be replaced before the building reaches the end of its economic life have an annual expense deduction.

Examples of items for this category are carpeting, floor coverings, roofing, appliances, heating, and air conditioning.

How to Determine Capitalization

After accounting for these components of the income statement used to find NOI**,** you may need to differentiate which form of the capitalization rate (the "R" in the IRV formula) to be used: the building capitalization rate, or the land capitalization rate.

If the property has a building, the Building capitalization rate is used.

The Building capitalization rate is comprised of **three** rates:

- an effective tax rate,
- a recapture rate, and
- a mortgage interest rate.

If the property consists of land that is bare and unimproved, the Land capitalization rate is used.

The Land capitalization rate includes only **two** rates:

- an effective tax rate, and
- a mortgage interest rate.

The **Effective Tax Rate** is the rate determined by multiplying the level of assessment by the aggregate (total) tax rate supported by an individual property. It is used to calculate property taxes by applying the effective tax rate to the full market value.

The **Mortgage Interest Rate** is the interest rate used to convert future payments into present value.

The **Recapture Rate** is used to describe the rate of recovery of an investment in a wasting asset—one that becomes less valuable because it is used up.

The recapture rate is not used when determining the capitalization rate for bare and unimproved land. This is because the recapture rate describes the rate of recovery of an investment in a wasting asset; one that becomes less valuable because it is used up. Land does not generally depreciate or become used up, so it is not a wasting asset.

For class purposes, **a gravel parking lot is not considered improved land**. therefore, no recapture rate is used in the cap rate**. Only use the effective tax rate and the mortgage interest rate.**

***A paved lot is considered improved (it can depreciate)** and the cap rate will be calculated using all three rates

Value is simply the market value, or what a sale of the real estate would bring on the open market.

Example of Determining a Value Using the Income Approach

An apartment building has 15 units that rent for $500 per month. The allowable expenses are $50 per unit, per month. The appropriate capitalization rate is 10.25 percent. What is the value of the building?

IRV formula = $\frac{\text{I}}{\text{R x}}$ Divide I (Net Operating Income) by R (the capitalization rate).

To arrive at a value, you need the net operating income and the appropriate capitalization rate.

1. **Determine the potential gross income.**
   15 (units) x $500 per unit x 12 (months) = PGI $90,000

2. **Determine the annual allowable expenses**.
   15 (units) x $50 per unit x 12 (months) = – Exp – $9,000

3. **Determine the net operating income**
   $90,000 - $9,000 = NOI $81,000

4. **Apply the IRV formula**

   IRV formula = $\frac{\text{I}}{\text{R x}}$ $\frac{81{,}000}{.1025}$ = $790,244

   The value of the property is **$790,244**

.

Exercise 6-1 IRV Formulas

Using the IRV formula, complete the following questions.

1. A retail building recently sold for $900,000. The net annual income is $135,000. What is the capitalization rate? _____

2. A small office building provides its owner with a net annual income of $27,400. The appropriate capitalization rate is 9.35 percent.

   What is the value of this office building? _____

3. The capitalization rate for an office building is 11.3 percent. This building recently sold for $452,600.

   What is the net annual income? _____

4. An apartment building recently sold for $375,700. The net annual income for this building $53,428.

   What is the capitalization rate? _____

5. An apartment building has 20 units that rent for $350 per month. The allowable expenses are $25 per unit, per month. The capitalization rate is 12.54 percent.

   What is the value of this building? _____

6. An asphalt parking lot recently sold for $267,900. The mortgage interest rate is 9.25 percent, the recapture rate is 2.54 percent, and the effective tax rate is 2.00 percent.

   What is the parking lot's net annual income? _____

Exercise 6-2 Income Analysis

In this exercise, you will prepare an income statement to determine the net operating income and value for an improvement.

The formula for arriving at a net operating income is:

Potential gross income (PGI)
— Vacancy and collection losses
+ Miscellaneous income
Effective gross income (EGI)
— Allowable expenses
— Reserves for replacements (RR)
Net operating income (NOI)

The net operating income (NOI) is the income that you will use in the IRV formula to determine the value of an improvement.

There are several steps to follow in preparing an income statement. First, determine the potential gross income (PGI). Remember, PGI is the economic or market rent for a property at 100 percent occupancy.

The next step is to determine the vacancy and collection losses. The market currently is indicating that a 3% loss is typical for the area.

Now add in miscellaneous income. This is any income other than rent, and it may come from several sources such as parking, coin-operated laundry facilities, vending, etc.

Subtract the vacancy and collection losses from the PGI and add in the miscellaneous income to determine the effective gross income (EGI).

The next step is to determine the adjustments for allowable expenses. Allowable expenses are the expenses that are reasonable, typical, and necessary for the operation of the business. In preparing the income statement, taxes and interest are not considered allowable expenses. This is because taxes and interest are reflected in the capitalization rate.

For this exercise, go through the 14 categories listed under “Expenses,” select the appropriate amounts, and write them on the appropriate lines. You must add these amounts to arrive at the total allowable expenses.

The final step in the formula is to subtract allowable expenses from the effective gross income to arrive at the net income.

A mnemonic you can use to remember the order of the formula is:

Please	Potential Gross Income
View	— Vacancy and Collection Losses
My	+ Miscellaneous Income
Electronic	Effective Gross Income
Email	— Expenses
Right	— Reserves for Replacement
Now	Net Operating Income (NOI)

Income and analysis statement

Evaluate the income and expense statement below to develop the current net annual income. Determine which expenses are allowed and enter the amount in the last column. Use the above formula to derive NOI. Then use IRV to determine value.

Income Information	**Allowed**		**Amount**
Rents received	YES		**$ 113,845**
Vacancy and collection loss 3%			
Parking spaces		**2,400**	
Vending and laundry		**1,500**	
Effective gross income			
	------	-----	-----
Expenses:	------	-----	-----
Management		**$4,500**	
Administrative		**200**	
Fuel		**2,800**	
Electrical		**360**	
Water		**155**	
Income tax		**13,000**	
Scavenger (trash removal)		**975**	
Paint and painting supplies		**800**	
Property tax		**16,000**	
Fur coat for M.M.		**4,525**	
Reserves for replacement		**6,250**	
Insurance		**500**	
Mortgage interest		**7,250**	
Janitor		**3,600**	
Total allowable expenses	-----		
Net operating income	-----		

Net operating income = $ _____

Overall capitalization rate = 14.3 percent

Value of property = $ _____

$$\frac{I}{R \times V}$$

Unit 6- Summary

$$\frac{I}{R \bullet V}$$

I = Net income
R = Capitalization rate
V = Market value

Potential gross income (PGI)
— Vacancy and collection losses
+ Miscellaneous income
Effective gross income (EGI)
— Allowable expenses
— Reserves for replacements (RR)

Net operating income (NOI)

Please
View
My
Electronic
Email
Right
Now

Building cap rate = effective tax rate + mortgage interest rate + recapture rate

Land cap rate = effective tax rate + mortgage interest rate

Capitalization rate - the rate of return on a real estate investment property based on the income that the property is expected to generate. The capitalization rate is used to estimate the investor's potential return on his or her investment.

Effective tax rate - the total tax rate determined by applying the aggregate tax rate to an individual property's market value.

Mortgage interest rate - the rate of interest charged by the lender in addition to the principal.

Recapture rate - the rate of recovery of a wasting asset, one which becomes less valuable over time.

Unit 6- Review questions

1. A 100-space paved parking lot rents for $30 a month per space. The effective tax rate is 2.54 percent, the mortgage interest rate is 9.35 percent, and the recapture rate is 3.00 percent.

