

I-E, Introduction to Sales Ratio Studies

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CLASS GLOSSARY

Appraisal – an opinion of value, supported by evidence.

Assessed Value (AV) – the value placed on property for tax purposes and used as a basis for distribution of the tax burden. Most of the time this amount is subject to the State-issued equalization factor and the deduction of the homestead exemption on residential parcels.

Assessment – the official act of discovering, listing, appraising and entering a value for property on the assessment rolls for *ad valorem* tax purposes.

Assessment Level – refers to the statutory level of 33.33% or the actual level obtainable from a sales ratio study.

Bank Real Estate Owned (REO) - the first sale of the property owned by a financial institution as a result of a judgment of foreclosure, transfer pursuant to a deed in lieu of foreclosure, or consent judgment, occurring after the foreclosure proceeding is complete.

Coefficient of Concentration (COC) – the percentage of observations falling within 10% of the median level of assessments; a high COC indicates more uniformity.

Coefficient of Dispersion (COD) - a statistical measure of variation of individual assessment ratios around the median level of assessments. An average error expressed as a percent of the median; an indicator of assessment uniformity found by dividing the average deviation by the median. It is the most common method used in measuring assessment uniformity.

Equalized Assessed Value (EAV) – the assessed value multiplied by the State equalization factor. This gives the property value from which the tax rate is calculated after deducting all qualified homestead exemptions. For farm acreage, farm buildings, and coal rights, the final assessed value is the equalized assessed value. Individual tax bills are calculated by multiplying the individual district's tax rates by the equalized assessed value after all qualifying exemptions have been removed.

Equalization Multiplier – the application of a uniform percent increase or decrease to assessed values of various areas or classes of property to bring assessment levels to a uniform level of market value. The multiplier can be applied by Township Assessor (TA), Supervisor of Assessments (CCAO) or Board of Review (BR).

Factor – represents the adjustment to an appraisal for any number of variables.

Market Value (Fair Cash Value) – the most probable sales price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus.

Mean – an arithmetic average.

Median – the middle value of a ranked set of numbers.

Mode – the number that occurs most frequently in a set of numbers.

Outlier - a Sales Ratio (SR) whose results are a large deviation from the median; either below the median or above the median.

Price-Related Differential (PRD) – any assessment bias related to the value of property.

Quartiles – the values that divide a set of data into four equal parts (25%, 50%, 75%, 100%) when the data are arrayed in ascending order.

Sale in Lieu of Foreclosure – a transfer pursuant to a deed in lieu of foreclosure if the Grantee is a financial institution.

Sales Ratio (SR) – the ratio of assessed value to market value found from a property that has sold; ratio equals prior year (equalized) assessed value (AV or EAV) divided by the current year sales price (SP).

Sales Ratio Study – a analysis of the percentage relationship of assessed value to market value. Ratio equals prior year assessed value divided by the current year sales price. A minimum of 25 useable sales/appraisals is required.

Short Sale – the property was sold for less than the amount owed to the mortgage lender or mortgagor, if the mortgagor has agreed to the sale.

Urban Weighted Method – non-farm values; used in determining a county's median level of assessment by dividing the county's total assessed value (AV) by the county's total Estimate of Full Value (EFV); this is the preferred method of calculating a county multiplier.

ACRONYMS

- **AV** = Assessed Value
- **Bank REO** = Bank Real Estate Owned
- **BR** = Board of Review
- **CCAO** = Supervisor of Assessments, aka Chief County Assessing Officer
- **COC** = Coefficient of Concentration
- **COD** = Coefficient of Dispersion
- **DOR** = Department of Revenue
- **EAV** = Equalized Assessed Value
- **EFV** = Estimate of Full Value
- **MV** = Market Value (Fair Cash Value)
- **PRD** = Price Related Differential
- **PTAB** = Property Tax Appeal Board
- **RETD** = Real Estate Transfer Declaration or PTAX 203 form
- **SP** = Sales Price
- **SR** = Sales Ratio
- **TA** = Township Assessor

WHERE TO GET ASSISTANCE OR INFORMATION

WEB LINKS

- Property Tax Division: www.tax.illinois.gov/LocalGovernment/PropertyTax
- Property Tax Code (35ILCS 200): www.ilga.gov
- Illinois Property Tax Appeal Board: <http://www.ptab.illinois.gov/>
- Real Estate Transfer Declaration Procedures for CCAO's
<http://tax.illinois.gov/LocalGovernment/PropertyTax/CCAOProcedures.pdf>

PUBLICATIONS

- PTAX-1004 The Illinois Property Tax System
<http://tax.illinois.gov/Publications/LocalGovernment/PTAX1004.pdf>
- PTAX-136 Property Assessment and Equalization
<http://tax.illinois.gov/Publications/Pubs/Pub-136.pdf>

Unit 1

Basic Math for Sales Ratio Studies

This unit covers basic math calculations for Sales Ratio Studies.

Learning Objectives

After completing this unit, you should be able to

- Calculate a sales ratio
- Explain the difference between mean, median and mode
- Calculate averages
- Explain the difference between decimals or percentages

Terms and Concepts

- Decimals
- Percentages
- Average
- Mean
- Median
- Mode
- Sales Ratio
- Quartiles
- Interquartile Range

Review of Math Basics and Statistics

1. Decimals and Percentages

A sales ratio (SR) can be presented as a decimal or a percentage. It is calculated by dividing the components, which are equalized assessed value (EAV)/sales price. Decimals are carried to four places after the decimal point, or .5000, while percentages are presented with two places after the point, or 50.00%, for Sales Ratio Studies. Below is an example of a decimal:

EAV = \$35,000
Sales Price = \$110,000

$$35,000/110,000 = .3182$$

To convert this result to a percentage, multiply the result by 100 as follows:

$$.3182 \times 100 = 31.82\%$$

The reverse of the above conversion of a decimal to percentage can be completed to produce the decimal:

$$31.82\% / 100 = .3182$$

Exercise 1-1

Calculate the missing component(s) below:

EAV	Sales Price	Decimal	Percentage
40,000	125,000		
35,000	105,000		
60,000	190,450		
150,000	583,500		
120,000	90,000		
2,500	50,000		
75,000	166,500		

2. Statistical Measures: Mean, Median and Mode

The **mean** of a group of numbers, also called an array of numbers, represents the average of the entire group. To calculate the mean, add the entire array of numbers together and divide by the total number of the group.

2, 5, 10, 25, 50, 55, 70, 77, 110, 110, 150, 200

The average of this group of numbers is: 72

Add all of the numbers together for a total (864) and divide by the total numbers in the group (12).

What does the result of 72 above represent for this group of numbers? The interpretation is that the average represents a centrally located result or if these numbers represented the SR calculated for a county, the average or mean for the county is an SR of 72%.

The mean result for an array of numbers is sensitive to the range of the numbers. When the 150 and the 200 in the group of numbers is replaced with 7 and 139, what happens to the average for this group?

Add the following numbers together and divide by 12 for the answer.

2, 5, 7, 10, 25, 50, 55, 70, 77, 110, 110, 139

The average of this group of numbers is: 55

The discussion then would be when comparing this mean to the statutory level of 33.33% that the county has considerable work to complete to bring the assessments to conform to the required level. But, does that make sense in terms of the mean being a reasonably accurate result for a central point of tendency?

Another statistical measure that would provide a more practical result when discussing Sales Ratio Studies is the **median**. This is the middle occurrence for the total group of SR for a county. Using the first set of numbers as the guide, what is the median?

Exercise 1-2

Median = _____

Note: To find the median in an odd numbered group, find the middle result after the numbers are sorted in ascending order. For groups of numbers with an even amount in the array, locate the two middle results, add together and divide the answer by two.

Exercise 1-3

The final statistical centrally located result when evaluating SR is the **mode**. This is the number that is displayed the most in an array of figures. Using the first or second set of numbers above, what would the mode be? _____

3. Sales Ratio (SR)

The calculation of an SR uses the following formula:

$$\text{EAV} / \text{Sales Price (SP)} = \text{SR}$$

You will notice this was used when discussing the basic math of decimal and percentage calculations previously. The information can be found within the County's assessment records and on the RETD that's recorded for the sale of property.

Exercise 1-4

Specifically, the EAV represents the final, Board of Review certified assessment from the prior year. If the sale for a property is being recorded in 2015, what assessment year should be used?

Deed for the sale is dated: 2015 = _____ Assessment

Deed for the sale is dated: 2012 = _____ Assessment

Deed for the sale is dated: 2014 = _____ Assessment

Deed for the sale is dated: 2016 = _____ Assessment

4. Quartiles

Quartiles divide the array of data into four equal quarters. The first quartile is where the lowest 25% of the observations would fall. The second quartile is where the median would be located and the third quartile is where 75% of the observations would fall below.

Examples for calculating quartiles:

The first quartile for an array of numbers with a set of data of 75 is:

$$(0.25)(75) + 0.25 = 19$$

This result indicates that 25% of this particular set of data falls below the score of 19.

The third quartile for an array of numbers with a set of data of 75 is:

$$(0.75)(75) + 0.75 = 57$$

This result indicates that 75% of results for this particular set of data falls below the score of 57.

Exercise 1-5

Answer the questions for following array of numbers.

19.25, 22.46, 32.57, 32.99, 34.20, 36.59, 36.59, 37.46, 37.89, 38.80, 38.99, 39.99, 42.76, 44.98, 87.25

What is the First Quartile in the above group of numbers?

$$(0.__)(15) + 0.__ = ___$$

What is the Third Quartile in the above group of numbers?

$$(0.__)(15) + 0.__ = ___$$

The consequence of the quartile results produced in a sales ratio study is to apply the outcome to identify outliers and remove them from the study.

These outliers are felt to distort the study's results and can be caused by a number of attributes:

- The assessed value from the prior year is not in sync with the current year's sales price. The sales price could be higher because of major remodeling, for example. The

sales price could also be lower based on the house remaining vacant for a number of years.

- The inadvertent use of a sale that does not represent an arm's length transaction. The sale may have occurred between a father and his married daughter (with a different last name) and if the preparer did not indicate they were relatives, this sale may end up on the sales ratio study.
- An error in the assessed value provided by the CCAO's office on the PTAX 203 form. The office may have accidentally not provided the prior year's Board of Review EAV.

5. Interquartile Range

The interquartile range is used when calculating the sales ratios that are identified as outliers for the sales ratio study.

The difference between the first and third quartiles represents the interquartile range.

From the above calculations for the first and third quartile, we found that the first quartile result was 32.99 and the third quartile result was 39.99. The interquartile range in this example is 7.00. When evaluating the sales ratio results for your township, the interquartile range is multiplied by 6 with a result of 42.00 in this instance. The 42.00 is added to the 39.99 to find the upper trim point or 81.99. This same process is applied to calculate the lower trim point or 42.00 is subtracted from 32.99 for the lower trim point of -9.01. Following through then, any sales ratio above 81.99 is removed from the study and any sales ratio below -9.01 (there would not be a negative sales ratio so there wouldn't be a removal for this result) are removed from the study as well.

Third Quartile – First Quartile = Interquartile Range

Interquartile Range x 6 = Result

Third Quartile + Result = Upper Trim Limit

First Quartile – Result = Lower Trim Limit

Exercise 1-6

From the above example, were there any sales removed from this study? _____

For the above example, what is the ratio range for this township before removal of outliers? _____ after the removal of outliers? _____

What was the median for this set of data before removal of any outliers? _____

What is the median for set of data after removal of outliers, if applicable? _____

Exercise 1-7

Answer the questions for the following array of numbers.

15.25, 25.46, 26.57, 38.99, 39.20, 39.59, 39.59, 41.46, 43.89, 44.80, 45.99, 45.99, 50.76, 90.98, 107.25

From the above example, were there any sales removed from this study? _____

For the above example, what is the ratio range for this township before removal of outliers?
_____ after the removal of outliers? _____

What was the median for this set of data before removal of any outliers? _____

What is the median for set of data after removal of outliers, if applicable? _____

Exercise 1-8

2.38, 21.46, 26.57, 38.99, 39.20, 39.59, 39.59, 41.46, 43.89, 45.80, 45.99, 45.99, 50.76, 54.85, 55.67, 79.88, 90.98, 157.25, 166.88

From the above example, were there any sales removed from this study? _____

For the above example, what is the ratio range for this township before removal of outliers?
_____ after the removal of outliers? _____

What was the median for this set of data before removal of any outliers? _____

What is the median for set of data after removal of outliers, if applicable? _____

Exercise 1-9

1.25, 25.46, 26.57, 38.99, 39.20, 39.59, 39.59, 41.46, 43.89, 44.80, 45.99, 45.99, 50.76, 88.92, 127.25

From the above example, were there any sales removed from this study? _____

For the above example, what is the ratio range for this township before removal of outliers?
_____ after the removal of outliers? _____

What was the median for this set of data before removal of any outliers? _____

What is the median for set of data after removal of outliers, if applicable? _____

Exercise 1-10

15.25, 25.46, 26.57, 38.99, 39.20, 39.59, 39.59, 40.72, 41.46, 43.89, 44.80, 45.99, 45.99, 50.76, 75.98, 107.25, 110.68, 111.25, 138.55

From the above example, were there any sales removed from this study? _____

For the above example, what is the ratio range for this township before removal of outliers?
_____ after the removal of outliers? _____

What was the median for this set of data before removal of any outliers? _____

What is the median for set of data after removal of outliers, if applicable? _____

Exercise 1-11

1.25, 4.38, 5.50, 15.25, 25.46, 36.57, 38.99, 39.20, 39.59, 39.59, 40.99, 41.46, 42.66, 43.89, 44.80, 45.99, 45.99, 49.98, 50.76, 75.22, 90.98, 97.25, 145.33

From the above example, were there any sales removed from this study? _____

For the above example, what is the ratio range for this township before removal of outliers?
_____ after the removal of outliers? _____

What was the median for this set of data before removal of any outliers? _____

What is the median for set of data after removal of outliers, if applicable? _____

Summary

The basic math for sales ratio studies include calculated results being expressed as either decimals, .4526, or percentages, 45.26%. When a decimal is presented as a percentage, multiply the result by 100. The reverse is true for presenting a percentage as a decimal, or dividing the result by 100.

Measures for the point of central tendency include the mean (average), the median and the mode for an array of numbers. The mean is calculated by adding all of the results together and dividing by the total number in the array. The median represents the central point within an array of numbers. To find the median, arrange the results in ascending order and for an odd number, find the middle point. For an even number of results within an array and after arranging in ascending order, locate the two middle results, add together and divide by 2. The final point of central tendency is the mode. The mode represents the number within an array that is presented the most number of times.

Quartile ranges divide an array of numbers into four equal parts. The importance of the part these quartile ranges play in a sales ratio study is that they are used in the calculation that will 'trim' sales ratios that are outside the calculated range.

Interquartile range is the distance between the first and third quartiles. Used in the calculation for the lower and upper limits of outliers.