   What is the value of the parking lot? $_____

2. A 2-story commercial building has a value of $960,000. The building provides its owner with a monthly net income of $6,000 per floor. This is well in line with similar properties.

   What is the building capitalization rate? _____

3. Land used as a parking lot recently sold for $270,000. The recapture rate is 3.25 percent, the mortgage interest rate is 8.15 percent, and the effective tax rate is 2.50 percent.

   What is the net income of this parking lot? $_____

4. A 12-unit apartment building has (6) 1-bedroom units, (4) 2-bedroom units, and (2) 3-bedroom units. The 3-bedroom units rent for $1200 a month, the 2-bedroom units rent for $875 a month, and the 1-bedroom units rent for $600 a month. Similar properties in the area have recorded their monthly income to be at $10,000 a month.

   What is the potential gross income of this apartment building?
   $_____

5. An office building has a potential gross income of $152,176. The vacancy and collection loss is 4%.

   What is the dollar amount of the vacancy and collection loss?
   $_____

   What is the effective gross income? $_____

Unit 7- The Sales Comparison Approach

This unit covers the adjustments to comparable properties to arrive at a value for the subject property.

The purpose of this unit is to provide a basic understanding of how the sales comparison, or market approach method of appraisal can be used to determine a value.

Learning Objectives

After completing the assigned readings, you should be able to

- compute the gross income multiplier, the net income, the overall rate, and the unit price, for a property.
- make the necessary adjustments
- select the property that is most comparable to the subject property.
- identify three indications of value and select the best one for the subject property.

Terms and Concepts

Unit price
Gross income multiplier (GIM)
Gross rent
Sales price
Units
Overall rate
Adjusted sales price
Adjusted unit price

Sales Comparison, or Market Approach

The sales comparison, or market approach is one of the three methods (cost approach, income approach, sales comparison approach) which an assessor can use to value property for assessment purposes. Sales of properties that are similar to the subject (the one that is to be valued) are compared and adjusted to reflect similar and dissimilar features to arrive at a fair market value.

The sales comparison approach is dependent on the availability of recent sales of comparable properties and the validity of the appraisers' judgments made regarding their similarities and differences.

Consideration must be given to all the tangible and intangible factors influencing value.

- location
- size
- date of sale
- construction
- age
- physical features
- condition
- desirability, and usefulness (or utility)
- property rights

The appraiser adjusts the comparable sales to the subject property.

If the comparable property is **superior** in some manner to the subject property, the sales price of the comparable property is adjusted **downward** to the subject property.

Likewise, if the comparable property is **inferior** in some manner to the subject property, the sales price of the comparable property is adjusted **upward** to the subject property. An easy way to remember the adjustments is:

Comp **S**uperior, **S**ubtract (-)
Comp **I**nferior, **I**ncrease (+)

Adjustments

For example, an adjustment may be warranted if several comparable industrial warehouse sales are alike in every way except two are located near an interstate highway and the other sales are located a mile away from any major roadway. If the properties by the interstate sold for more than the non-interstate properties and the subject is by an interstate, then the location seems to be a factor affecting price.

An **upward adjustment** would be required before the inferior sales can be used to estimate the value of the subject property located next to the interstate.

A **downward adjustment** may be necessary if comparable sales are superior to the subject property because they have a railroad spur and the subject property does not. The significance of this approach is in its ability to estimate value that directly reflects the activity of buyers and sellers in the market.

The time (how many months ago) the sale occurred is important because the value of real estate varies over time with changing economic and property conditions. Unlike residential real estate appraisal, the selection of comparable commercial properties may often occur in areas outside of the jurisdiction and may be sales that occurred over 1 year ago. This is based on the fewer number of commercial properties, fewer sales, and a wider search for sold properties.

Units of Comparison – the Gross Income Multiplier and Unit Price

The Gross Income Multiplier (GIM) is used in commercial real estate to roughly value a property in order to make an **investment** decision. It is a ratio of property value to gross income. It is a multiplier, not a percentage.

To arrive at a GIM, divide the sales price by the gross rent.

GIM = Sales Price ÷ Gross Rent (Gross Income) or GIM = $\frac{SP}{GI}$

The first step in calculating a GIM is to select several comparables from which sufficient information can be developed. Such comparable properties should be similar in terms of size, price, location, rents, etc.

Example: Gross Income Multiplier
The subject property has a gross income of $50,000. A comparable sale with a gross income of $56,000 and a selling price of $392,000 is found. (In actual practice, several comparables would be located and analyzed.)

$$\text{GIM} = \frac{\text{Sale Price}}{\text{Gross Income}}$$

$$\text{GIM} = \frac{\$392,000}{\$56,000} = 7$$

The comparable sold for 7 times its gross income. This multiplier can be used with the subject property to arrive at a value:

GIM = SP ÷ GI or V (SP) = GIM x GI = 7 x $50,000 = $350,000

The value for the subject property could be estimated at $350,000.

The Unit Price is calculated by taking the sales price of the entire property (adjusted to reflect current value) divided by the number of units (apartments, offices, storage units, etc.)

Unit Price = Adjusted Sales Price ÷ Number of Units or $UP = \frac{\text{Adj. SP}}{\text{\# Units}}$

The adjusted Sales Price is used because we want to reflect what the current sales price would be today, not when the property last sold.

The first step in the sales comparison approach is to gather information on comparable properties that have sold. Once the information is gathered, the assessor should study the properties to determine if any adjustments are needed.

The GIM can be used to quickly survey the market for investment opportunity by filtering out properties with a low sales price relative to gross income. It is somewhat limited due to not considering the expenses associated with a property. It would also not be a good indicator of value for an owner-occupied property.

Exercise 7-1 Apartment Building Sales Comparison

The following 5 sales presented in the analysis grid were selected as the most comparable to the subject property. All the sales are located in the subject's market area. You must first determine what units of comparison to use to arrive at a value for the subject. You will use two units of comparison: the unit value and a GIM to estimate the market value of the subject property. Then you will determine which method of comparison gives you the best indication of value. To calculate an overall cap rate for the property, use the IRV formula to find the rate.

Market Data

The subject property is a 24-unit apartment building with 11 efficiencies and 13 one-bedroom apartments. The annual gross rent is $113,845 and expenses are $26,162. The subject was built 12 years ago. It has vinyl siding over a wood frame and average quality of construction.

An analysis of all apartment property sales within the neighborhood indicates an annual market increase of 5 percent. The following 5 sales presented in the analysis grid were selected as the most comparable to the subject property.

Sale 1- 107 Capitol

The property at 107 Capitol, built 12 years ago of vinyl siding on a wood frame, is in a condition that is inferior to the subject property. The subject property is in a better location than the property at 107 Capitol.

Sale 2- 455 Main

The property at 455 Main, also built 12 years ago of average quality construction, has vinyl siding on a wood frame. It sold one year ago. It is of average condition. The location is superior to the subject property.

Sale 3- 806 Capitol

The property at 806 Capitol, built 8 years ago, sold two years ago. The location of sale 3 is inferior to the subject property. However, the construction quality of 806 Capitol is superior to the subject property.

Sale 4- 355 Pine

The property at 355 Pine was built 9 years ago. The condition and location of 355 Pine are superior to the subject property. The construction quality of this property is also superior to the subject property.

Sale 5- 456 State

The condition of 456 State, built 12 years ago of vinyl on a wood frame, is like the subject property. The location is similar to the subject, and it is of average quality construction.