An additional component of the calculation to identify outliers on a sales ratio study is the interquartile range. This represents the difference between the first and third quartiles after the sales ratios are arranged in ascending order. To calculate the lower and upper trim points is completed with the following formula:

Third Quartile – First Quartile = Interquartile Range
Interquartile Range x 6 = Result
Third Quartile + Result = Upper Trim Limit
First Quartile – Result = Lower Trim Limit

UNIT 1 Review Questions

1. **T or F** To calculate a sales ratio, the EAV is divided by the sales price.
2. **T or F** The mode for an array of numbers is the result located in the middle.
3. **T or F** A median is the number that shows up in an array of numbers the most times.
4. **T or F** Quartile ranges play no significant role in the sales ratio process.
5. **T or F** The formula to calculate a sales ratio contains the current year's EAV divided by the prior year's sales price.
6. What central point of tendency reflects the middle sales ratio result?

7. Calculate the lower and upper trim points from the following array of 15 numbers.
2.00, 15.46, 24.80, 24.80, 25.08, 26.10, 32.99, 33.24, 33.24, 34.15, 36.77, 50.86,
51.33, 77.33, 105.66
From your results, what, if any ratios will be removed from the data? _____

Unit 2

PTAX-203 Form/The Sales Ratio Study

This unit discusses the PTAX-203 form, focusing on the information gathered on these documents and determines through editing procedures whether a sale is to be included in or excluded from the sales ratio study. This chapter will also provide a discussion for sales transactions that represent arm's length characteristics and those transactions that do not. The importance of removing sales that are not arm's length or valid sales is also discussed.

Once the valid sales are identified through the Department's editing processes the discussion moves towards the uses for Sales Ratio Studies, including a basic understanding of the process for determining a median level of assessment, assessment uniformity, the appeal process for issues relating to the assessment value of property and as a basis for the determination of the assessor bonus award and the partial reimbursement of the supervisor of assessment's salary.

Learning Objectives

After completing this unit, you should be able to

- Become familiar with PTAX-203 form
- Understand the requirements for an arm's length transaction
- Identify several uses for the sales ratio study
- Identify criteria for the development of the sales ratio study
- Determine the median level of assessments
- Verify the PTAX-203 information
- Calculate sales ratios
- Determine the outlier ratios to remove from sales ratio study

Terms and Concepts

- Arm's length transaction
- Median
- Median level
- Rank
- Sales Ratio
- Trimming

Illinois Real Estate Transfer Declaration, Form PTAX-203

Each deed and assignment of beneficial interest of a land trust recorded must be accompanied by Form PTAX-203, Illinois Real Estate Transfer Declaration, unless specifically exempted under Section 31-45 of the Property Tax Code. The PTAX-203 contains information from the buyer and seller and from the Chief County Assessing Officer (CCAO) that is analyzed and used by the Department in their annual assessment/sales ratio study for each county. If the property has a sale price over \$1 million and has a current use of "Apartment building (over 6 units)," "Office," "Retail establishment," "Commercial building," "Industrial building," or "Other," a Form PTAX-203-A, Illinois Real Estate Transfer Declaration, Supplemental Form A must also be filed.

The sales ratio study conducted by the Department's Property Tax Division, Equalization and Sales Ratio Section, provides the basis of computation for equalization multipliers in support of the Department's statutory responsibility to equalize the level of assessments among the counties in the state (Inter-county equalization).

Form PTAX-203, Illinois Real Estate Transfer Declaration, is commonly referred to as the RETD, and is the primary source of information used by the Department and by any assessing official when conducting a sales ratio study.

One of the purposes of this unit is to introduce basic sales analysis used by the Department to determine the sales that will be included in the sales ratio study. If both the assessing officials and the Department use the same editing processes and methodology, a sales ratio study conducted by both groups should produce the same results.

Once all of the declarations are received and edited, the Department will conduct a sales ratio study with all of the useable sales.

Reviewing Certain Line Instructions for RETD's

Line 5: Mark with an "x" the type of instrument (deed).

The following deed types are the only deed types that are included in the sales ratio studies. All other deed types would exclude the sale from the study.

- Warranty deeds
- Trustee deeds

Line 7: Answer "Yes" or "No" if the property was advertised for sale.

Sale meets the "advertised for sale" if it was open to the general public for sale through avenues such as advertised by newspaper, trade publication, radio/electronic media, a sign, word of mouth, or through a real estate agent.

If the property was not available to the public, exclude the sale.

Line 8: Identify the property's current use and intended primary use.

Used to determine changes in use.

Line 8c: Be sure to review this line because if the mobile home is personal property, the amount should be included in the value of personal property on line 12a. Subtract this amount from the full actual consideration on line 11 to arrive at the net consideration on line 13. If the mobile home is real estate, do not include the amount in the value of personal property.

Line 9: Identify any significant physical changes in the property since January 1 of the previous year and write the date of the change.

Used to determine changes in AV due to changes in construction. Physical changes must have been done since January 1 of the previous year and before the sales date.

Line 10: Identify only the items that apply to this sale.

Examples of other reasons to exclude a sale from the study:

Fulfillment of installment contract	Sale-leaseback
Sale between related individuals	Governmental Agency
Transfer of less than 100% interest	Court-ordered sale
Charitable organization transfer	Condemnation
Option to Purchase	
Auction Sales	
Same surname transfer	

Note: The following properties will be used in the sales ratio study:

Real Estate Investment Trust (REIT)	Bank REO
Pension Fund	Sale in Lieu of Foreclosure
Adjacent Property Owner	Short Sale
Relocation Company	

Line 11: Full actual consideration – actual money paid for the property.

Line 12: Amount of personal property included in the sale price.

Line 13: Net consideration – the full actual consideration minus personal property

Comments by the CCAO may be made by code numbers. If the information on the PTAX-203 is not believed to be correct, the CCAO should use the appropriate code to inform the

Department. These codes are located in the “Real Estate Transfer Declaration Procedures for CCAOs” manual that can be found on the Department’s website.

The Assessment/Sales Ratio Study

The primary tool the equalization process utilizes is the sales ratio study. The Sales Ratio Study provides the Median Level of Assessments for a specific jurisdiction for the year of the study. This study provides information on the percentage relationship of assessed value to market value for real property in certain categories and geographic areas. Information is also provided on the variation in assessment levels among and within these categories and geographic areas. The year of the sales ratio study refers to the year in which the sales occurred. So, the 2015 sales ratio study refers to sales from 2015 and the assessed values applied to those same sales from the prior year, 2014.

The attributes that allow a sale of property to be included or excluded from the Sales Ratio Study is based on the idea of what the market value or full value of a property is.

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 each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus.

Some types of sales included in the sales ratio study would be:

1. Arm’s Length Transactions.
 - buyer and seller are motivated;
 - both parties are well informed or well advised and acting in what they consider their best interests;
 - a reasonable time is allowed for exposure in the open market;
 - While a reasonable length of time can be a subjective attribute because there is no definitive hard and fast rule guiding what is reasonable, the following lists the types of advertising considered acceptable with no discussion on the length of time:
 - Advertised via an MLS listing or with a Realtor
 - Advertised by word of mouth
 - Advertised by owner placing ‘For Sale’ sign in front yard
 - Advertising via the internet
 - payment is made in terms of cash in United States dollars or in terms of financial arrangements comparable thereto; and
 - the price represents the normal consideration for the property sold unaffected by anyone associated with the sale.
 - The transaction is one between unrelated parties or parties not under abnormal pressure from each other.
2. Current year sales with prior year assessment values.
3. Sales that used either Warranty or Trustee deeds to record the transaction.

Some types of sales excluded from the sales ratio study would be:

1. Sales that are not Arm's Length Transactions.
 - Not advertised for sale
 - Family transfer (same surname)
 - Transfer to a bank, credit union, or savings and loan
 - Transfer in Lieu of Foreclosure (different than a sale in lieu of foreclosure which is left in the sales ratio study per statute)
 - Sheriff's deed
 - Court Officer's deed
 - Transfers to a Governmental unit
2. A prior year sale recorded in the current year.
3. Sales where the prior year's assessed value and the sales price are not comparable.
 - A new improvement was added
 - Property was demolished
 - Partial or pro-rated assessment
 - Sale involved exempt or specially-assessed property

Core facts for the above definition of market value are:

- The buyer and seller are knowledgeable about the property.
- The buyer and seller are acting in their best interests.
- The property has been advertised on the market for a reasonable length of time.
- The consideration can be in the form of cash or other agreed upon value.

In addition to the idea of receiving and paying, the market value for a property is the discussion of the type of deed that's used in the conveyance of title for the property. The Warranty (including the Corporation Warranty) and Trustee deeds are the only two types of deed that will grant all rights to the ownership of the property, free and clear of encumbrances or breaks in the line of title and included in the sales ratio study. The following is a list of deeds that are excluded from the sales ratio study:

Limited Warranty Deed
Deed in Trust
Court Officer's Deed
Special Commissioner Deed
Guardian's Deed
Sheriff's Deed

Special Warranty Deed
Quit Claim Deed
Master's Deed
Administrator's Deed
Conservator's Deed
Cemetery Lots (Exempt)

The following is a list of additional attributes that will remove a sale from the sales ratio study:

Family (same surname) Transfer	Re-Recording of Document
Sheriff's Deed	Timber Rights-Mineral Rights
Transfers to Government Unit	Transfer to a Hospital
Transfers to/from Charitable Organizations	
Auction Sales	
Supplemental Deed Given to Correct an Error in Previous Deed	
Conveyance of Less than Full Interest Transfers	
Assignments of Beneficial Interest of a Land Trust	
Sale that includes exchange of real estate	

The sales ratio study results can provide information for:

1. In the review and appeal of assessments.

The sales ratio studies provide a measure of the average assessment level for a given geographic area or category of property against which assessments of individual parcels may be judged in determining the degree of over or understatement, if any. One of the reasons to appeal an assessment is that the level of assessment on the property is higher than the township or county median level of assessments.

2. As a diagnostic tool to evaluate local assessment practices.

It is the responsibility of local assessing officials to use the assessment/sales ratio study to evaluate their assessment policies and make assessment changes to sales and non-sales when warranted so that the final assessment of all properties in their jurisdictions are at a uniform percentage of value. Certain measures of assessment uniformity (coefficient of dispersion, coefficient of concentration, median absolute deviation) are based on the median level of assessments. A sales ratio study can be completed at any time and even multiple times throughout the year to support the evaluation of the trending for the real estate market. Studies that gather information on current sales for a particular neighborhood, subdivision, location/proximity that make the properties more desirable and other characteristics of properties within the township are just a few viable possibilities.

3. To determine eligibility for the assessor bonus award.

In order to qualify for the assessor bonus award, the average of the median levels of assessments of the prior 3 years must be between 31.33% and 35.33% and the Coefficient of Dispersion (COD) must be below the appropriate COD as determined by the population of the county.

4. In reimbursement to a county of a portion of the Supervisor of Assessment's salary.

In order to qualify for the reimbursement to the county, the average of the median levels of assessments of the prior 3 years must be between 31.33% and 35.33%.

Verification of Property Sale Data

The process of verifying the accuracy of information that preparers place on the PTAX-203 form is important and has various implications when the information is left incorrect. All information can be verified as soon as possible after a sale occurs and be communicated back to the CCAO's office. Items to review would include but should not be limited to the following actions.

- Verify that the parcel identification number (PIN) is correct for the property being sold.
- Confirm the address, date of deed (date which deed was signed by parties to the transaction) and type of property.
- Verify that any specific attributes to the sale are indicated in Step 1, Lines 9 and 10 (Line 9 – major remodeling would be the removal of walls and addition of rooms, for example. This would not include painting, new floors, new kitchen/bathroom fixtures which are considered maintenance. The best proof for major remodeling would be a building permit or letter from the seller/buyer stating the work specifically completed for review by the Department).
- Review whether there would be a reason that the sales price does not coincide with the assessed value.
- Review the legal description to verify it is referencing the property being sold.
- Verify the seller and buyer information as well as the preparer information.

The timing of the corrections needs to occur before the Department prepares the sales ratio study for the year of the sale. For example, a sale that occurred in 2015 should be corrected before the 2015 sales ratio study is completed. The CCAO is provided with the detail listing for the county, broken down by township for review. The CCAO can provide the sales that the Department is proposing to use for review to the Township Assessor and if there is a valid reason for removing a sale (or adding a sale), proof will have to accompany the request for removal from the CCAO's office back to the Department. The Department will then review the information provided and based on procedures, make the decision to either remove the sale or add the sale.

By providing corrections in a timely manner to the CCAO's office, this will ensure that the Department is using the same set of sales for all programs that utilize those results.

Median Level of Assessments

Chapter 1 of this course provided the formula for calculating the sales ratio as follows:

EAV / Sales Price = Sales Ratio

This is a straightforward formula, but remember that the final Board of Review certified prior year EAV is to be used.

The median of the sales ratios will be determined using the sales from the current year and the assessed values from the prior year for those transactions that have been determined to be market value. The median is the middle number in a set of numbers that have been ranked (placed in order). If there are an even number of ratios, the median will be the average of the two middle numbers.

For example, if a property assessed at \$38,600 in one year and sold for \$120,000 in the following year, the sales ratio would be 32.17 %.

$$\text{Sales Ratio} = \frac{38,600}{120,000} \times 100 (\%) = 32.17 \%$$

Steps to calculate a median:

- Calculate a sales ratio for each sale using the formula above.
- Rank the sales ratios.
- Determine the median. (Find the middle ratio.)

Exercise 2-1

Always show your answer with 2 decimal places. Use normal rounding: if the number in the third decimal place is 5 or more, round the number in the second decimal place up; if the number in the third decimal place is 4 or less, leave the number in the second decimal place as it is. If the number on the calculator does not have 2 decimal places, add final zeroes.

Calculate the sales ratio for the first sale by dividing the assessed value from the prior year (\$26,000) by the sales price from the current year (\$80,000) and multiply by 100 to change the decimal answer to a percent.

$26,000 \div 80,000 = .325 \times 100 = 32.5\%$. Write it with 2 decimal places as 32.50 %.

Calculate the sales ratios and rank the results. Use normal rounding to round answers to the nearest one-hundredth of a percent.

SALES RATIO STUDY

Prior year Assessed Value	Current Year Sale Price	Sales Ratio (%)	RANKED (%)
\$26,000	\$80,000	32.50	_____
3,000	7,500	_____	_____
19,200	60,000	_____	_____
4,200	11,400	_____	_____
2,800	6,500	_____	_____
25,000	83,600	_____	_____
17,100	50,000	_____	_____
17,900	59,900	_____	_____
18,400	61,300	_____	_____

Remember to rank the sales before you find the median. Ranking the sales ratio results can either be in ascending or descending order. The median assessment will always be displayed in the middle of the ranking.

Median Level of Assessments = _____

Exercise 2-2

SALES RATIO STUDY

Prior year Assessed Value	Current Year Sale Price	Sales Ratio	Ranked
\$ 10,000	86,800	_____	_____
15,600	70,000	_____	_____
20,300	80,000	_____	_____
26,000	80,000	<u>32.50</u>	<u>28.75</u>
3,000	7,500	<u>40.00</u>	<u>29.08</u>
19,200	60,000	<u>32.00</u>	<u>29.34</u>
4,200	11,400	<u>36.84</u>	<u>29.88</u>
2,800	6,500	<u>43.08</u>	<u>29.90</u>
25,000	83,600	<u>29.90</u>	<u>30.02</u>
17,100	50,000	<u>34.20</u>	<u>32.00</u>
17,900	59,900	<u>29.88</u>	<u>32.50</u>
18,400	61,300	<u>30.02</u>	<u>34.20</u>
3,500	7,600	<u>46.05</u>	<u>34.40</u>
4,300	9,900	<u>43.43</u>	<u>36.84</u>
25,800	75,000	<u>34.40</u>	<u>40.00</u>
16,500	57,400	<u>28.75</u>	<u>43.08</u>
27,200	92,700	<u>29.34</u>	<u>43.43</u>
28,500	98,000	<u>29.08</u>	<u>46.05</u>

Median = _____

Trimming of Sales

Chapter 1, discussed the Quartile and Interquartile ranges. These are used in combination to calculate the outliers to be removed from a sales ratio study. Trimming will remove these outliers because they may represent a sale where the assessed value is not in sync with the sales price and can skew the results.

The calculation is as follows:

1. Determine the first and third quartiles in an array of sales ratios.
2. Calculate the interquartile range between the first and third quartiles.
3. Calculate the lower trim point by taking the first quartile minus (six times the interquartile range). This calculation can produce a negative result which would not affect the lower sales ratios for the township.
4. Compute the upper trim point by taking the third quartile plus (six times the interquartile range).
5. Any sales ratios that fall below the lower trim point or above the upper trim point will be removed from the sales ratio study.

Exercise 2-3

28.75, 29.08, 29.34, 29.88, 29.90, 30.02, 32.00, 32.50, 34.20, 34.40, 36.84, 40.00, 43.08, 43.43, 46.05

Median level of assessments (from above set of data) _____

First Quartile _____

Third Quartile _____

Lower trim point _____

Upper trim point _____

Median level of assessments after trimming _____

Urban Weighted Median Ratio

The Department of Revenue calculates a median level of assessments for every township in each county that has a minimum of 25 useable sales. All of the sales in townships that do not have this minimum number of sales are placed together in an "All Others" category. A median is calculated for this "All Others" category as well. Once the medians have been calculated for each of the townships that have enough sales, and for the "All Others" category, a median is calculated for the county as a whole. This county median is used in the calculation of the state equalization factor for the county.

In order to calculate a county median, it is necessary to know both the total assessed values in the county and the total market value of property in the county. What class of properties are included for the assessed values? _____

Total assessed values for each of the townships are reported to the Department of Revenue on the Tentative and Final abstracts sent to the Department from the counties. A method for estimating the total market value (Estimate of Full Value) is necessary. The total market value for a township may be estimated by dividing the total assessed value for the township by the median level of assessments (written as a decimal number). To prevent bias, any parcels (non-farm only) having assessments greater than \$999,999 are not included in the weighting process. To convert a number from a percent to a decimal, divide the percent by 100. 32.50% = .3250. To find the median for the county, find the total assessed value for the county and divide by the total estimate of full value for the county. Multiply by 100 to change the number to a percent.

Assessed Value / Median = Estimate of Full Value

Exercise 2-4

	Assessed Value (000's)	Median Ratio (%)	Estimated Full Value (000's)
Township 1	3,648	32.50	_____
Township 2	10,450	33.10	_____
Township 3	6,279	31.62	_____
All other townships	<u>30,560</u>	<u>32.20</u>	_____
Total	50,937	_____	_____

Urban weighted ratio – County's Median Level of Assessments _____

Exercise 2-5

	Assessed Value (000's)	Median Ratio (%)	Estimated Full Value (000's)
Township 1	5,700	32.50	_____
Township 2	12,555	33.10	_____
Township 3	7,859	31.62	_____
Township 4	14,667	34.88	_____
Township 5	22,885	29.44	_____
All other townships	<u>30,560</u>	<u>32.81</u>	_____
Total	94,226	_____	_____

Urban weighted ratio – County's Median Level of Assessments _____

Exercise 2-6

	Assessed Value (000's)	Median Ratio (%)	Estimated Full Value (000's)
Township 1	6,500	32.50	_____
Township 2	14,887	33.10	_____
Township 3	9,534	31.62	_____
Township 4	20,080	34.88	_____
Township 5	62,331	29.44	_____
All other townships	<u>46,788</u>	<u>32.81</u>	_____
Total	160,120	_____	_____

Urban weighted ratio – County's Median Level of Assessments _____

Summary

Each deed and assignment of beneficial interest of a land trust recorded must be accompanied by Form PTAX-203, Illinois Real Estate Transfer Declaration, unless specifically exempted under Section 31-45 of the Property Tax Code. The RETD is the primary source of information for conducting a sales ratio study.

If the sale involves land that is located in more than one township, the sale is excluded from the urban study.

Warranty deeds are acceptable if not rejected for some other reason. Trustee deeds are acceptable for the study if they pass all the edits. Corporate Warranty deeds are useable if the companies involved are not related.

When calculating the sales ratio, use the assessed value after the books are closed at the board of review divided by the net consideration from the sale price.

The Sales Ratio Study provides the Median Level of Assessments for that jurisdiction for the year of the study. The year of the sales ratio study is the year from which the sales occurred.

The median sales ratio is used:

1. In the computation of equalization multipliers. The sales ratio medians are the beginning point for the tentative multiplier.
2. In the review and appeal of assessments.
3. As a diagnostic tool to evaluate local assessment practices.
4. To determine eligibility for the assessor bonus award.
5. To determine eligibility for the reimbursement to the county of a portion of the salary of the Supervisor of Assessments.

Sales that do not meet the market value/arm's length transaction criteria are excluded from the sales ratio study.

The definition of 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 each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus.

Verification of sales data for your jurisdiction should encompass all of the information placed on the PTAX 203 form by preparers, including date of instrument, parcel identification number and any other significant change that is attributable to the sale. Pay particular attention to the attributes that would identify a sale as an arm's length transaction:

- The buyer and seller are knowledgeable about the property
- The buyer and seller are acting in their best interests
- The property has been advertised on the market for a reasonable length of time
 - While a reasonable length of time can be a subjective attribute and that's because there is no definitive hard and fast rule guiding what is reasonable, the following lists the types of advertising considered acceptable with no discussion on the length of time:
 - Advertised via an MLS listing or with a Realtor
 - Advertised by word of mouth
 - Advertised by owner placing 'For Sale' sign in front yard
 - Advertising via the internet

Provide the corrections, along with the required proof, for a sale to either be removed or added to the study to the CCAO's office. The CCAO can forward the information to the Department when the review of the detail listing occurs.

Trimming of outliers occurs to remove sales that do not have the assessments and the sales price in sync with each other, it is viewed that the sale does not represent an arm's length transaction. Outliers are calculated using the formula from page 26.

The Urban Weighted Ratio is used to calculate the County's median level of assessments. It uses only non-farm sales transactions after the removal of parcels greater than \$999,999 to prevent bias. The importance of this ratio is that it represents the beginning point for the calculation of the County's multiplier factor to be applied to assessments for the following year and includes residential, other land/improvements, commercial and industrial classes of properties.

UNIT 2 Review Questions

1. **T or F** A sale of property between relatives will be included in the sales ratio study.
2. **T or F** A sale for an exempt property will not be included in the sales ratio study.
3. **T or F** The median level of assessments is found by ranking sales ratios in ascending order and locating middle result.
4. **T or F** A property has to be advertised with a realtor to be an arm's length transaction.
5. **T or F** To calculate the upper and lower trim points for an array of data, the first step is to identify the first and second quartiles.
6. **T or F** The calculation for the county's urban weighted sales ratio median includes all classes of property.
7. What are some of the uses for the sales ratio study?

8. If a house assessed at \$74,250 recently sold for \$198,000, the sales ratio is _____. Was the house (over, statutorily, or under) assessed?
9. The 2014 study would use sales from _____ and assessed values for these same properties from _____.
10. List two deed types that would be included in the sales ratio study:

11. List five uses of property that would exclude a sale from the sales ratio study:

12. List two other reasons why a sale would be excluded from the sales ratio study.

Unit 3

Measure for the Uniformity of Assessments

This unit covers some of the measures of assessment uniformity – the Coefficient of Dispersion (COD), the Price-Related Differential (PRD), and the Coefficient of Concentration (COC) – with a particular emphasis on the Coefficient of Dispersion as the most commonly used measure of assessment uniformity.

The purpose of this unit is to provide a basic understanding of the measures of uniformity, each of which considers uniformity from a different perspective. Taking the measures into consideration together yields a more complete picture of uniformity than would be possible with one measure alone.

Learning Objectives

After completing this unit, you should be able to

- utilize the median in calculating the measures of uniformity.
- calculate the COD, the COC, and the PRD.
- interpret the degree of assessment uniformity as indicated by the measures of uniformity.

Terms and Concepts

- Coefficient of Concentration (COC)
- Coefficient of Dispersion (COD)
- Concentration
- Differential
- Price-Related Differential (PRD)

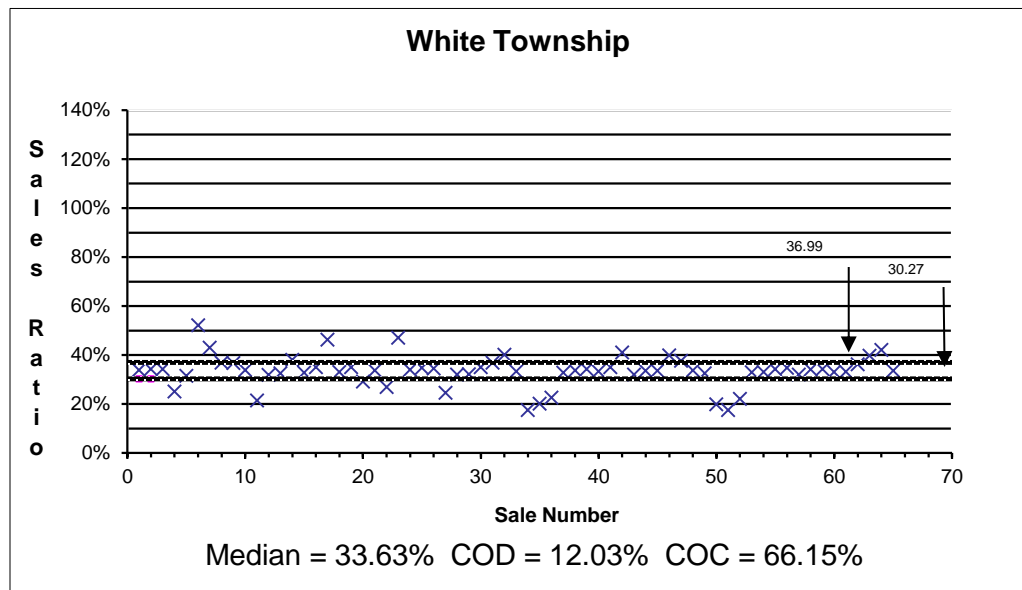
Coefficient of Dispersion

The most commonly used statistical measure of uniformity is the **Coefficient of Dispersion (COD)**. The COD provides a measure of the variation of individual assessment ratios around the median level of assessment.

Higher CODs indicate that individual ratios vary widely from the median, and that properties are not uniformly assessed. This also indicates that the property tax burden is not fairly distributed among taxpayers in that particular region or jurisdiction.

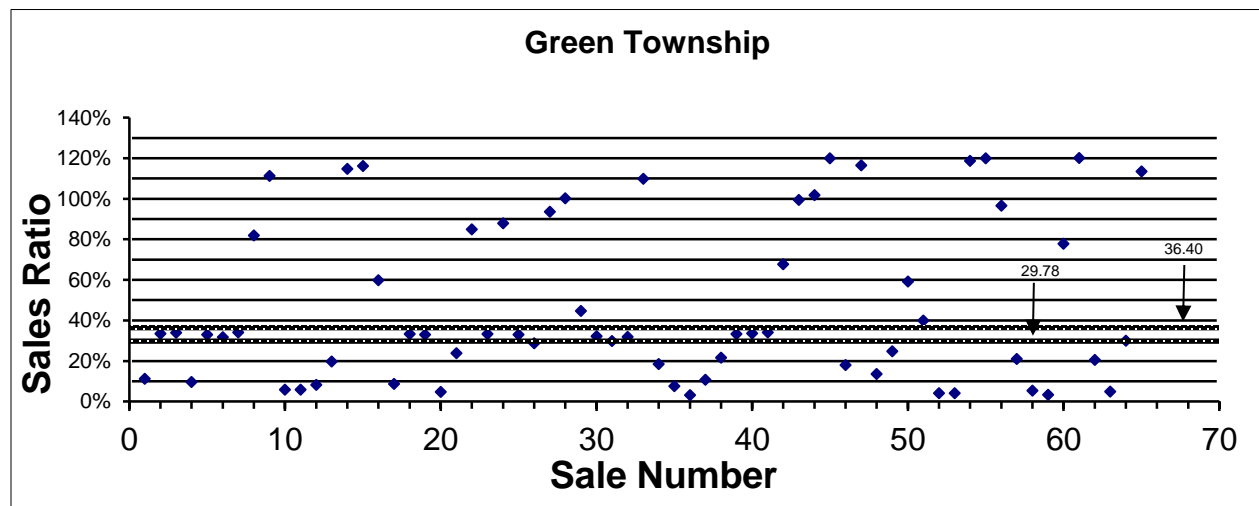
The following page shows by graph how the more uniform COD is displayed when compared with a COD that has more variance.

Example of COD results for White Township:



This particular statistical measurement is used in conjunction with the 3-year average median level to arrive at the decision whether a township assessor or CCAO qualifies for the Assessor Bonus Award.

Compare the results for White Township with a COD of 12.03% to Greene Township with a COD of 92.80%.



The ratios are scattered widely. Ratios vary from 3.25% to 120.09%. The COD for this data is 92.80%. Remember that a high COD indicates non-uniformity of assessments. A low COD would indicate better assessment uniformity.

Additional COD calculations follow:

Exercise 3-2

- Determine the sales ratio for each of the following sales, find the median, and calculate the difference by taking sales ratio – median = absolute deviation (ignore the minus sign).