Part I- Use the grid with the market data you've been given and determine GIM and Unit Price.

Sales Price adjusted for time (adjusted sales price) is the number you will use in determining GIM, income, and unit price. This is because you want to compare <u>current</u> values of all the sales (market data indicates a 5% yearly increase in value).

Check your answers on next page. Round your answers to full dollars.

Subject Parcel	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5
Address	107 Capitol	455 Main	806 Capitol	355 Pine	456 State
Sales date	Current	1 yr. ago	2 yrs. ago	1 yr. ago	Current
Sales price	$642,000	$626,000	$510,000	$612,000	$584,000
SP adjusted	N/A	+5%	+10%	+5%	N/A
for time	$642,000				$584,000
Gross rent	$110,700	$111,840	$99,960	$113,280	$108,240
GIM					
Expenses	$25,440	$25,680	$23,040	$26,040	$24,900
Net income					
Overall rate					
Units	27	24	18	18	22
Unit price					
Monthly Unit Gross income					

Subject Parcel	**Sale 1**	**Sale 2**	**Sale 3**	**Sale 4**	**Sale 5**
Address	107 Capitol	455 Main	806 Capitol	355 Pine	456 State
Sales date	Current	1 yr. ago	2 yrs. ago	1 yr. ago	Current
Sales price	$642,000	$626,000	$510,000	$612,000	$584,000
SP adjusted for time	- $642,000	+5% $657,300	+10% $561,000	+5% $642,600	- $584,000
Gross rent	$110,700	$111,840	$99,960	$113,280	$108,240
GIM	**5.80**	**5.88**	**5.61**	**5.67**	**5.40**
Expenses	$25,440	$25,680	$23,040	$26,040	$24,900
Net income	**$85,260**	**$86,160**	**$76,920**	**$87,240**	**$83,340**
Overall rate	**13.28 %**	**13.11 %**	**13.71 %**	**13.58 %**	**14.27 %**
Units	27	24	18	18	22
Unit price	**$23,778**	**$27,388**	**$31,167**	**$35,700**	**$26,545**
Monthly Unit Gross income	4100/12 $342.00	4660/12 $388.00	5553/12 $463.00	6293/12 $524.00	4920/12 $410.00

Each sale is now examined to determine if any **adjustment** is necessary. Once you have reviewed the data, you will come up with a total ranking for each property.

After making all the necessary adjustments and calculations, the appraiser would study the grid to determine the sales which are most comparable to the subject property. Once the comparables have been selected, values can be determined for the subject property.

Use the data sheet on the next page and the previous grid to fill in Part II with “Inferior,” “Similar,” or “Superior.” <u>If there is nothing written for the characteristic, it is similar.</u>

Let's walk through column one, **Sale 1**.

The previous grid noted that **Sale 1** at 107 Capitol was a "current" sale so the date of sale is "**Similar.**" Since it was built 12 years ago when the subject property was also built, the age is also "Similar."

Sale 1 is constructed of vinyl siding on a wood frame so it is **similar** to the subject's construction quality. From the data sheet, **Sale 1** is in a condition that is **inferior** to the subject property.

The **subject** property is in a **better** location than the property at 107 Capitol. Since the subject property is in a better location that Sale 1, then **Sale 1 has an inferior location** to the subject property. Remember to **always adjust the comparable property**.

From the grid, we see that Sale 1 has 15 efficiency apartments and 12 1-bedroom apartments which is **similar** to the subject.

Looking at the **Sale 1** column, there are **2 "Inferior"** characteristics with the remaining characteristics rated **"Similar"**. We would conclude **Sale 1** is somewhat **inferior** to the subject which would indicate a value higher than $23,778 per unit for the subject.

Part Two- complete the grid for sales 2 – 5.

Parcel	Subject	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5
Date of Sale	—	Similar				
Location	—	Inferior				
Condition	—	Inferior				
Age	12 yrs. old	Similar				
Construction Quality	Vinyl	Similar				
# of Adjustments	—	**2**				
Overall Rating	—	**Inferior**				

For each sale, add together the number of adjustments and determine an overall rating of the property characteristics as being similar, inferior or superior to the subject. The sale with the fewest number of adjustments will be our best comparable, or property most like the subject.

Unit Price (dollar per apartment unit of measure) Analysis:

You should have selected sale 5 as the property most comparable to the subject because it required the least number of adjustments.

Since sale 1 overall is inferior to the subject, a value higher than the sale price of $23,778 per unit (table on page 122) for the subject is indicated.

Sale 2 is similar; a price in the $27,388 range might be better for the subject. Sale 3 was also similar and had a unit price of $31,157. Sale 4 was superior overall, with a unit price of 35,700. So, the value estimate for the subject property should be less than the sale price of sale 4.

The subject is most similar (least number of adjustments) to sale 5 which sold for $26,545.

To arrive at a value for the subject property based on unit price, multiply the number of apartment units in the subject property by the unit value indicated by the selected comparable.

The subject property has 24 apartment units. We will value them at $26,545 per unit as we discovered from the market.

26,545 x 24 = $637,080.

Gross Income Multiplier (GIM) Unit of Measure Analysis

For the gross income multiplier, we will again choose sale 5 as the sale with the least number of adjustments, but this time we will look at the GIM, a value for the subject property based on income.

To arrive at a value for the subject property using the GIM, multiply the **subject property's gross rent by the comparable GIM.**

Multiply the subject's gross income by the GIM of 5.40 for sale 5. The subject property has a gross rent of $113,845.

5.40 X $113,845 = $ 614,763

The Last Analysis- Consistency

Now, we will examine **consistency (meaning reliability).**

The unit prices range from $23,778 to $35,700 per unit (apartment). This would most likely be considered a large sales price spread considering expenses have been factored in to the analysis. **These unit prices are highly variable (not consistent).**

The GIM for the comparables range from 5.40 to 5.88, meaning that the known comparables' sales prices varied from 5.40 times gross rent to 5.88 times gross rent. These numbers are **very consistent, meaning they have little variability (consistent).**

Considering the 5 sales, which unit of value, the unit price or the GIM is <u>most consistent</u>?

_____

This would be the basis for which unit of value to choose.

After determining, through this calculation, that the market is responding to the GIM, the value that the assessor would place on the property would be **$614,763, which is the number we calculated using the GIM of the most similar sale, Sale 5.**

Unit 7- Summary

The sales comparison approach to value arrives at a value for the subject property by comparing it to similar properties that have sold. Consideration must be given to all the tangible and intangible factors influencing value, such as location, construction, age, physical features, condition, desirability, and usefulness.

If the comparable property that has sold is superior in some manner to the subject property being evaluated, the sales price of the comparable property is adjusted downward to the subject property. Likewise, if the comparable property is inferior in some manner to the subject property, the sales price of the comparable property is adjusted upward to the subject property.

Comp Superior, Subtract (-)
Comp Inferior, Increase (+)

The **GIM** is a method to evaluate property based on its sale price and gross rents.

Unit 7- Review questions

1.T or F When using the sales comparison, or market approach, one never adjusts the subject.

2.T or F The formula for the GIM is the gross rent divided by the sales price.

3.T or F Make a minus adjustment to your comparable if it is inferior to your subject.

4.T or F If the market is showing an annual increase of 3 percent, a sale occurring 2 years ago would have a minus adjustment of 6 percent.

5.T or F The GIM is a unit of comparison in the income approach to value.

6.T or F When valuing property using the sales comparison, or market approach, 3 to 5 sales is recommended.