	EAV	Sale Price	Sales Ratio (%)	Median (%)	Absolute Deviation
\$	20,000	\$ 65,000	_____	_____	_____
	5,000	7,500	_____	_____	_____
	24,300	47,800	_____	_____	_____
	6,200	13,200	_____	_____	_____
	9,800	28,500	_____	_____	_____
	16,850	70,450	_____	_____	_____
	17,250	54,900	_____	_____	_____
	18,600	59,000	_____	_____	_____
				Sum of Deviations:	_____

2. Average Deviation = $\frac{\text{Sum of Deviations}}{\text{Number of Sales}}$ = $\frac{\quad}{8}$ = $\quad\%$

- Now divide the average deviation by the median.
Multiply the answer by 100 to change it to a percent.

COD = $\frac{\text{Average Deviation}}{\text{Median}} \times 100\%$ = _____

Exercise 3-3

- Determine the sales ratio for each of the following sales, find the median, and calculate the difference by taking sales ratio – median = absolute deviation (ignore the minus sign).

	EAV	Sale Price	Sales Ratio (%)	Median (%)	Absolute Deviation
\$	35,500	\$ 90,000	_____	_____	_____
	2,500	7,000	_____	_____	_____
	18,000	56,000	_____	_____	_____
	6,500	16,400	_____	_____	_____
	4,000	11,900	_____	_____	_____
	29,500	84,900	_____	_____	_____
	30,000	88,000	_____	_____	_____
	45,000	128,000	_____	_____	_____

Sum of Deviations: _____

2. Average Deviation = $\frac{\text{Sum of Deviations}}{\text{Number of Sales}} = \frac{\quad}{8} = \quad\%$

- Now divide the average deviation by the median.
Multiply the answer by 100 to change it to a percent.

COD = $\frac{\text{Average Deviation}}{\text{Median}} \times 100\% = \quad\quad\quad$

Coefficient of Concentration

The **Coefficient of Concentration (COC)** measures assessment uniformity in a different way. The COC measures the percent of the ratios within a specific percentage range of the median. In many instances, a significant COC will measure the percent of ratios within 10% of the median ratio. The Department of Revenue uses a 10% range. If ratios are grouped closely (within 10%) of the median, the concentration of sales ratios will be large. A high COC indicates greater assessment uniformity than a low COC.

The COD calculates how far the average deviation is from the median. With the COC the distance from the median is pre-determined at 10%. The COC yields the proportion of the ratios that fall within this range.

The COC will be a number between 0% and 100%. A COC of 100% would indicate that all of the sales ratios are within 10% of the median.

STEPS FOR CALCULATING THE COC:

- Step 1. Find the median sales ratio.
- Step 2. Find the number which is 10% below the median by multiplying the median ratio by .9.
(100% - 10% = 90% = .90 = .9)
- Step 3. Find the number which is 10% above the median by multiplying the median ratio by 1.1.
(100% + 10% = 110% = 1.10 = 1.1)
- Step 4. Count the number of ratios between the high and low values computed in steps 2 and 3.
- Step 5. Divide the number of ratios from step 4 by the total number of sales ratios and multiply by 100%.

What is the COC for the sets of sales ratios for Exercises 1 through 4 on the previous pages?

Exercise 3-1 _____

Exercise 3-2 _____

Exercise 3-3 _____

Exercise 3-4 _____

Unlike the COD, the COC has the advantage of not being affected by very high or very low ratios. The COC indicates only how concentrated the ratios are near the median ratio, but says nothing about the ratios outside the percentage range. Unlike the COD, a **higher COC** is an indicator of **better** assessment equity.

Price Related Differential

The **Price-Related Differential** is another measure of assessment uniformity. The PRD measures a pattern of inequity in assessments that has a correlation with the value of the property (a measurement of assessment bias in relation to value). Differentials greater than 1.03 or less than .98 are indicative of inequity in assessments.

A differential less than .98 indicates a tendency for higher-valued properties to be assessed at a higher rate than lower-valued properties. This indicates a possible bias in favor of lower-valued properties.

A differential greater than 1.03 indicates a tendency for higher-valued properties to be assessed at a lower rate than lower-priced properties. That is, there is an indication of a possible bias in favor of higher-valued properties.

Steps required to calculate the PRD:

- Step 1. Determine the Sum of the Assessed Values.
- Step 2. Determine the Sum of the Sales Prices.
- Step 3. Determine the **Sales-Based Average Ratio** by dividing the sum of the Assessed Values by the sum of the Sales Prices.

$$\text{Sales-Based Average Ratio} = \frac{\text{Sum of AV's}}{\text{Sum of SP's}} \times 100\%$$

- Step 4. Determine the Sum of the Sale Ratios.
- Step 5. Determine the **Mean Assessment Ratio** by dividing the sum of the Sales Ratios by the number of Sales Ratios.

$$\text{Mean Assessment Ratio} = \frac{\text{Sum of the Sales Ratios}}{\text{Number of Ratios}}$$

- Step 6. Determine the **Price-Related Differential** by dividing the Mean Assessment Ratio by the Sales-Based Average Ratio.

Do not change the result to a percent. Calculate the PRD to 2 decimal places.

$$\text{Price-Related Differential} = \frac{\text{Mean Assessment Ratio}}{\text{Sales-Based Average Ratio}}$$

Using the same set of sales from Page 38-41, calculate the PRD. What is the result?

Exercise 3-1 _____

Exercise 3-2 _____

Exercise 3-3 _____

Exercise 3-4 _____

Use the area below as scratch paper.

Exercise 3-5

Using the following set of data, calculate each of the following measures of uniformity.

COD _____

COC _____

PRD _____

What conclusions can be drawn from the above results? Are there any issues with the uniformity of the assessments?

	EAV	Sale Price	Sales Ratio (%)	Median (%)	Absolute Deviation
\$	23,000	\$ 80,000	_____	_____	_____
	4,000	7,500	_____	_____	_____
	19,850	60,000	_____	_____	_____
	4,800	12,000	_____	_____	_____
	2,800	6,500	_____	_____	_____
	25,000	88,000	_____	_____	_____
	17,100	50,000	_____	_____	_____
	17,900	59,900	_____	_____	_____
	18,400	61,300	_____	_____	_____
Total	_____	_____	_____	_____	_____

Summary

This chapter discussed three measures of assessment uniformity: the Coefficient of Dispersion (COD), the Coefficient of Concentration (COC), and the Price-Related Differential (PRD). The COD is the most commonly used measure of assessment uniformity.

For measures of uniformity, the township is most uniform if:

1. the COD is low
2. the COC is high
3. the PRD is between .98 and 1.03

A Price Related Differential less than .98 indicates that there is a tendency for higher-valued properties to exhibit higher assessment ratios than lower-valued properties.

A PRD greater than 1.03 indicates that there is a tendency for higher-valued properties to exhibit lower assessment ratios than lower-valued properties.

The COD measures how far the average deviation is from the median.

The COC measures the proportion of ratios that are within 10% of the median.

The PRD measures assessment disparity in relation to the value of the property.

UNIT 3 Review Questions

1. T or F Individual sales that are clustered around a township's median indicates a high COD result.
2. T or F A lower COC result indicates an issue with uniformity assessment.
3. T or F A PRD of 1.05 indicates a bias for assessments of higher-valued properties to be assessed higher than lower-valued properties.
4. Calculate the COD, COC and PRD for the following set of data:

Assessed Value	Sales Price	Sales Ratio	Ranked	Median	Deviation
\$ 4,000	16,000	<u>25.00</u>	<u>21.15</u>	_____	_____
2,000	7,600	<u>26.32</u>	<u>22.22</u>	_____	_____
13,000	32,000	<u>40.63</u>	<u>24.82</u>	_____	_____
8,000	29,500	_____	_____	_____	_____
5,000	18,800	_____	<u>26.32</u>	_____	_____
3,500	14,100	_____	_____	_____	_____
14,700	35,800	<u>41.06</u>	<u>26.60</u>	_____	_____
2,200	10,400	<u>21.15</u>	<u>26.67</u>	_____	_____
8,000	30,000	<u>26.67</u>	_____	_____	_____
2,200	9,900	_____	_____	_____	_____
19,400	54,000	_____	<u>30.51</u>	_____	_____
8,700	31,000	<u>28.06</u>	<u>31.09</u>	_____	_____
8,300	26,700	<u>31.09</u>	_____	_____	_____
3,600	11,800	_____	_____	_____	_____
19,500	47,300	<u>41.23</u>	<u>40.31</u>	_____	_____
9,700	23,200	_____	<u>40.63</u>	_____	_____
3,100	7,500	_____	<u>41.06</u>	_____	_____
18,500	45,900	<u>40.31</u>	<u>41.23</u>	_____	_____
12,000	25,000	<u>48.00</u>	_____	_____	_____
20,000	52,700	<u>37.95</u>	_____	_____	_____
4,100	8,000	_____	<u>48.00</u>	_____	_____
25,200	51,700	_____	<u>48.08</u>	_____	_____
5,000	10,400	<u>48.08</u>	<u>48.74</u>	_____	_____
13,300	50,000	<u>26.60</u>	_____	_____	_____

1. Median Level of Assessment _____
2. Coefficient of Dispersion (COD) _____
3. Price Related Differential (PRD) _____
4. Coefficient of Concentration (COC) _____

Unit 4

Equalization

This unit covers various aspects of equalization including the definition of equalization, the three-year average median levels of assessments, and the effect of equalization. Also included is a brief mention of reassessment factors and their impact on the median levels of assessment used in calculating the equalization factor.

The purpose of this unit is to provide a basic understanding of the equalization process and the correct uses for the equalization multipliers. The focus is on the procedures involved in the calculation of the equalization multiplier.

LEARNING OBJECTIVES:

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

- determine whether an objective is being met by the use of an equalization factor
- calculate the three-year average median level of assessments
- calculate the appropriate equalization factor using the three-year average median
- meet the statutory conditions to determine the equalization factor
- apply the equalization factor to individual properties

TERMS AND CONCEPTS:

- Average medians
- Equalized Assessed Value (EAV)
- Equalization
- Reassessment factors
- Township Assessor (TA)

Equalization is the application of a uniform percentage increase or decrease to assessed values of various geographic areas or classes of property to bring assessments, on the average, to a uniform level of market value.

Uniform percent means that an equalization multiplier is applied uniformly to all properties (except farm land, farm buildings, wind turbines*, coal, and state-assessed properties).

The multiplier will increase the assessed values if the factor is greater than one or decrease the assessed values if the factor is less than one.

The multiplier is applied to the assessed valuation for each individual property.

Various geographic areas – An equalization multiplier may be applied to a geographic area as a township, or neighborhood, or the county as a whole.

Various classes of property – An equalization multiplier may be applied to a class of property such as residential, other land/improvements, commercial, and industrial properties.

On the average – The equalization multiplier is found by taking the average of the medians for the three years prior to the year of the equalization factor. For the 2015 equalization multiplier, the average of the medians from 2012, 2013, and 2014 will be used in the calculation.

Uniform level of market value – The equalization multiplier will increase or decrease the three-year average of the median levels of assessments to the statutory level of 33.33%.

The equalization multiplier is applied to the assessed values for the current year. A 2015 equalization multiplier is applied to 2015 assessments, for taxes payable in 2016.

The formula for calculating the equalization factor is:

$$\text{Equalization Multiplier} = \frac{\text{Desired Level (33.33\%)}}{\text{Prior 3-Year Average Median Level}}$$

* wind turbines with at least 0.5 MW nameplate capacity

Example of the effect of equalization:

In this example, the median level of assessments for:

County A = 33.33%.

County B = 28.00%

County C = 38.00%

Also, there is in each county a property whose fair market value is \$90,000. These three properties are in the same taxing district that overlaps all three counties. The assessor in each county determined an assessed value, for the tax rolls, for the properties by multiplying the fair market value by the county's median level of assessment.

COUNTY A	COUNTY B	COUNTY C
\$90,000	\$90,000	\$90,000
33.33%	28.00%	38.00%

Assessed Values for the properties:

County A: $\$90,000 \times 33.33\% = \$29,997$

County B: $\$90,000 \times 28.00\% = \$25,200$

County C: $\$90,000 \times 38.00\% = \$34,200$

If the tax rate for the taxing district is 3%, the property owners will be paying to the community college:

Property in County A: $\$29,997 \times 3\% = \$ 899.91$

Property in County B: $\$25,200 \times 3\% = \$ 756.00$

Property in County C: $\$34,200 \times 3\% = \$1,026.00$

Although these properties have the same market value and are all located in the same taxing district, the amount of property tax paid to the district varies widely due to the different assessment levels placed on the properties.

Each of the counties decides to apply an equalization multiplier. This multiplier is found by dividing 33.33% (the statutory level) by the average of the median levels of assessments for the prior 3 years.

$$\text{Equalization Multiplier} = \frac{\text{Desired Level (33.33\%)}}{\text{Prior 3-Year Average Median Level}}$$

If the medians were the same for each of the prior three years as for the current year, the equalization factors would be:

$$\text{County A: } \frac{33.33\%}{33.33\%} = 1.0000$$

$$\text{County B: } \frac{33.33\%}{28.00\%} = 1.1904$$

$$\text{County C: } \frac{33.33\%}{38.00\%} = .8771$$

Each county applies its equalization multiplier to all property in the county, except farm, coal, wind turbines over .5 MW capacity, and state-assessed properties. The equalized assessed value for the properties in the example will be:

$$\text{County A: } \$29,997 \times 1.0000 = \$29,997$$

$$\text{County B: } \$25,200 \times 1.1904 = \$29,998$$

$$\text{County C: } \$34,200 \times .8771 = \$29,997$$

When the tax rate is applied to each of these three properties that were assessed at the median level of assessments and then equalized, the taxes owed will be the same.

Note: This example makes some special assumptions in order to illustrate the purpose of equalization. The example assumes 1) that the market values of the three properties were known to be the same, 2) that each of these properties were assessed at the median level of assessments for the county, and 3) that the medians for each of the counties were the same for the current year as for the prior 3 years.

Class Exercise

For each of the counties listed below, calculate the average of the medians for the prior three years. The result will be written as a percent to two decimal places. After the three-year average is calculated, use the average to calculate the equalization factor necessary to bring assessments to the statutory level.

$$\text{Equalization Multiplier} = \frac{\text{Desired Level (33.33\%)}}{\text{Prior 3-Year Average Median Level}}$$

Exercise 4-1

For county "A", the medians for the prior three years are: 32.09, 31.81, and 30.61. The total of these medians is 94.51. Divide 94.51 by 3 to find the three-year average of 31.50.