Exam Preparation

Examination Information

- You must have a calculator- one that displays up to 10 decimal points is best.
- The exam consists of 50 multiple choice questions.
- Each question is worth an equal number of points when the exam is graded.
- There is only one best answer for each question on the examination.
- Two hours are allotted for completion of the exam.
- The exam is closed book. All class materials, papers, computers, and cellular devices must be removed from the table before taking the exam.
- Cellular phones may not be used as calculators.

Test-Taking Strategies

- Read each question thoroughly and choose the one best answer provided.
- Review the answer sheet for any skipped answers or multiple answers for the same question
- Some test-takers prefer to answer questions that they are confident in the answers first and choose to skip over harder questions or questions that involve math calculations. If this is done, be sure to complete the correct answer on the answer sheet for the questions being answered. The answer sheets are graded by hand, so question numbers may be circled so that they can be easily identified during the second pass through the exam.
- Be mindful of the time allotted. If a question is taking a lot of time to answer, move past it and come back to it later.
- Guessing an answer is better than leaving it blank if time becomes an issue.

Answer key

Units 1 through 7

1-B Introduction to Commercial Assessment Practices

Unit 1- Review answers

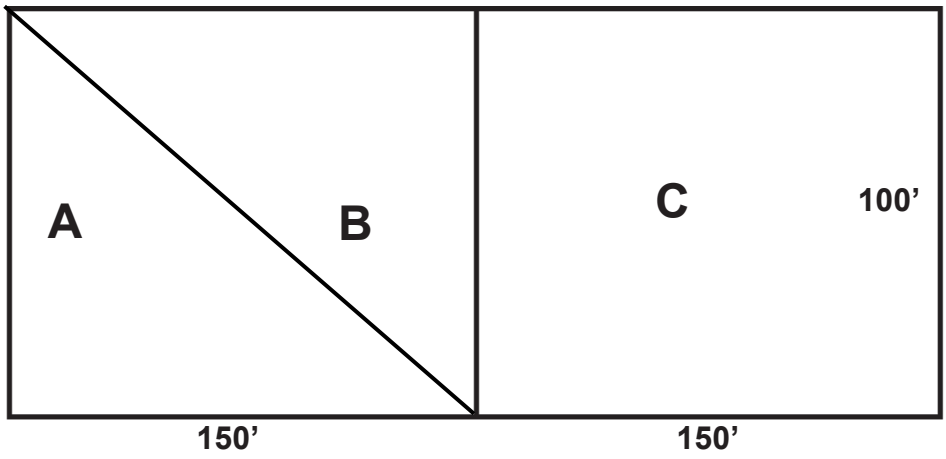
There can be more than one answer.

F	Sales comparison	**A**	$\frac{I}{R \bullet V}$
C, D	Cost approach	**B**	The loss of value due to all causes
A	Income approach	**C**	MV = Land value + (RCN - depreciation)
B	Depreciation	**D**	Approach that is most applicable when the improvement is new and is at its highest and best use.
E	Capitalization	**E**	Conversion of the net return produced by a property into an indication of value.
		F	Adjust recent comparable sales to the subject.

Unit 2- Exercise 2-1 answers

	Site Shape	Measurements	Square Footage	Approx. Acreage
1.	Rectangle	400’ x 800’	320,000	7.35
2.	Rectangle	320’ x 480’	**153,600**	**3.53**
3.	Triangle	320’ x 480’	76,800	1.76
4.	Triangle	150’ x 180’	**13,500**	**.31**
5.	Square	150’ x 150’	**22,500**	**.52**
6.	Triangle	600’ x 900’	**270,000**	**6.20**

7. Refer to the diagram below



Compute the values for the three parcels
If the square foot value is $1.00/SF

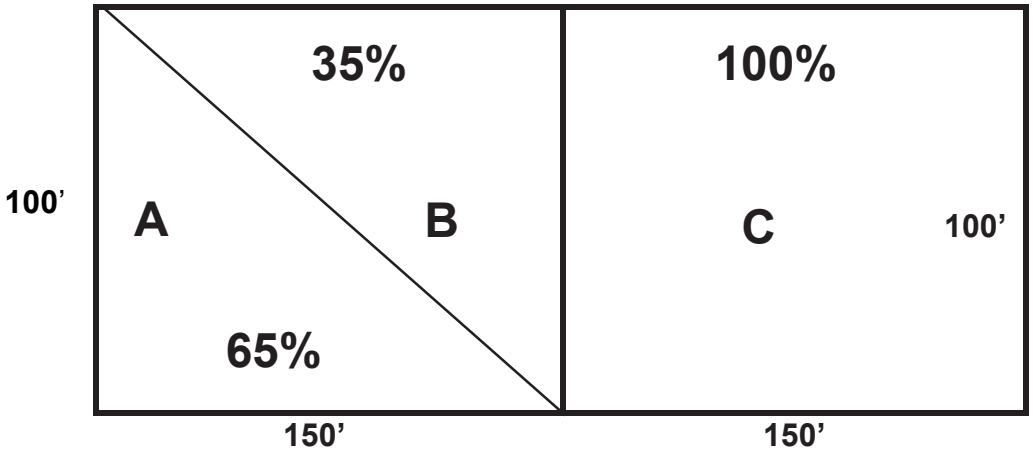
A $15,000

B $ 7,500

C $ 7,500

Exercise 2-2 answers

65/35 Rule (Applies to Front Foot Only)



Compute the values for the three parcels above if
The front foot value is $100 FF.

A $ 9,750
B $ 5,250
C $15,000

A $ 9,750 (150' x $100/FF x 65%)

B $ 5,250 (150' x $100/FF x 35%)

C $15,000 (150' x $100/FF)

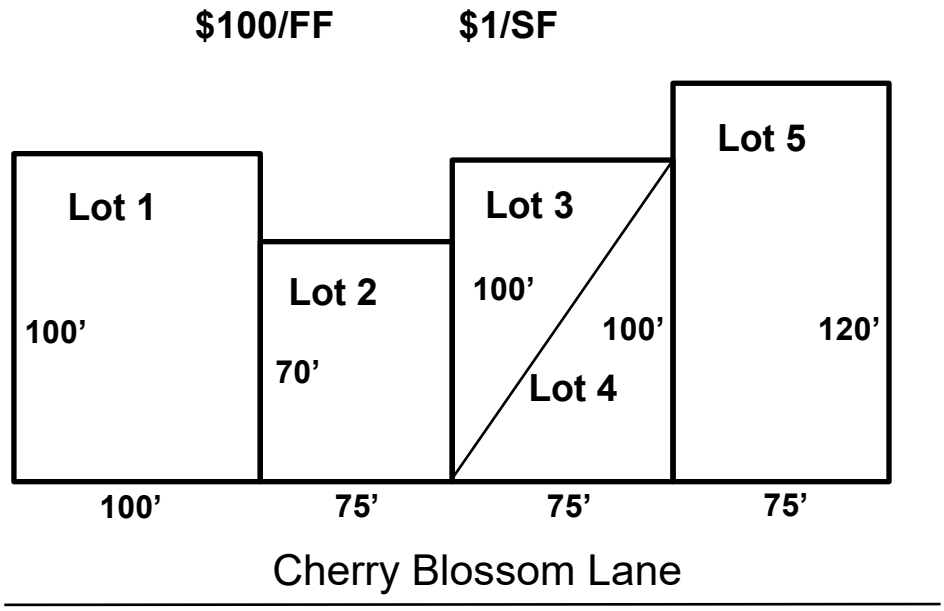
Exercise 2-3 answers

For this exercise, the front foot unit of comparison derived from the market is $100 per front foot. The square foot value derived from the market is $1/SF.