Now divide the statutory level of 33.33% by the 3-year average of 31.50%

$$\frac{33.33\%}{31.50\%} = 1.0581 \quad \text{Always write the answer rounded to four decimal places.}$$

COUNTY	3 YEARS PRIOR	2 YEARS PRIOR	PREVIOUS YEAR	3-YEAR AVERAGE	CURRENT MULTIPLIER
"A"	32.09	31.81	30.61	<u>31.50</u>	<u>1.0581</u>
"B"	34.25	33.33	33.78	_____	_____
"C"	30.19	29.16	30.78	_____	_____
"D"	33.26	33.98	32.75	_____	_____
"E"	31.18	31.95	31.19	_____	_____
"F"	30.60	30.23	31.27	_____	_____
"G"	34.15	32.62	34.09	_____	_____

In order to calculate the equalization multiplier for 2015, an assessor would need the median levels of assessments for the following years:

Although reassessment is not being taken into account for this class exercise, there are times when significant reassessment has occurred within the county and/or township. The reassessment is identified when the change is more or less than 1.00%. When the county determines that changes in total assessed value for a township, or the county as a whole, is solely due to reassessment, a reassessment adjustment may be determined to adjust the medians for this. A reassessment factor is applied to the medians to change them for the reassessment. Once a reassessment factor is determined, it is applied to the median for the year calculated and all previous years.

Since the equalization multiplier uses the medians only for the prior three years, it is not necessary to carry the reassessment factor back beyond the three years.

The reassessment factor is noted as a percent increase or decrease (denoted by a + or – sign). To find the actual multiplier to be applied, add or subtract the factor from 100% and change to a decimal number. Then multiply the median by all of the factors through all of the Supervisor of Assessments and Board of Review changes. If a factor is 0.00%, multiply by 1.

Exercise 4-2

An assessor wants to find the prior 3-year average median level of assessments for a 2015 equalization multiplier. In 2012 the CCAO (S/A) determined that it was necessary to adjust the median level of assessments by a reassessment factor. This factor will apply to the 2012 assessment year only. In 2014 the Board of Review determined through their appeals work that it was necessary to adjust the median level of assessments by a reassessment factor.

2012 - Adjust the median level of assessment by multiplying the given median for the appropriate years by a + 6.60% (S/A change only).

$$100.00\% + 6.60\% = 106.60\% = 1.0660$$

2014 - Adjust the median level of assessment by multiplying the given median for the appropriate years by a -1.95% (B/R change only).

$$100.00\% - 1.95\% = 98.05\% = 0.9805$$

Use the adjusted medians to determine a 3-year average median level of assessment. Then find the equalization multiplier.

YR	MEDIAN	'12 S/A	'12 B/R	'13 S/A	'13 B/R	'14 S/A	'14 B/R	'15 TA	
	Adjusted	Chgs	Chgs	Chgs	Chgs	Chgs	Chgs	Chgs	Median
2012	29.65	+6.60%	0.00%	0.00%	0.00%	0.00%	-1.95%	0.00%	_____
2013	28.54	0.00%	0.00%	0.00%	0.00%	0.00%	-1.95%	0.00%	_____
2014	32.07	0.00%	0.00%	0.00%	0.00%	0.00%	-1.95%	0.00%	_____

For the 2012 median of 29.65,

$$29.65 \times 1.0660 \times 1.0000 \times 1.0000 \times 1.0000 \times 1.0000 \times \text{_____} \times 1.0000 = \text{_____}\%$$

'12 S/A '12 B/R '13 S/A '13 B/R '14 S/A '14 B/R '15 TA

The 3-year average median level of assessments for this township is: _____

The equalization multiplier is: _____

Exercise 4-3

For the data listed below, calculate the median and the COD.

Assessed Value	Sales Price	Sales Ratio	Ranked Ratio	Deviation
42,630	110,000	38.75	24.67	1.45
46,100	120,000	38.42	28.54	1.12
44,400	117,000	37.95	29.63	.65
41,600	106,200	39.17	31.88	1.87
38,800	103,800	37.38	32.85	.08
42,140	109,400	38.52	33.35	1.22
39,360	99,300	39.64	33.78	2.34
37,620	98,200	38.31	33.78	1.01
38,710	100,500	38.52	34.58	1.22
40,580	101,700	39.90	34.59	2.60
39,550	106,300	37.21	35.93	.09
41,710	107,900	38.66	36.27	1.36
36,920	110,700	33.35	37.21	3.95
37,770	109,200	34.59	37.38	2.71
40,080	110,500	36.27	37.95	1.03
47,140	118,300	39.85	38.31	2.55
36,900	106,700	34.58	38.42	2.72
36,000	100,200	35.93	38.52	1.37
24,320	98,600	24.67	38.52	12.63
27,770	97,300	28.54	38.63	8.76
28,770	97,100	29.63	38.66	7.67
30,600	96,000	31.88	38.75	5.42
31,400	95,600	32.85	39.17	4.45
30,400	90,000	33.78	39.64	3.52
38,630	100,000	38.63	39.85	1.33
37,160	110,000	33.78	39.90	3.52

1. Median

2. COD

Assuming that the median was exactly the same for each of the prior three years – so that the median just calculated is also the three-year average, calculate the equalization factor required to bring the three-year average median level of assessments to 33.33%.

3. If the median level of assessments has been the same as the current level for the past 3 years, calculate the equalization factor. _____

Now apply the equalization multiplier that you just calculated to each of the assessed values on the next page to achieve an equalized assessed value for each property on the chart. Then calculate new sales ratios, a new median, and a new COD.

In the prior exercise, the median was 37.30% and the equalization factor was .8936. Multiply the assessed value for the first sale (\$42,630) by 0.8936. The result is an equalized assessed value of \$38,094. The sales ratio for this sale would become 34.63 ($38,094 \div 110,000$).

Multiply each of the assessed values by the equalization multiplier to find the equalized assessed value (EAV). Then calculate the sales ratio by dividing the EAV by the sales price.

Exercise 4-3 (continued)

A V	EAV	Sales Price	S R	Ranked	Dev
42,630	_____	110,000	_____	_____	_____
46,100	_____	120,000	_____	_____	_____
44,400	_____	117,000	_____	_____	_____
41,600	_____	106,200	_____	_____	_____
38,800	_____	103,800	_____	_____	_____
42,140	_____	109,400	_____	_____	_____
39,360	_____	99,300	_____	_____	_____
37,620	_____	98,200	_____	_____	_____
38,710	_____	100,500	_____	_____	_____
40,580	_____	101,700	_____	_____	_____
39,550	_____	106,300	_____	_____	_____
41,710	_____	107,900	_____	_____	_____
36,920	_____	110,700	_____	_____	_____
37,770	_____	109,200	_____	_____	_____
40,080	_____	110,500	_____	_____	_____
47,140	42,124	118,300	<u>35.61</u>	_____	<u>2.28</u>
36,900	32,974	106,700	<u>30.90</u>	_____	<u>2.43</u>
36,000	32,170	100,200	_____	_____	<u>1.22</u>
24,320	21,732	98,600	_____	_____	<u>11.29</u>
27,770	24,815	97,300	_____	_____	<u>7.83</u>
28,770	25,709	97,100	<u>26.48</u>	_____	<u>6.85</u>
30,600	27,344	96,000	_____	_____	<u>4.85</u>
31,400	28,059	95,600	_____	_____	<u>3.98</u>
30,400	27,165	90,000	_____	_____	<u>3.15</u>
38,630	34,520	100,000	_____	_____	<u>1.19</u>
37,160	33,206	110,000	_____	_____	<u>3.14</u>

1. Multiply each of the assessed values by the equalization factor.
2. Calculate the new median _____
3. Calculate the COD _____

Summary

Equalization is the application of a uniform percentage increase or decrease to assessed values of various geographic areas or classes of property to bring assessments, on the average, to a uniform level of market value.

In Illinois, the statutory level of assessments is 33 ⅓% of market value.

Equalization multipliers adjust the three-year average median level of assessments to the statutory level.

The calculation of the equalization multiplier uses the average of the medians from the prior 3 years.

The formula for calculating the equalization multiplier is:

$$\text{Equalization Multiplier} = \frac{\text{Desired Level (33.33\%)}}{\text{Prior 3-Year Average Median Level}}$$

The equalization multiplier is applied to the assessed values for the current year. A 2015 equalization multiplier is applied to 2015 assessments, taxes payable in 2016.

Unit 4 Review Questions

1. An _____ factor will uniformly increase or decrease assessed values of all properties in the county except for _____, _____, _____, _____, and _____ – _____ properties.

2. A township assessor is calculating a township multiplier for this year.

Median Level of Assessment for 3 years ago 32.79

Median Level of Assessment for 2 years ago 31.92

Median Level of Assessment for last year 31.58

a. The prior 3-year average median level of assessments for this township is: _____

b. The township equalization multiplier will be: _____

3. Another township assessor in the same county is calculating a township multiplier for this year.

Median Level of Assessment for 3 years ago: 32.45

Median Level of Assessment for 2 years ago: 31.09

Median Level of Assessment for last year: 30.36

a. The prior 3-year average median level of assessments for the township is: _____

b. This township equalization multiplier will be: _____

Unit 5

Assessor Bonus

This unit covers the qualifications and application procedure for the Assessor Bonus Award. This award is based on performance, using criteria with respect to the median level of assessments and uniformity of assessments as determined by the Coefficient of Dispersion.

The purpose of this unit is to inform township assessors and supervisors of assessments of the availability of the Assessor Bonus award, highlighting the application process and eligibility.

LEARNING OBJECTIVES:

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

- realize that the bonus award is available to assessors
- correctly complete an application for the bonus award
- know which criteria applies to the assessor's jurisdiction
- determine whether eligibility criteria has been met for a given year

TERMS AND CONCEPTS:

- Elected County Official (ECO)
- Illinois Municipal Retirement Fund (IMRF)
- Tentative equalization factor

ASSESSOR BONUS AWARD

Any assessor, in counties other than Cook or the St. Clair County Assessor, may petition the Department of Revenue to receive additional compensation based on performance.

In order to receive the assessor bonus award, you must

1. be in a qualifying position,
2. have a three-year average median within the correct range,
3. determine whether your jurisdiction is within a small or large county,
4. have a COD less than the COD requirement based on the size of your county, and
5. file a completed application within the correct time frame.

35 ILCS 200 Sec 4-20:

“As used in this Section, ‘assessor’ means any township or multi-township assessor, or supervisor of assessments.”

Positions that qualify for the bonus award are

1. any **elected or appointed** township or multi-township assessor, or
2. the supervisor of assessments.

Positions that do **not** qualify for the bonus award include

1. township assessors in Cook county,
2. county assessors in Cook and St. Clair counties,
3. an individual who has contracted to complete the assessments, and
4. a deputy assessor.

County assessors in Cook and St. Clair counties do not meet the condition of being in a qualified position since the requirement is for an individual to hold the title of a “supervisor of assessments.”

An individual who has contracted to complete the assessments does not meet the condition as he or she does not hold the position of township assessor.

The “Illinois County Populations Based on the 2010 Decennial Census Counts” from the US Department of Commerce, Bureau of the Census is the guide used to determine whether the assessor’s county is a small county (50,000 or fewer) or a large county (over 50,000).

In order to qualify for the bonus award, a person must meet the requirements listed below.

For counties with 50,000 or fewer inhabitants, the requirements are:

- a three-year average level of assessments between 31.33% and 35.33% of the fair cash value for the assessment jurisdiction, and
- a coefficient of dispersion (COD) no greater than 30.00 percent.

For counties with more than 50,000 inhabitants, the requirements are:

- a three-year average level of assessments between 31.33% and 35.33% of the fair cash value for the assessment jurisdiction, and
- a coefficient of dispersion (COD) no greater than 15.00 percent.

Assessors may use the Department's sales ratio data or the assessor's own data with proper documentation. If the township does not have enough sales to have its own study done by the Department of Revenue, the township assessor may use independent appraisals and/or trending to establish the median level of assessments and the COD.

File Form PTAX-205, Assessor's Application for Additional Compensation, after you have signed your assessment books, but no later than 60 days after your county's tentative equalization factor hearing for the assessment year.

Do not submit Form PTAX-205 before your assessment books are given to the chief county assessment officer (CCAO) or board of review, as appropriate.

Trending is a process whereby the sales from one year are combined with the sales from a prior or a following year in order to have enough sales (25) to complete a sales ratio study. By combining sales from 2 or 3 years, many townships will have enough sales to determine the median level of assessments. Trending may be used for intra-county equalization factors or for the assessor bonus award.

Class Exercise

To determine whether the assessors would receive their bonuses this year, first, find the average of the medians from the prior three years by adding the medians and dividing by 3 (years).

For the first line on the chart below, $29.07 + 33.59 + 27.63 = 90.29$. $90.29 \div 3 = 30.09666$. Rounded to two decimal places, the three-year average would be 30.10%. Determine whether this 3-year average is within the acceptable range [31.33% – 35.33%]. If it is not, the assessor would not qualify for the assessor bonus award. In this case, 30.10% is too low, so the assessor would not receive his bonus. Write “No” in the “Yes/No” column. It is not necessary to check the COD if the assessor’s average median is not in the acceptable range.

If the three-year average is acceptable, the assessor would then need to determine whether the COD is within the acceptable range. For the COD, the acceptable range depends on the population of the county. In the case of the first line on the chart below, the population is 66,241. Any county over 50,000 in population must not have a COD over 15.00. Remember that, for the COD, smaller numbers indicate greater assessment uniformity. Since the population on the first line of the chart is greater than 50,000, an acceptable COD would have to be less than 15.00. The “COD” column shows a COD for the township to be 16.40 which is greater than 15.00. The COD is not in the acceptable range. So this assessor would not receive the assessor bonus award because the COD was too large, considering the population of the county.

Exercise 5-1

Now complete the rest of the chart

Population	3 Years Ago	2 Years Ago	Last Year	3-year average	COD	Yes/No
66,241	29.07 %	33.59 %	27.63 %	<u>30.10 %</u>	16.4	<u>No</u>
39,582	37.38	31.72	36.24	_____	27.3	_____
81,769	32.85	33.57	36.48	_____	11.5	_____
47,391	29.63	31.02	33.58	_____	34.8	_____
52,089	32.55	34.60	33.72	_____	18.6	_____
107,464	36.82	31.09	35.98	_____	14.3	_____
183,697	29.75	28.04	32.56	_____	9.4	_____
28,434	31.99	32.48	35.79	_____	16.7	_____

The filing time frame for submitting the PTAX-205 20__ Assessor’s Application for Additional Compensation (Fill in the __ with this year) shall begin after the assessor signs the assessment books and continue until 60 days after the original hearing date in the county for the tentative equalization factor.

An assessor may obtain a PTAX-205 form from the Supervisor of Assessments

**Instructions for completing the
PTAX-205 Assessor's Application for Additional Compensation**

1. Be sure to check whether you contribute to the Illinois Municipal Retirement Fund (IMRF). If the answer is "Yes," check whether it is "Regular" or "ECO." "ECO" refers to Elected County Officials. However, check with the township or county office to determine which of these options applies to your office.
2. On line 6a, mark whether you are "elected," "appointed," or "on contract."
3. Be sure to sign the form at the bottom of the front page.
4. File the application within the correct time frame:
"after you have signed your assessment books, but no later than **60 days after** your county's tentative equalization factor hearing for (the year of the application)."

If your jurisdiction does not have a minimum of 25 useable sales for any one, or more, of the three years, you may supplement the actual sales with independent appraisals or use a process for combining sales, from prior or subsequent years, called trending.