Value the lots using the formulas below.

Front Foot: Lot value = number of FF x $ per FF x factor for shape

Square Foot: Lot value = number of SF x $ per SF



Lot 1 FF value = **$10,000**
SF value = **$10,000**

Lot 2 FF value = **$7,500**
SF value = **$5,250**

Lot 3 FF value = **$2,625**
SF value = **$3,750**

Lot 4 FF value = **$4,875**
SF value = **$3,750**

Lot 5 FF value = **$7,500**
SF value = **$9,000**

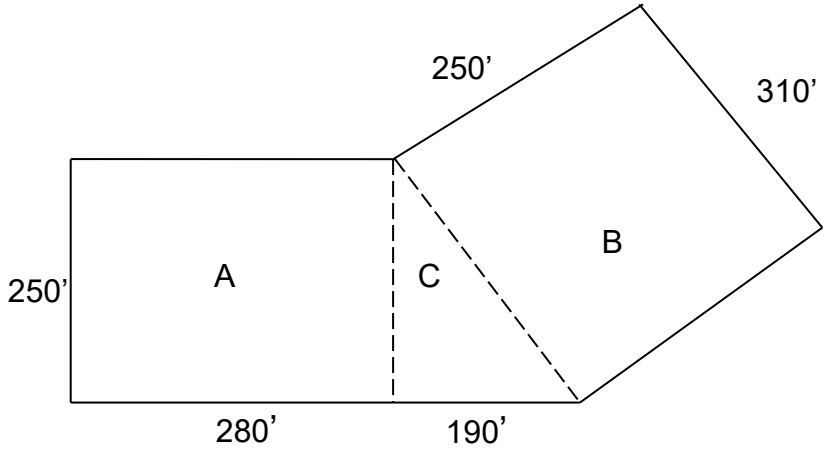
Review Exercise 2-1 answers

Compute the square footage and the acreage for the following (assume all triangles are right triangles). Don't forget there are 43,560 SF in an acre.

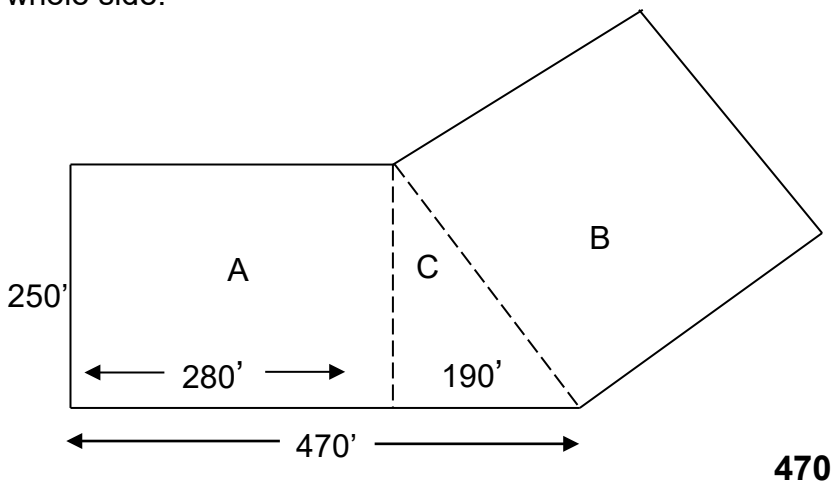
Parcel shape	Measurements	Square footage	Acreage
1. Square	1,528 ft. x 1,528 ft.	2,334,784	53.60
2. Square	680 ft. each side	462,400	10.62
3. Rectangle	1,250 ft. x 1,000 ft.	1,250,000	28.70
4. Rectangle	125 ft. x 75 ft.	9,375	.22
5. Square	65 ft. x 65 ft.	4,225	.10
6. Triangle	475 ft. x 986 ft.	468,350	10.75
7. Triangle	680 ft. x 360 ft.	244,800	5.62

Review Exercise 2-2 answers

First divide the figure into rectangles and right triangles.

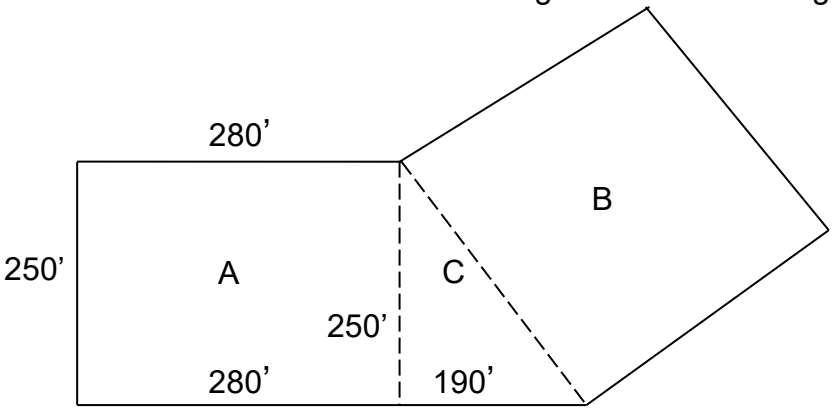


Remember that the opposite sides of rectangles have the same measure. The base of the triangle is found by subtracting the length of the side of the rectangle from the length of the whole side.



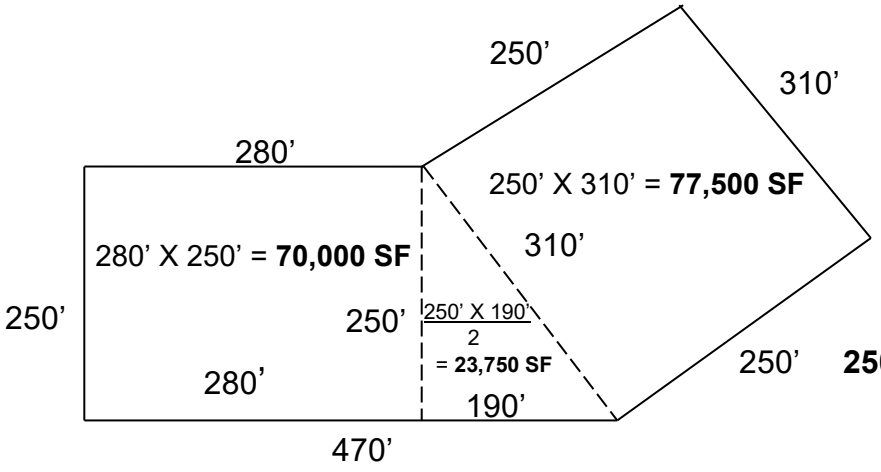
470' – 280' = 190'

The area of rectangle **A = 280' x 250' = 70,000 SF**. The area of the triangle C can be determined with the formula for finding the area of a triangle $\frac{(B \times h)}{2}$.



$$\frac{190' \times 250'}{2} = 23{,}750 \text{ SF}$$

Now the area of rectangle B can be determined again using the mathematical fact that opposite sides of a rectangle have the same measure.



250’ X 310’ = 77,500 SF

Finally, **add A + B + C = 70,000 SF + 23,750 SF + 77,500 SF= 171,250 SF**

$$\textbf{Acreage} = \frac{\textbf{171,250 SF}}{\textbf{43,560 SF}} = \textbf{3.93 acres}$$

Unit 3- Exercise answers

Exercise 3-1

An average structure has a value of $700,000 in central Illinois. The subject is of good quality and is in an area where construction costs are higher. What is the combined factor if the cost factor is 1.06 and the quality grade factor is 1.22?

1.29

What is the new calculated value? **$ 903,000**

Exercise 3-2

Find the 2nd effective age, REL factor, and depreciation for the following:

1. A structure whose 1st effective age is 10, and has a CDU of “P”.

   2nd Effective Age **15** REL **70** Depreciation **30 %**

2. An average structure, 5 years old, with a CDU of “A”.

   2nd Effective Age **5** REL **90** Depreciation **10 %**

3. A structure with an actual age of 20, but age considering physical condition of 10, with a CDU of “E”.

   2nd Effective Age **1** REL **98** Depreciation **2 %**

Unit 3- Review answers

Across

1 __**CDU**____ ratings are assigned in relation to other structures within the neighborhood.

2 _**DESIGN**__ factors adjust the appraisal publication values to account for unusual architectural designs.

3 _**COST**___factors adjust the manual to current local actual labor and material rates.

4 A _**FACTOR** adjusts values by applying an increase or decrease.

5 A quality grade of “A” is considered _**EXCELLENT**__.

6 An assessor is a _**MASS**__ appraiser.

7 To place a value upon. _**APPRAISE**__

Down

1 This age helps determine REL. _**EFFECTIVE**__

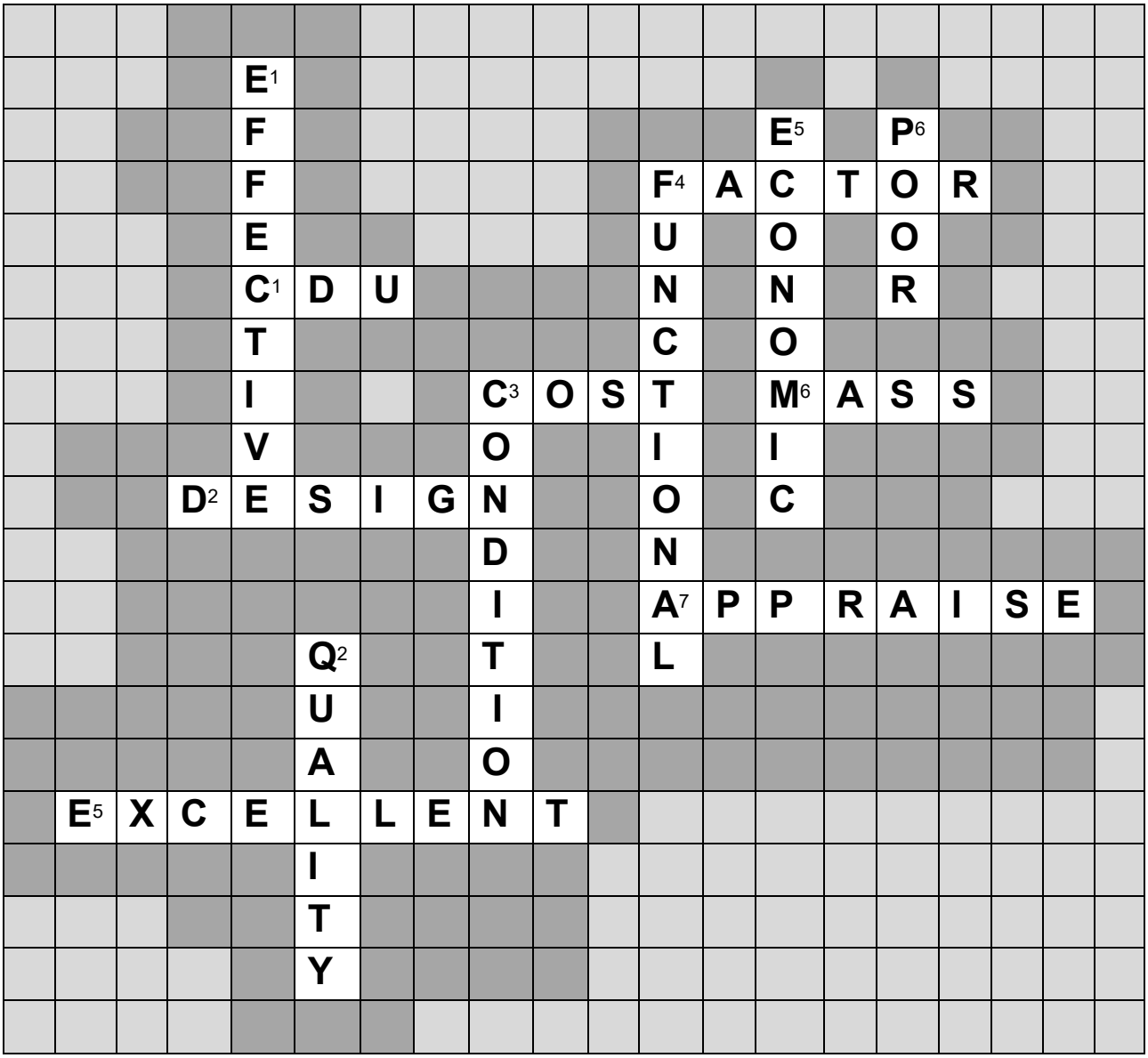
2 The factor that may remain the same for the life of the improvement _**QUALITY GRADE**_.

3 Physical depreciation refers to the _**CONDITION**_ of the structure

4 Type of depreciation that occurs when a structure has features like low ceilings, lack of air conditioning, etc. _**FUNCTIONAL**_

5 Type of depreciation that is outside the property boundaries. _**ECONOMIC**_

6 A not-so-great category under Schedule A._**POOR**_

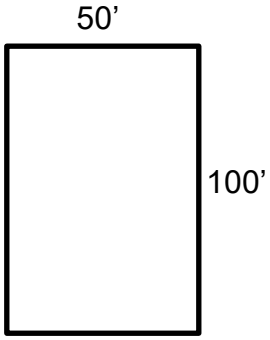

E1
F
F
E
C1 D U
T
I C3 O S T M6 A S S
V O I I
D2 E S I G N O C
D N
I A7 P P R A I S E
Q2 T L
U I
A O
E5 X C E L L E N T
I
T
Y
E5
P6
F4 A C T O R
U O O
N N R
C O

Unit 4- Exercise 4-1 answers

	2-Story L36 W40 H28	2-Story L48 W50 H28	2-Story L44 W50 H28	3-Story L72 W48 H42
S/F ground area **(SFGA)**	**1,440**	**2,400**	**2,200**	**3,456**
Eff. Perim. L/F **(EP)**	**152**	**196**	**188**	**240**
C/F of bldg. **(CF)**	**40,320**	**67,200**	**61,600**	**145,152**
S/F wall area **(SFWA)**	**4,256**	**5,488**	**5,264**	**10,080**
Wall Ratio **(WR)**	**9.47**	**12.24**	**11.70**	**14.40**
Shape Adjustment Factor	**1.211**	**1.115**	**1.115**	**1.060**

2. Complete the Data Bank

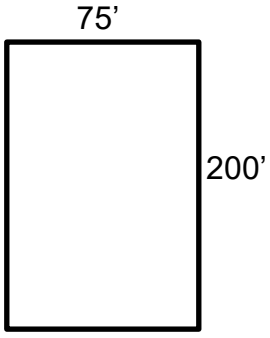
13’	Open store
14’	Open store
9’	Basement Unfinished



DATA BANK	
SF Ground Area	5,000
Eff. Perim LF	300
CF of Bldg.	135,000
SF Wall Area	8,100
Wall Ratio	16.67