Summary

The assessor bonus award is based on the performance of the assessor. Township and multi-township assessors and supervisors of assessments from all counties except Cook or St Clair County Assessor may qualify for the bonus award.

Assessors must file an application for the bonus award after the assessment books are signed and within 60 days of the hearing date in their counties for the tentative multiplier.

If the jurisdiction does not have a minimum of 25 useable sales for any one, or more, of the three years, you may supplement the actual sales with independent appraisals or use trending.

Unit 5 Review Questions

1. A township assessor is applying for the bonus award for this year. The COD is 15.92%.

Median Level of Assessment for 3 years ago	32.79
Median Level of Assessment for 2 years ago	31.92
Median Level of Assessment for last year	31.58

- a. If the population of the county is less than 50,000, will the assessor receive his or her bonus? _____
- b. If the population of the county is greater than 50,000, will the assessor receive his or her bonus? _____
2. A township assessor is applying for the bonus award for this year. The COD is 14.80%.

Median Level of Assessment for 3 years ago:	32.45
Median Level of Assessment for 2 years ago:	31.09
Median Level of Assessment for last year:	30.36

- a. If the population of the county is less than 50,000, will the assessor receive his or her bonus? _____
- b. If the population of the county is greater than 50,000, will the assessor receive his or her bonus? _____
3. In order to qualify for the assessor bonus award, the assessor must be in a _____, have a _____-year average median level of assessments between _____ and _____, and a COD no greater than _____ (assuming that the population of the county is 50,000 or less).

Unit 6

Trending

This unit covers the process of trending to combine sales from two or more years when there were not enough sales from a given year to conduct a separate sales ratio study for a township. The trending process adjusts the values of the sales from one year to current market conditions for the year that did not have enough sales to achieve a sales ratio study. The trended sales from one (or more) year(s) are then combined with the actual market sales from the year of the sales ratio study. Using the combined sales, a sales ratio may then be completed.

The purpose of this unit is to familiarize you with the appropriate circumstances when trending may be used and the procedures necessary for the calculations.

Learning Objectives:

After completing the assigned readings, you should be able to

- know what trending will accomplish
- be familiar with the appropriate occasions when trending may or may not be used
- be able to calculate a trending factor
- use the trending factor in adjusting sales for current market values
- complete a sales ratio study with the adjusted sales combined with current sales

Terms and Concepts

- adjusted sales prices
- trending
- trending factor

Need for Trended Medians

The prior 3-year average median level of assessments (adjusted for change, if applicable) is used in the:

A. Process of determining equalization factor $\frac{33.33\%}{\text{Prior 3-year average median}}$

B. Qualifications for the Assessor's Bonus Award.

The average of the medians from the prior three years must be between 31.33% and 35.33%.

(Note: The COD must also be in the correct range.)

Before a three-year average median level of assessments can be established, there must be enough useable sales within a jurisdiction to establish a median level of assessments for each of the years being used in the calculation.

For example, if a 2015 township multiplier is being calculated, a median level for 2012, 2013, and 2014 is used to determine the prior 3-year average median level of assessments for the assessment year of 2015.

In order to calculate the 2015 township multiplier, the following information must be available:

Median Sales Ratio for	2012	34.50	
Median Sales Ratio for	2013	33.90	
Median Sales Ratio for	2014	<u>34.00</u>	
			$102.40 \div 3 = 34.13\%$

There must be a minimum of 25 useable sales and/or appraisals before an assessment district can implement a Sales Ratio Study. If an assessment district does not have 25 useable sales in a particular year, appraisals can be used to supplement this study. Properties must be randomly selected, and the appraisals performed by an independent appraiser.

Counties may find the burden of hiring independent appraisers cumbersome and costly. An alternative to using independent appraisals is the process called trending.

Trending may be used to determine a median level of assessments in the calculation of:

1. Intra-County Equalization
2. Assessor Bonus Award

Trending is not used in the calculation of the state equalization multiplier.

Trending is a method that may be used to determine a median level of assessments when one, or more than one, of the 3 years involved in finding the prior 3-year median level of assessments for the purposes listed above does not have 25 useable sales.

In the technique of trending, the sales that pass the editing for a sales ratio study can be adjusted back in time or they may be adjusted forward in time. The new ratios are combined with the existing sales ratios of that year. A median level of assessments for the year in question can be established from the combined ratios.

When trending, trend back first, if possible, since the sales are more current. If the median that is being established is for the most current of the 3 years, it will be necessary to trend forward.

If the Supervisor of Assessments wanted to apply a township equalization multiplier for 2015, he would need the township medians for 2012, 2013, and 2014. If the township did not have enough sales to find a township median for 2014, he could trend the 2013 sales forward and calculate sales ratios using the adjusted market values (now 2014 market value) and the assessed values from 2013 to find 2014 sales ratios. Combine these ratios with the ratios found from the actual sales in 2014 to find a median for the township for 2014.

Always use the assessed valuation for the year prior to the year of the sales ratio study. For a 2014 sales ratio study, the assessed values on the same properties that sold must come from 2013.

Example 1: The Supervisor of Assessments plans to determine an equalization multiplier for the townships for 2015. He will need the medians for 2012, 2013, and 2014 in order to calculate the prior 3-year average median level of assessments.

2012 median =	29.78
2013 median =	30.07
2014 median =	_____

The **2013** sales would be adjusted by a trending factor to 2014 values. New sales ratios would be calculated for the 2013 sales adjusted to 2014 market value. The sales ratios would be found by dividing the **2013 assessed value** from the properties that sold by the **adjusted 2014** market value of those same properties.

Example 2: The Board of Review plans to determine an equalization multiplier for the townships for 2015. They will need the medians for 2012, 2013, and 2014 in order to calculate the prior 3-year average median level of assessments.

2012 median =	_____
2013 median =	32.59
2014 median =	33.80

Since the missing median is the first of the three years, the **2013** sales would be trended backward. The **2013** sales would be adjusted by a trending factor to 2012 market values. New sales ratios would be calculated for the 2013 sales adjusted to 2012 market value.

Sales ratios are found by dividing the prior year assessed value by the current year selling price. A 2012 sales ratio is found by dividing the 2011 assessed value by the 2012 sales price.

Example 3: The Board of Review plans to determine an equalization multiplier for the townships for 2015. They will need the medians for 2012, 2013, and 2014 in order to calculate the prior 3-year average median level of assessments. In 2013 there were less than 25 sales.

2012 median =	28.72
2013 median =	_____
2014 median =	31.25

Since the missing median is the middle of the three years, the **2012** sales may be trended forward or the **2014** sales may be trended backward. If there is a choice, trend backward. In this case the **2014** sales would be adjusted by a trending factor to 2013 market values. The 2014 sales are trended backward to become 2013 sales. New sales ratios would be calculated for the 2014 sales adjusted to 2013 market value.

A 2013 sales ratio is found by dividing the 2012 assessed value by the 2013 sales price. So, the sales ratios would be found by dividing the **2012 assessed value** from the properties that sold (in 2014 adjusted backward to 2013 market value) by the **adjusted 2013** market value of those same properties.

If two or more years are missing, it may be necessary to trend one year forward and another year back or two years forward (backward) to achieve the 25 useable sales.

The **trending factor** is the number that will be used to adjust the sales price (market value) of a property either forward to a later year or backward to an estimate of market value for a year previous to the actual year of sale.

The trending factor depends on the **county's** medians to adjust the value from the value at the year of sale to an estimate of the value for the year that did not have enough sales.

$$\text{Trending Factor} = \frac{\text{County Median} - \text{Trended **From** Year}}{\text{County Median} - \text{Trended **To** Year}}$$

Exercise 6-1

Calculate the trending factors (**to 4 decimal places**) if a **county's** urban-weighted medians are:

2012	2013	2014
31.57	30.48	32.95

- | | | | |
|-------------------------------|-----------------|---|-------|
| 1. Trend 2012 forward to 2013 | Trending Factor | = | _____ |
| 2. Trend 2014 back to 2013 | Trending Factor | = | _____ |
| 3. Trend 2013 back to 2012 | Trending Factor | = | _____ |
| 4. Trend 2013 forward to 2014 | Trending Factor | = | _____ |

Using the information from above exercise, determine from what year the assessed values would come.

- | | | |
|-------------------------------|----------------------|-------|
| 1. Trend 2012 forward to 2013 | Assessed Values from | _____ |
| 2. Trend 2014 back to 2013 | Assessed Values from | _____ |
| 3. Trend 2013 back to 2012 | Assessed Values from | _____ |
| 4. Trend 2013 forward to 2014 | Assessed Values from | _____ |

Exercise 6-2

Calculate the trending factors (**to 4 decimal places**) if a **county's** urban-weighted medians are:

2012	2013	2014
30.08	35.32	29.54

- | | | | |
|-------------------------------|-----------------|---|-------|
| 5. Trend 2012 forward to 2013 | Trending Factor | = | _____ |
| 6. Trend 2014 back to 2013 | Trending Factor | = | _____ |
| 7. Trend 2013 back to 2012 | Trending Factor | = | _____ |
| 8. Trend 2013 forward to 2014 | Trending Factor | = | _____ |

Using the information from above exercise, determine from what year the assessed values would come.

- | | | |
|-------------------------------|----------------------|-------|
| 5. Trend 2012 forward to 2013 | Assessed Values from | _____ |
| 6. Trend 2014 back to 2013 | Assessed Values from | _____ |
| 7. Trend 2013 back to 2012 | Assessed Values from | _____ |
| 8. Trend 2013 forward to 2014 | Assessed Values from | _____ |

Trending Procedure:

1. Determine the trending factor

$$\text{Trending Factor} = \frac{\text{County Median — Trended From Year}}{\text{County Median — Trended To Year}}$$

2. Multiply each of the sale prices by the trending factor. This is now the “Adjusted Sale Price” for the year of the sales ratio study.
3. Find the assessed value for each of the properties for the year prior to the year of the sales ratio study. These will be given in the problems.
4. Find the sales ratios by dividing the assessed value for each property by its adjusted sale price. Multiply by 100 to change it to a percent.
5. Combine these new ratios with the existing sales ratios.
6. Now rank all (existing ratios and trended ratios) of the ratios and establish a median level of assessments.

Note: A median level of assessments that has been established by a sales ratio study may be adjusted for changes (for example – township reassessment, equalization) implemented since the data for the study was collected.

Exercise 6-3

Township Medians:

2012	28.32
2013	27.40
2014	_____

County Medians:

2012	30.68
2013	31.15
2014	29.54

Existing sales Ratios from 2014:

11.67	23.87	24.87	25.21	26.40	27.12	29.53
22.95	24.50	24.95	25.69	26.73	29.33	

(Calculated from _____ sales and the AV of those sales from _____.)

Trend _____ (year) sales forward to be combined with _____ sales.

Trending factor = _____ (4 decimal places)

Fill in the correct years in the blank lines in the headings.

Multiply the sales price by the trending factor to find the adjusted market value.

Sale #	_____ Sales Price	Trending Factor	ADJ _____ Market Value	_____ AV	2014 Sales Ratio
1	\$ 250,000	1.0545	263,625	\$ 55,299	20.98
2	489,500	_____	_____	109,607	_____
3	386,000	_____	_____	89,017	_____
4	335,000	_____	_____	84,071	_____
5	1,300,000	_____	_____	349,802	_____
6	272,000	_____	_____	73,473	_____
7	169,900	_____	_____	46,735	_____
8	267,500	_____	_____	76,321	_____
9	222,000	_____	_____	63,687	_____
10	840,200	_____	_____	254,365	_____
11	388,000	_____	_____	127,540	_____
12	287,000	_____	_____	100,797	_____

The sales ratios as calculated from the actual 2014 sales are listed in the table below. Complete the table by ranking the trended 2014 (trended from 2013) sales ratios in the table.

11.67		25.21	26.40	
	23.87		26.73	29.33
	24.50			29.53
	24.87	25.69	27.12	
22.95	24.95			

2014 Median = _____

2015 Twp Equalization Multiplier = _____

All valid, arm's length transactions included in the 2014 sales ratio study will be used. Those sales that are not considered arm's length for the definition of inclusion on the sales ratio study are not used.

For example, 1) if the 2012 AV was based on unimproved land but there was an improvement on the property in 2014 ; 2) splits, 2012 AV was based on 1 acre but 2014 sales price was for ½ acre; 3) reclassified property where the 2012 AV was residential but the property was sold in 2014 as commercial property.

Exercise 6-4

The Board of Review is applying township equalization factors for the 2015 assessment year. In order to calculate a 3-year average median level of assessments for a 2015 equalization multiplier, the Board will need the medians for Hoover Township for 2012, 2013, and 2014. Hoover Township's median level of assessments for 2013 was 32.94 and for 2014 was 33.24. However, there were not enough sales in 2012 to determine a median level for 2012.

Hoover Township's medians are:

2012 =	_____
2013 =	32.94
2014 =	33.24

County medians are:

2012 =	35.00
2013 =	34.00

The Board has decided to use trending to calculate the median for 2012.

Existing ratios for 2012 sales: (18 sales)

13.50	28.10	31.20	38.20	49.40
15.30	29.30	33.50	38.30	64.40
22.60	29.70	35.80	39.20	
26.00	31.20	37.20	39.30	

In this exercise, the Board of Review is combining the 2013 sales with the 2012 sales by trending the 2013 sales back to 2012 (Adjusting the 2013 selling prices back to the 2012 selling prices by using a trending factor), and then developing 2012 sales ratios by using 2011 assessed values of those properties along with the 2012 adjusted sales prices found by the trended sales.

Trending Factor = _____ (see data on the prior page)

Multiply the Selling Prices by the trending factor.

Find the new 2012 sales ratios

Sale #	2013 SP	Trending Factor	2012 Adjusted SP	2011 AV	2012 Ratios
1	58,400	_____	_____	11,914	_____
2	29,000	_____	_____	6,198	_____
3	34,100	_____	_____	7,288	_____
4	14,200	_____	_____	3,311	_____
5	44,500	_____	_____	10,807	_____
6	4,000	_____	_____	972	_____
7	40,000	_____	_____	10,103	_____
8	33,000	_____	_____	8,335	_____
9	24,500	_____	_____	6,426	_____
10	19,500	_____	_____	5,115	_____
11	18,000	_____	_____	5,071	_____
12	59,900	_____	_____	17,457	_____
13	32,900	_____	_____	10,227	_____
14	23,000	_____	_____	7,150	_____
15	26,000	_____	_____	8,335	_____
16	10,000	_____	_____	3,497	_____
17	13,500	_____	_____	4,721	_____
18	13,800	_____	_____	4,826	_____
19	15,000	_____	_____	5,537	_____
20	22,000	_____	_____	9,190	_____
21	56,500	_____	_____	27,443	_____
22	6,500	_____	_____	3,346	_____
23	9,000	_____	_____	5,421	_____
24	9,800	_____	_____	6,188	_____
25	3,500	_____	_____	2,312	_____
26	1,500	_____	_____	1,501	_____
27	3,000	_____	_____	3,409	_____
28	2,000	_____	_____	2,506	_____

1. Calculate the trended sales ratios.
2. Combine the new trended ratios with the original ratios from 2012.
Find the median using all of the ratios. (Ratios are ranked in columns)

13.50				33.50		49.40	
15.30			31.20	35.80	38.20		
		28.10	31.20		38.30		
	26.00				39.20		
		29.30			39.30	64.40	
22.60		29.70		37.20			

Hoover Township's medians are:

2012 =	
2013 =	32.94
2014 =	33.24

The township equalization multiplier would be: _____

Summary

Trending is a method that may be used to determine a median level of assessments when one, or more than one, of the 3 years involved in finding the prior 3-year median level of assessments for the purposes listed above does not have 25 useable sales.

Trending may be used for intra-county sales ratio studies and equalization or the assessor bonus award when there are less than 25 useable sales in a given year.

Sales ratios found by adjusting sales (forward or backward) to the year with an insufficient number of sales are combined with all existing sales ratios to determine the median level of assessments.

Trending is not used in the calculation of the state equalization factor.

Unit 6 Review Questions

1. What would the trending factor be if the 2014 sales were trended back to 2013?

county medians
2012 median = 28.72
2013 median = 31.69
2014 median = 30.48

township medians
2012 median = 32.51
2013 median = _____
2014 median = 29.86

2. If an assessor were trending sales from 2012 to 2013, the assessed values on those properties would be from _____ (year).

3. In order to trend 2014 sales back to 2013, multiply the _____ sales by the trending factor. Then divide the _____ assessed values by the _____ sales trended back to _____ market value. (Insert years.)

Unit 7

The Sales Ratio Study: Table 1

This unit covers Table 1 from the Sales Ratio Study. The “I-E Class Sales Ratio Study” is found in the Supplemental section at the back of the packet. This unit focuses on the understanding and interpretation of the sales ratio studies.

The purpose of this unit is to familiarize township assessors and supervisors of assessments with the sales ratio study and the information that can be gathered from it. Particular emphasis is on the median level of assessments, measures of assessment uniformity, and equalization.

The “I-E Class Sales Ratio Study” has fictitious counties and townships. Its purpose is to become familiar with the information and format of the sales ratio study.

Learning Objectives:

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

- find the median level of assessments for a county or township
- locate the measures of assessment uniformity for a jurisdiction
- determine whether a jurisdiction is assessing uniformly
- analyze what types of properties are most in need of reassessment

Table 1: Assessment Ratios

Turn to the I-E Class Sales Ratio Study in the supplemental section at the back of the manual.¹

Columns in Table 1 of the sales ratio study:

1. **Geographic Area:** name of the county or township.
2. **Urban** when all of the useable sales are included; “Unimp” is only displayed when there are 25 or more useable sales for the category, otherwise urban indicates improved sales only.
3. **Adjusted Median** found by adjusting the calculated median for changes due to reassessment. The adjusted median is the median used in the calculation of the equalization factors.
4. **Median** as calculated from the sales ratio study.
5. **COD**
6. **Sales:** number of sales used in the sales ratio study.
7. **1st Quartile:** ratio such that 25% ($\frac{1}{4}$) of the ratios are smaller than the number listed and 75% ($\frac{3}{4}$) of the ratios are larger than the ratio listed.
8. **3rd Quartile:** ratio such that 75% ($\frac{3}{4}$) of the ratios are smaller than the number listed and 25% ($\frac{1}{4}$) of the ratios are larger than the ratio listed.
9. **Ratio Range:** the difference between the largest sales ratio and the smallest sales ratio.
10. **PRD**
11. **95% Confidence Interval:** the ratio range such that there is a 95% assurance that the true median of all properties falls within this range.
12. **COC**

Begin by looking at the first county on the list: Arthur County. All of the townships have “Urban” in the second column. “Urban” refers to studies that exclude farm sales.

Now look at “Baker County.” Apple River township has “Urban” directly to the right of the township name. “Urban” refers to the total number of useable non-farm sales in the county or township. Below “Urban” is “Imp” which stands for improved properties and “Unimp” which stands for unimproved properties. For all counties other than Cook, the Department calculates median assessment levels for both “improved” and “unimproved” urban property when there are 25 or more useable sales in each of these subcategories. This information helps local assessing officials identify the presence or absence of a systematic bias toward higher or lower assessment levels on unimproved property. Look at the 6th column whose

¹ This table is for illustrative purposes only. The table is similar in form to the actual Table 1 Assessment Ratios published by the Department of Revenue.

heading is "Sales." For Apple River township there were a total of 141 useable sales. Of these 31 were improved properties and 110 were unimproved.

The heading for the fourth column is "Median." This is the median as calculated from the sales ratio study before any adjustments are made. For the sales ratio study, found on Page 25, the median was calculated to be 32.50%. For Ferrari township in Autobahn county, the median as calculated is 28.62%. The heading of the third column is "Adjusted Median." This is the calculated median from the fourth column after adjustments for changes due to reassessment or equalization by the CCAO or the board of review. In Duke county, Water Well township has a (raw) median of 32.41%. Notice that the adjusted median for Water Well township has a "-" in the adjusted median column. This indicates that the adjusted median is the same as the (raw) median of 32.41%.

There are 11 counties in this classroom sales ratio study. Looking at the "Total County" row and the "Median" column, find the county whose median is closest to 33.33%.

Find the county with the median of 29.57% _____.

Exercise 7-1

Refer to Table 1 in the "I-E Class Sales Ratio Study" found in the supplemental section.

Find the adjusted median level of assessments.

- Jaguar Township, Autobahn County _____
- Big Valley Township, Duke County _____
- Carnation Township, Floral County _____
- Wyoming Township, Hayes County _____
- Aspen Township, Lincoln County _____

Find the COD.

- Pole Cat Township, Duke County _____
- Hidden Valley Township, Grant County _____
- Abilene Township, Harrison County _____
- Red Maple Township, Lincoln County _____
- Tennyson Township, Roosevelt County _____

Best COD _____ Township

Find the PRD.

- Yugo Township, Autobahn County _____
- Tennyson Township, Roosevelt County _____
- Mulberry Pie Township, Baker County _____
- Water Well Township, Duke County _____
- Holly Township, Lincoln County _____

Best PRD _____ Township

Find the COC.

Lamborghini Township, Autobahn County	_____
Abilene Township, Harrison County	_____
Peach Cobbler Township, Baker County	_____
Daisy Township, Duke County	_____
Walnut Grove Township, Lincoln County	_____

Best COC _____ Township

Assessment Ratios for Lincoln County

The Supervisor of Assessments wants to determine whether there is a difference in uniformity between improved and unimproved properties. Several townships have enough sales to have sales ratio studies done by these sub-categories. He or she decides to look at all of the available measures of uniformity listed in the sales ratio study book. By comparing the unimproved properties to the improved properties for the townships that had enough sales to conduct sales ratio studies for the sub-categories of "Improved" and "Unimproved", determine which type of property was most uniformly assessed for each of the measures of uniformity listed.

a. For the **COD**:

	Improved	Unimproved
Blue Spruce	_____	_____
Cherry	_____	_____
Cottonwood	_____	_____
Hawthorn	_____	_____

Most uniform (COD) is (unimproved, improved) _____

b. For the **COC**:

	Improved	Unimproved
Blue Spruce	_____	_____
Cherry	_____	_____
Cottonwood	_____	_____
Hawthorn	_____	_____

Most uniform (COC) is (unimproved, improved) _____

c. For the **PRD**:

	Improved	Unimproved
Blue Spruce	_____	_____
Cherry	_____	_____
Cottonwood	_____	_____
Hawthorn	_____	_____

Most uniform (PRD) is (unimproved, improved) _____

Overall, which type of property should she concentrate on for reassessment?

Summary

The sales ratio study as performed by the Department of Revenue provides multiple tools for a more complete grasp of assessment uniformity within the county.

The sales ratio study, as it appears in “Table 1 Assessment Ratios”, provides the assessor with information necessary to determine what townships would be most helped by reassessment. The assessor, using the calculations of the median, the COD, the PRD, and the COC, may make a better determination on how to most effectively utilize limited time and resources to improve assessment uniformity.

Unit 7 Review Questions

Assessment Ratios for FLORAL COUNTY

Refer to the "I-E Class Sales Ratio Study" in the supplemental section.

- 1. What was the median assessment ratio for Carnation township? _____
- 2. Begonia township was under-assessed, statutorily assessed, or over-assessed? _____
- 3. Which township was assessing closest to the statutory level (use adjusted median)? _____
- 4. Considering only the COD, name the township that was:
least uniformly assessed. _____
most uniformly assessed. _____

Homework

Answers follow the page the exercise is presented on.

Interquartile Range Calculations

Calculate the upper and lower trim limits for the following group of numbers:

7.81, 17.46, 17.89, 20.00, 35.23, 38.99, 40.77, 50.22, 51.33, 51.87, 59.82, 62.37, 65.79, 89.99, 125.66

1. First Quartile: _____

2. Third Quartile: _____

3. Interquartile range: _____

4. Interquartile range $\times 6 =$ _____

5. Third Quartile + Result = _____

6. First Quartile – Result = _____

Are there any numbers removed from this group? _____

1. First Quartile: 4

2. Third Quartile: 12

3. Interquartile range: 42.37

4. Interquartile range 42.37 x 6 = 254.22

5. Third Quartile + Result = 316.59

6. First Quartile – Result = -234.22

Are there any numbers removed from this group? No

TOWNSHIP #2

Av	Sale Price	Sales Ratio (%)	Ranked	Deviation
\$ 22,097	\$ 124,000	_____	_____	_____
36,098	117,500	_____	_____	_____
37,474	98,000	_____	_____	_____
31,520	105,000	_____	_____	_____
28,064	62,900	_____	_____	_____
10,475	24,600	_____	_____	_____
24,522	79,000	_____	_____	_____
37,475	138,700	_____	_____	_____
35,176	85,000	_____	_____	_____
18,931	72,400	_____	_____	_____
22,258	58,200	_____	_____	_____
5,210	12,800	_____	_____	_____
28,285	87,300	_____	_____	_____
31,845	113,000	_____	_____	_____
27,407	82,900	_____	_____	_____
7,319	18,700	_____	_____	_____
20,744	69,500	_____	_____	_____
31,548	92,300	_____	_____	_____

Median Level of Assessment _____

Coefficient of Dispersion (COD) _____

Coefficient of Concentration (COC) _____

Price Related Differential (PRD) _____

TOWNSHIP #2

Assessed Value	Sale Price	Sales Ratio (%)	Ranked	Dev
\$ 22,097	\$ 124,000	17.82	17.82	14.91
36,098	117,500	30.72	26.15	2.01
37,474	98,000	38.24	27.02	5.51
31,520	105,000	30.02	28.18	2.71
28,064	62,900	44.62	29.85	11.89
10,475	24,600	42.58	30.02	9.85
24,522	79,000	31.04	30.72	1.69
37,475	138,700	27.02	31.04	5.71
35,176	85,000	41.38	32.40	8.65
18,931	72,400	26.15	33.06	6.58
22,258	58,200	38.24	34.18	5.51
5,210	12,800	40.70	38.24	7.97
28,285	87,300	32.40	38.24	.33
31,845	113,000	28.18	39.14	4.55
27,407	82,900	33.06	40.70	.33
7,319	18,700	39.14	41.38	6.41
20,744	69,500	29.85	42.58	2.88
31,548	92,300	34.18	44.62	1.45
<hr/> 456,448	<hr/> 1,441,800	<hr/> 605.34		<hr/> 98.94

Median Level of Assessment	32.73 %
Coefficient of Dispersion (COD)	16.80 %
Coefficient of Concentration (COC)	38.89 %
Price Related Differential (PRD)	1.06

PRICE-RELATED DIFFERENTIAL
P R D

Assessed Value	Sale Price	Sales Ratio
\$ 26,000	\$80,000	32.50
3,000	7,500	40.00
19,200	60,000	32.00
4,200	11,400	36.84
2,800	6,500	43.08
25,000	83,600	29.90
17,100	50,000	34.20
17,900	59,900	29.88
18,400	61,300	30.02
3,500	7,600	46.05
4,300	9,900	43.43
25,800	75,000	34.40
16,500	57,400	28.75
27,200	92,700	29.34
28,500	98,000	29.08
20,300	80,000	25.38
15,600	70,000	22.29
10,000	86,800	11.52

Totals:	285,300	÷	997,600		578.66 ÷ 18 = 32.15
		28.60			

Price -Related Differential = $\frac{32.15}{28.60} = 1.12$

Does this indicate a possible bias based on the value of the property? Yes

PRICE-RELATED DIFFERENTIAL
P R D

Assessed Value	Sale Price	Sales Ratio
\$ 36,000	\$80,000	45.00
5,000	7,500	66.67
19,200	75,000	25.60
6,200	11,400	54.39
3,200	6,500	49.23
25,000	75,600	33.07
15,100	50,000	30.20
18,900	59,900	31.55
18,400	55,300	33.27
3,000	7,600	39.47
4,300	10,900	39.45
25,800	55,000	46.91
6,500	57,400	11.32
25,200	92,700	27.18
27,500	98,000	28.06
22,300	80,000	27.88
17,600	70,000	25.14
10,000	96,800	10.33

Totals: $\frac{289,200}{29.22} \div \frac{989,600}{624.72 \div 18} = 34.71$

Price -Related Differential = $\frac{34.71}{29.22} = 1.19$

Does this indicate a possible bias based on the value of the property? Yes

Trend forward and backward

You will find the charts and tables on the following pages. The answers begin on the pages that follow the charts and tables.

A township assessor is applying for the 2015 assessor's bonus. She needs to determine whether her 3-year average median level of assessments is between _____ % and _____ %. She also needs to know her COD to see if it is in the right range. The population of her county is 62,793.

The township did not have 25 useable sales for any of the 3 years needed for the 2015 assessor bonus award. Therefore the assessor will have to use trending to calculate the township medians for each of the 3 years (2012, 2013, and 2014).

The **county** medians are:

2012 Urban Weighted Median	=	34.01
2013 Urban Weighted Median	=	31.53
2014 Urban Weighted Median	=	30.65

OVERVIEW:

Exercise A: Trend backward

Determine 2012 median level – trend 2013 to 2012

Exercise B: Trend backward

Determine 2013 median level – trend 2014 to 2013

Exercise C: Trend forward

Determine 2014 median level - trend 2013 to 2014

Exercise D: Calculate 3–year average median level of assessments

Exercise E: Calculate the COD for 2014

Values for the 2014 Sales

The 2014 Sales will be used for this trending exercise.
Information needed is the 2014 ratios as calculated from the 2014 sales and the corresponding 2013 AV's in order to calculate the 2014 median.