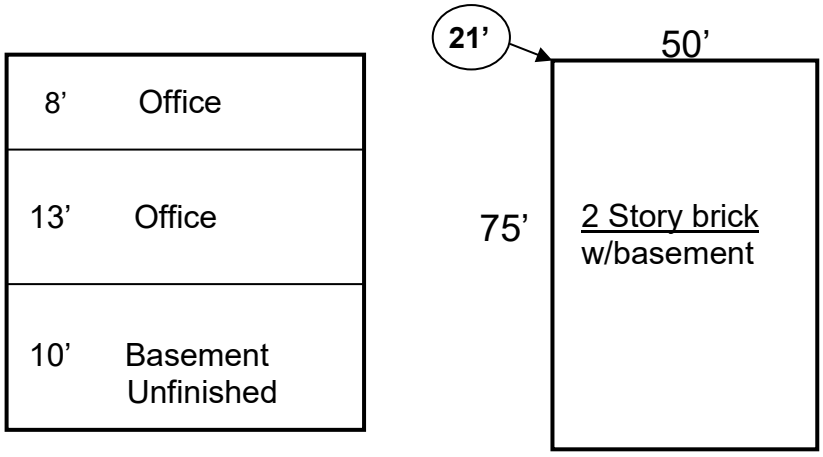
3. Complete the Data Bank

13’	Open store
13’	Open store
14’	Open store
9’	Basement Unfinished



DATA BANK	
SF Ground Area	15,000
Eff. Perim LF	550
CF of Bldg.	600,000
SF Wall Area	22,000
Wall Ratio	27.27

Unit 4- Review answers



Data Bank:

S/F ground area **(SFGA)**	**3,750**
Eff. Perimeter L/F **(EP)**	**250**
C/F of bldg. **(CF)**	**78,750**
S/F wall area **(SFWA)**	**5,250**
Wall Ratio **(WR)**	**15.00**

1. Compute the EP if one of the 75' walls is a party wall. **220 SF**
2. Compute the EP if both of the 75' walls are party walls. **190 SF**
3. Calculate the data bank for the following structures.

	2-Story L52 W36 H26	3-Story L40 W50 H42	2-Story L150 W75 H28
S/F ground area	1,872	2,000	11,250
Eff. perimeter	176	180	450
C/F of building	48,672	84,000	315,000
S/F wall area	4,576	7,560	12,600
Wall ratio	10.64	11.11	25.00

	2-Story L40 W40 H26	3-Story L40 W40 H42	2-Story L50 W40 H28
S/F ground area	1,600	1,600	2,000
Eff. perimeter	160	160	180
C/F of building	41,600	67,200	56,000
S/F wall area	4,160	6,720	5,040
Wall ratio	10.00	10.00	11.11

4. Calculate the data bank for the following structures, if 1 wall of the length is a party wall.

	2-Story L40 W40 H26	3-Story L40 W40 H42	2-Story L50 W40 H28
S/F ground area	1,600	1,600	2,000
Eff. perimeter	144	144	160
C/F of building	41,600	67,200	56,000
S/F wall area	3,744	6,048	4,480
Wall ratio	11.11	11.11	12.50

Unit 5- Exercise answers

Exercise 5-1

8	**1.283**	22.00	**.950**
10.5	**1.166**	20.75	**.969**
35.80	**.866**	14.6	**1.042**

Exercise 5-2 A/C and Sprinkling System Worksheet answers

No A/C Air conditioning adjustment

1-Story Retail

L52 W36 H13	**SAF**	**1.166**	
1st floor store (14')	**WH =**	**-2% or .98**	**$ -7.80 x .98 x 1.166 = - $ 8.91**
Total Adjustment to Base Price			**- $ 8.91**

2-Story Retail

L40 W40 H26	**SAF**	**1.183**	
1st floor store (14')	**WH =**	**0 %**	**$ - 7.80 x 1.00 x 1.183 = - $ 9.23**
2nd floor store (12')	**WH =**	**0 %**	**$ - 7.80 x 1.00 x 1.183 = - $ 9.23**
Total Adjustment to Base Price			**- $ 18.46**

3-Story Office

L40 W40 H44	**SAF**	**1.105**	
1st floor office (14')	**WH =**	**0 %**	**$ -16.50 x 1.00 x 1.105 = -$18.23**
2nd floor office (14')	**WH =**	**4 %**	**$ -16.50 x 1.04 x 1.105 = -$18.96**
3rd floor office (16')	**WH =**	**8 %**	**$ -16.50 x 1.08 x 1.105 = -$19.69**
Total Adjustment to Base Price			**$ - $ 56.88**

2-Story Retail

L50 W40 H28	**SAF**	**1.148**	
1st floor store (14')	**WH =**	**0 %**	**$ - 7.80 x 1.00 x 1.148 = - $ 8.95**
2nd floor store (14')	**WH =**	**4 %**	**$ - 7.80 x 1.04 x 1.148 = - $ 9.31**
Total Adjustment to Base Price			**$ - $18.26**

3-Story Retail & Office

L100 W 60 H40	**SAF**	**.981**	
1st floor store (12')	**WH =**	**-4 %**	**$ - 7.80 x .96 x .981 = - $ 7.35**
2nd floor store (14')	**WH =**	**4 %**	**$ - 7.80 x 1.04 x .981 = - $ 7.96**
3rd floor office (14')	**WH =**	**4 %**	**$ - 16.50 x 1.04 x .981 = - $ 16.83**
Total Adjustment to Base Price			**$ -$ 32.14**

Exercise 5-3 Plumbing Adjustment Worksheet answers

Exercise 5-3 Plumbing Adjustment Worksheet

Base Cost- The typical number of fixtures per SFFA plus one water heater per property.

- **Retail Base Cost**- 1 fixture per 800 SFFA is typical plus one water heater per property.
- **Office Base Cost**- 1 fixture per 1300 SFFA is typical plus one water heater per property.

*For this exercise only, all multi-story buildings are assumed to have the same SF on each floor. If the number of fixtures expected is fractional, always round up. You can't have half of a sink. *Number of Fixtures on PRC already have the H2O heater included.*

Description	SFGA	# Fix. Expected	+	H2O Heater	=	# Fix. Total	-	*# Fix. PRC	=	Diff. # Fix.	x $2,600 =	+- $ Adj.
1-Story **Retail**	**6,000**	**8**		**1**		**9**		**6**		**- 3**	**x $2,600 =**	**- $7,800**
2-Story **Retail**	**4,000**	**10**		**1**		**11**		**12**		**+1**	x $2,600 =	**+ $2,600**
3-Story **Retail**	**5,000**	**19**		**1**		**20**		**9**		**- 11**	x $2,600 =	**- $28,600**
1-Story **Office**	**5,000**	**4**		**1**		**5**		**7**		**+ 2**	x $2,600 =	**+ $5,200**
2-Story **Office**	**3,000**	**5**		**1**		**6**		**16**		**+10**	x $2,600 =	**+$26,000**
3-Story **Office**	**6,000**	**14**		**1**		**15**		**23**		**+8**	x $2,600 =	**+$20,800**
3-Story **Office 3 Flrs. 1&2 Retail**	**4,000**	**14**		**1**		**15**		**11**		**- 4**	x $2,600 =	**- $10,400**

Unit 5- Review answers

1. T or (F) An office building is 70’ x 100’. The first floor has a wall height of 16’. The wall height adjustment would be .98. **(1.04 is correct)**

2. T or (F) A 2-story retail building with a full basement has a width of 40’ and a length of 80’. The first-floor wall height is 16’, basement height is 9’, and the second story wall height is 14'. The square feet of wall area would be 9,360. **(16+14 = 30 40+40+80+80 = 240 x 30 = 7,200)**

3. (T) or F Using the building specifications above, the wall ratio would be 13.33.

4. (T) or F Always adjust your square feet of ground area (SFGA) by the eave height to arrive at the cubic foot.

5. An office building with a width of 100' and a length of 200' and an overall height of 12’ would have

   a. shape adjustment of .925
   b. wall height adjustment of 1.00
   (c.) a wall ratio of 33.33
   d. a size adjustment of 1.05

S/F ground area **(SFGA)**	**20,000**
Eff. Perimeter L/F **(EP)**	**600**
C/F of bldg. **(CF)**	**240,000**
S/F wall area **(SFWA)**	**7,200**
Wall Ratio **(WR)**	**33.33**

6. A 2-story retail building on a slab with a length of 70’ and a width of 50’ is fully sprinkled. What is the sprinkler adjustment?

   (a.) sprinkler costs are included in base price
   b. sprinkler cost of $26,950
   c. sprinkler cost of $3.90 per square foot
   d. sprinkler cost of $7.70 per square foot

7. Using the same dimensions above and standard wall heights, calculate the air conditioning adjustment amount placed in the computation ladder if the building did **not** have air conditioning?
   The two stories are each at the standard height. **(12 and 14 = 26 OH)**

   a. –$7.80 per square foot
   b. –$16.26 per square foot
   c. $15.60 per square foot
   d. $56,910

S/F ground area **(SFGA)**	**3,500**
Eff. Perimeter L/F **(EP)**	**240**
C/F of bldg. **(CF)**	**91,000**
S/F wall area **(SFWA)**	**6,240**
Wall Ratio **(WR)**	**14.58**

Shape adjustment factor is 1.042

-7.80 a/c floor 1 x 1.042 = $ 8.13
-7.80 a/c floor 2 x 1.042 = $ 8.13
-$16.26

Unit 6- Exercise 6-1 answers

Using the IRV formula, complete the following questions.

1. A retail building recently sold for $900,000. The net annual income is $135,000. What is the capitalization rate? **15%**

   135,000/900,000= .1500 or 15%

2. A small office building provides its owner with a net annual income of $27,400. The appropriate capitalization rate is 9.35 percent. What is the value of this building?

   $ 293,048

   27,400/ .0935= 293,048

3. The capitalization rate for an office building is 11.3 percent. This building recently sold for $452,600. What is the net annual income? **$ 51,144**

   452,600 x 0.113= 51,144

4. An apartment building recently sold for $375,700. The net annual income for this building is $53,428. What is the capitalization rate? **0.1422 = 14.22 %**

   53,428/375,700= .1422

5. An apartment building has 20 units that rent for $350 per month. The allowable expenses are $25 per unit, per month. The capitalization rate is 12.54 percent. What is the value of this building? **$622,010**

   350 x 12 x 20 = $84,000
   25 x 12 x 20 = – 6,000
   78,000

   78,000 = 622,010
   0.1254

6. An asphalt parking lot recently sold for $267,900. The mortgage interest rate is 9.25 percent, the equity rate is 2.54 percent, and the effective tax rate is 2.00 percent. What is the parking lot's net annual income? **$36,943**

   $267,900 x 0.1379= $36,943

Unit 6- Exercise 6-2 answers

Income analysis

Income Information	Allowed		Amount
Rents received			$ 113,845
Vacancy and collection loss 3%	Y		3,415
Parking spaces	Y		2,400
Vending and laundry	Y		1,500
Effective gross income			114,330
Expenses:			
Management	Y	$4,500	$4,500
Administrative	Y	200	200
Fuel	Y	2,800	2,800
Electrical	Y	360	360
Water	Y	155	155
~~Income tax~~	N	~~13,000~~	-
Scavenger (trash removal)	Y	975	975
Paint and Supplies	Y	800	800
~~Property tax~~	N	~~16,000~~	-
~~Fur coat for M.M.~~	N	~~4,525~~	-
Reserves for replacement	Y	6,250	6,250
Insurance	Y	500	500
~~Mortgage interest~~	N	~~7,250~~	-
Janitor	Y	3,600	3,600
Total allowable expenses			20,140
Net operating income			94,190

EGI = $114,330 – Allowed Expenses ($20,140) = NOI

NOI = Net operating income = $ 94,190

Overall capitalization rate = 14.3 percent

Value of property = $94,190 / .143 = $ 658,671

$$\frac{I}{R \times V}$$

Unit 6- Review answers

1. A 100-space paved parking lot rents for $30 a month per space. The effective tax rate is 2.54 percent, the mortgage interest rate is 9.35 percent, and the equity rate is 3.00 percent. **I / R x V = 36,000 / 0.1489** 30 x 12 x 100 = $36,000

   What is the value of the parking lot? **$241,773**

2. A 2-story commercial building has a value of $960,000. The building provides its owner with a monthly income of $6,000 per floor. This is well in line with similar properties. **I / R x V = 144,000 / 960,000** Income = **6,000 x 2 x 12 = $144,000**

   What is the building capitalization rate? **15%**

3. Land used as a parking lot recently sold for $270,000. The recapture rate is 3.25 percent, the mortgage interest rate is 8.15 percent, and the effective tax rate is 2.50 percent.

   I / R x V **R x V = 270,000 x .1065 = $28,755**

   What is the net income of this parking lot? **$ 28,755**

4. A 12-unit apartment building has (6) 1-bedroom units, (4) 2-bedroom units, and (2) 3-bedroom units. The 3-bedroom units rent for $1200 a month, the 2-bedroom units rent for $875 a month, and the 1-bedroom units rent for $600 a month. Similar properties in the area have recorded their monthly income to be at $10,000 a month.

   What is the PGI of this 12-unit apartment building? **$120,000**

   Potential Gross Income = $10,000 x 12 months = $120,000/year.

5. An office building has a potential gross income of $152,176. The vacancy and collection loss is 4%.

   What is the vacancy and collection loss? **$ 6,087**

   $152,176 x .04 = $6,087

   What is the effective gross income? **$146,089**

   $152,176 – 6,087 = $146,089

Unit 7- Exercise 7-1 answers

Parcel	Subject	Sale 1	Sale 2	Sale 3	Sale 4	Sale 5
Date of Sale	—	Similar	Inferior	Inferior	Inferior	Similar
Location	—	Inferior	Superior	Inferior	Superior	Similar
Condition	—	Inferior	Similar	Similar	Superior	Similar
Age	12 yrs. old	Similar	Similar	Superior	Superior	Similar
Construction Quality	Vinyl	Similar	Similar	Superior	Superior	Similar
Number of Adj.	—	2	2	4	5	0
Overall Rating	—	Inferior	Similar	Superior	Superior	Similar

Among the 5 sales, which unit of value, the unit price or the GIM is most consistent? This would be the basis for which unit of value to choose. **GIM**

Unit 7- Review answers

Match these terms to the correct definition. Some terms may require more than one definition

1. (T) or F — When using the sales comparison, or market approach, one never adjusts the subject.
2. T or (F) — The formula for the GIM is the gross rent divided by the sales price.
3. T or (F) — Make a minus adjustment to your comparable if it is inferior to your subject.
4. T or (F) — If the market is showing an annual increase of 3 percent, a sale occurring 2 years ago would have a minus adjustment of 6 percent.
5. T or (F) — The GIM is a unit of comparison in the income approach to value.
6. (T) or F — When valuing property, using the sales comparison, or market approach, 3 to 5 sales is recommended.