2014 Ratios

26.34	26.81	27.13	28.38	29.30
30.74	33.23	36.67	42.78	43.20

Values for the 2013 Sales

The 2013 sales 1) will be trended backward to be combined with the existing 2012 sales to determine a 2012 median and 2) will also be trended forward to be combined with existing 2014 sales ratios to determine a 2014 median.

After applying the trending factor to the 2013 sales price to determine an adjusted sales price for the year, the assessed value for those same sales for the prior year is needed.

- 1) 2011 assessed values for the 2013 sales adjusted to 2012 are needed to determine the 2012 trended sales ratios.
- 2) 2013 assessed value for the 2013 sales adjusted to 2014 is needed to determine the 2014 trended sales ratios.
- 3) 2012 sales ratios using 2011 AV and 2012 SP have been calculated in the table below.

<u>2011 AV</u>	<u>2012 AV</u>	<u>2013 AV</u>	<u>2013 SP</u>	<u>2013 SR</u>
\$ 5,120	\$ 5,120	\$ 8,510	\$ 25,000	20.48
9,360	9,360	13,150	40,000	23.40
14,990	15,228	21,990	60,000	25.38
10,210	10,209	13,550	39,800	25.65
16,920	16,920	21,110	65,000	26.03
15,700	15,702	20,390	60,000	26.17
26,470	28,558	35,580	109,000	26.20
2,160	2,160	2,380	8,000	27.00
5,560	5,560	6,940	20,000	27.80
13,270	13,270	15,670	46,500	28.54
36,570	36,576	41,900	127,000	28.80
29,660	29,664	33,340	101,000	29.37
19,600	19,598	22,430	65,000	30.15
21,390	21,393	22,330	68,000	31.46
11,210	11,209	11,430	32,500	34.49
15,140	15,141	15,010	43,875	34.51

Exercise A: Determine 2012 median level
 – trend 2013 back to 2012

RANK

$$\text{Trending Factor} = \frac{\text{County Median - Trended From Year}}{\text{County Median- Trended To Year}} = \underline{\hspace{2cm}}$$

2013 SP	Trending Factor	2012 Adjusted SP	2011 AV	2012 Ratios	
					26.34
					26.81
\$ 25,000		23,178	5,120	22.09	
40,000		37,084	9,360	25.24	27.13
60,000			14,990		
39,800			10,210		
65,000			16,920		
60,000			15,700		28.38
109,000			26,470		
8,000			2,160		29.30
20,000			5,560		
46,500			13,270		30.74
127,000			36,570		
101,000			29,660		
65,000			19,600		
68,000			21,390		
32,500			11,210		
43,875			15,140		33.23

36.67

2012 Median Level of Assessments: _____

Existing 2012 Sales Ratios: (Ranked in rows)

26.34	26.81	27.13	28.38	29.30	42.78
30.74	33.23	36.67	42.78	43.20	43.20

Exercise B: Determine 2013 median level – trend 2014 to 2013
Ranked

Trending Factor = _____

2014 \$ SP	Trending Factor	2013 Adjusted SP	2012 AV	2013 Ratios
				20.48
				23.40
67,500	_____	_____	14,380	_____
15,500	_____	_____	3,740	25.38
				25.65
26,500	_____	_____	6,430	26.03
				26.17
105,000	_____	_____	27,900	26.20
				27.00
66,000	_____	_____	17,610	_____
				27.80
27,000	_____	_____	7,920	28.54
				28.80
40,000	_____	_____	11,310	_____
				29.37
31,000	_____	_____	9,040	_____
				30.15
16,500	_____	_____	4,870	_____
				31.46
42,500	_____	_____	13,330	_____
				34.49
28,000	_____	_____	10,040	34.51

12,000	_____	_____	4,990	_____

7,000	_____	_____	8,300	_____

Existing 2013 Sales Ratios: (These are ranked in rows)

20.48 23.40 25.38 25.65 26.03 26.17 26.20 27.00

27.80 28.54 28.80 29.37 30.15 31.46 34.49 34.51

2013 Median Level of Assessments: _____

Exercise C: Determine 2014 median
– trend 2013 to 2014

Ranked

22.31

25.29

Trending Factor: _____

25.40

27.83

27.94

2013 SP	Trending Factor	2014 Adjusted SP	2013 AV	2014 Ratios	
					<u>29.33</u>
					<u>29.60</u>
					<u>30.52</u>
\$ 25,000	_____	_____	8,510	_____	<u>30.91</u>
40,000	_____	_____	13,150	_____	
60,000	_____	_____	21,990	_____	
39,800	_____	_____	13,550	_____	
65,000	_____	_____	21,110	_____	
60,000	_____	_____	20,390	_____	
109,000	_____	_____	35,580	_____	
8,000	_____	_____	2,380	_____	
20,000	_____	_____	6,940	_____	<u>32.85</u>
46,500	_____	_____	15,670	_____	
127,000	_____	_____	41,900	_____	
101,000	_____	_____	33,340	_____	
65,000	_____	_____	22,430	_____	
68,000	_____	_____	22,330	_____	
32,500	_____	_____	11,430	_____	
43,875	_____	_____	15,010	_____	

2014 Median Level of Assessments: _____

37.54

43.58

Existing 2014 Sales Ratios: (Ranked in rows)

124.14

22.31 25.29 25.40 27.83 27.94

29.33 29.60 30.52 30.91 32.85

37.54 43.58 124.14

Exercise D: Determine the 3-year average median
level of assessments _____

Exercise E: Determine the 2014 COD:

2014 SR's	2014 Median	Deviation	
22.31	32.07	_____	
25.29	32.07	_____	
25.40	32.07	_____	
27.83	32.07	_____	
27.94	32.07	_____	
28.92	32.07	_____	
29.33	32.07	_____	
29.60	32.07	_____	
30.52	32.07	_____	
30.91	32.07	_____	
31.57	32.07	_____	
31.73	32.07	_____	
31.92	32.07	_____	
31.96	32.07	_____	
32.07	32.07	_____	
32.09	32.07	_____	
32.76	32.07	_____	
32.85	32.07	_____	
33.04	32.07	_____	
33.09	32.07	_____	
33.10	32.07	_____	
33.26	32.07	_____	
33.54	32.07	_____	
33.73	32.07	_____	
34.19	32.07	_____	
35.63	32.07	_____	
37.54	32.07	_____	
43.58	32.07	_____	COD = _____
124.14	32.07	_____	

Will the assessor receive the Assessor Bonus Award? _____

Exercise A: Determine 2012 median level – trend 2013 back to 2012

Trending Factor = .9271

						RANK
						22.09
						<u>25.24</u>
						<u>26.19</u>
2013 SP	Trending Factor	2012 Adjusted SP	2011 AV	2012 Ratios		
						<u>26.34</u>
						<u>26.81</u>
\$ 25,000	.9271	23,178	5,120	22.09	<u>26.95</u>	
40,000	.9271	37,084	9,360	25.24	<u>27.13</u>	
60,000	.9271	55,626	14,990	26.95	<u>27.67</u>	
39,800	.9271	36,899	10,210	27.67	<u>28.08</u>	
65,000	.9271	60,262	16,920	28.08	<u>28.22</u>	
60,000	.9271	55,626	15,700	28.22	<u>28.38</u>	
109,000	.9271	101,054	26,470	28.22	<u>29.12</u>	
8,000	.9271	7,417	2,160	26.19	<u>29.30</u>	
20,000	.9271	18,542	5,560	29.12	<u>29.99</u>	
46,500	.9271	43,110	13,270	29.99	<u>30.74</u>	
127,000	.9271	117,742	36,570	30.78	<u>30.78</u>	
101,000	.9271	93,637	29,660	30.78	<u>31.06</u>	
65,000	.9271	60,262	19,600	31.06	<u>31.68</u>	
68,000	.9271	63,043	21,390	31.68	<u>32.52</u>	
32,500	.9271	30,131	11,210	32.52	<u>33.23</u>	
43,875	.9271	40,677	15,140	33.93	<u>33.93</u>	
				37.20	<u>36.67</u>	
				37.22	<u>37.20</u>	
					<u>37.22</u>	
					<u>42.78</u>	
					<u>43.20</u>	

2012 Median Level of Assessments: 29.65 %

Exercise B: Determine 2013 median level – trend 2014 to 2013

Trending Factor = .9721

2014 \$ SP	Trending Factor	2013 Adjusted SP	2012 AV	2013 Ratios	
					<u>20.48</u>
					<u>21.92</u>
					<u>23.40</u>
					<u>24.82</u>
67,500	<u>.9721</u>	65,617	14,380	21.92	<u>24.96</u>
					<u>25.38</u>
15,500	<u>.9721</u>	15,068	3,740	24.82	<u>25.65</u>
					<u>26.03</u>
26,500	<u>.9721</u>	25,761	6,430	24.96	<u>26.17</u>
					<u>26.20</u>
105,000	<u>.9721</u>	102,071	27,900	27.33	<u>27.00</u>
					<u>27.33</u>
66,000	<u>.9721</u>	64,159	17,610	27.45	<u>27.45</u>
					<u>27.80</u>
27,000	<u>.9721</u>	26,247	7,920	30.17	<u>28.54</u>
					<u>28.80</u>
40,000	<u>.9721</u>	38,884	11,310	29.09	<u>29.09</u>
					<u>29.37</u>
31,000	<u>.9721</u>	30,135	9,040	30.00	<u>30.00</u>
					<u>30.15</u>
16,500	<u>.9721</u>	16,040	4,870	30.36	<u>30.17</u>
					<u>30.36</u>
42,500	<u>.9721</u>	41,314	13,330	32.27	<u>31.46</u>
					<u>32.27</u>
28,000	<u>.9721</u>	27,219	10,040	36.89	<u>34.49</u>
					<u>34.51</u>
12,000	<u>.9721</u>	11,665	4,990	42.78	<u>36.89</u>
					<u>42.78</u>
7,000	<u>.9721</u>	6,805	8,300	121.97	<u>121.97</u>

2013 Median Level of Assessments: 28.54 %

Exercise C: Determine 2014 median level
Trend 2013 to 2014

Ranked

Trending Factor 1.0287

2013 SP	Trending Factor	2014 Adjusted SP	2013 AV	2014 Ratios	Ranked
					<u>22.31</u>
					<u>25.29</u>
					<u>25.40</u>
					<u>27.83</u>
					<u>27.94</u>
					<u>28.92</u>
					<u>29.33</u>
					<u>29.60</u>
					<u>30.52</u>
\$ 25,000	<u>1.0287</u>	<u>25,718</u>	8,510	<u>33.09</u>	<u>30.91</u>
40,000	<u>1.0287</u>	<u>41,148</u>	13,150	<u>31.96</u>	<u>31.57</u>
60,000	<u>1.0287</u>	<u>61,722</u>	21,990	<u>35.63</u>	<u>31.73</u>
39,800	<u>1.0287</u>	<u>40,942</u>	13,550	<u>33.10</u>	<u>31.92</u>
65,000	<u>1.0287</u>	<u>66,866</u>	21,110	<u>31.57</u>	<u>31.96</u>
60,000	<u>1.0287</u>	<u>61,722</u>	20,390	<u>33.04</u>	<u>32.07</u>
109,000	<u>1.0287</u>	<u>112,128</u>	35,580	<u>31.73</u>	<u>32.09</u>
8,000	<u>1.0287</u>	<u>8,230</u>	2,380	<u>28.92</u>	<u>32.76</u>
20,000	<u>1.0287</u>	<u>20,574</u>	6,940	<u>33.73</u>	<u>32.85</u>
46,500	<u>1.0287</u>	<u>47,835</u>	15,670	<u>32.76</u>	<u>33.04</u>
127,000	<u>1.0287</u>	<u>130,645</u>	41,900	<u>32.07</u>	<u>33.09</u>
101,000	<u>1.0287</u>	<u>103,899</u>	33,340	<u>32.09</u>	<u>33.10</u>
65,000	<u>1.0287</u>	<u>66,866</u>	22,430	<u>33.54</u>	<u>33.26</u>
68,000	<u>1.0287</u>	<u>69,952</u>	22,330	<u>31.92</u>	<u>33.54</u>
32,500	<u>1.0287</u>	<u>33,433</u>	11,430	<u>34.19</u>	<u>33.73</u>
43,875	<u>1.0287</u>	<u>45,134</u>	15,010	<u>33.26</u>	<u>34.19</u>
					<u>35.63</u>
2013 Median Level of Assessments: <u>32.07 %</u>					<u>37.54</u>
					<u>43.58</u>
Exercise D: Determine the 3-year average median level of assessments <u>30.09 %</u>					<u>124.14</u>

Exercise E: Determine the 2014 COD:

2014 SR's	2014 Median	Deviation	
22.31	32.07	9.76	
25.29	32.07	6.78	
25.40	32.07	6.67	
27.83	32.07	4.24	
27.94	32.07	4.13	
28.92	32.07	3.15	
29.33	32.07	2.74	
29.60	32.07	2.47	
30.52	32.07	1.55	
30.91	32.07	1.16	
31.57	32.07	.50	
31.73	32.07	.34	
31.92	32.07	.15	
31.96	32.07	.11	
32.07	32.07	.00	
32.09	32.07	.02	
32.76	32.07	.69	
32.85	32.07	.78	
33.04	32.07	.97	
33.09	32.07	1.02	
33.10	32.07	1.03	
33.26	32.07	1.19	
33.54	32.07	1.47	
33.73	32.07	1.66	
34.19	32.07	2.12	
35.63	32.07	3.56	
37.54	32.07	5.47	
43.58	32.07	11.51	COD = <u>17.99%</u>
124.14	32.07	92.07	

Total **167.20**

Will the assessor receive the Assessor Bonus Award? **NO**

Find the COD for this township

TOWNSHIP		
Prior Year AV	Current Year Sale Price	Sales Ratio %
\$ 15,700	\$ 57,900	<u>27.12</u>
35,600	98,300	<u>36.22</u>
24,800	72,900	<u>34.02</u>
16,300	56,100	<u>29.06</u>
19,500	68,400	<u>28.51</u>
32,100	83,100	<u>38.63</u>
14,000	47,500	<u>29.47</u>
35,600	93,800	<u>37.95</u>

COD = _____

Find the COD for this Township

TOWNSHIP

Prior Year AV	Current Year Sale Price	Sales Ratio	Deviations
\$ 15,700	\$ 57,900	<u>27.12</u>	4.63
35,600	98,300	<u>36.22</u>	4.47
24,800	72,900	<u>34.02</u>	2.27
16,300	56,100	<u>29.06</u>	2.69
19,500	68,400	<u>28.51</u>	3.24
32,100	83,100	<u>38.63</u>	6.88
14,000	47,500	<u>29.47</u>	2.28
35,600	93,800	<u>37.95</u>	6.20

Median = 31.75

$$\text{Average Deviation} = \frac{\text{Sum of Deviations}}{\text{Number of Sales}} = \frac{32.66\%}{8} = 4.08\%$$

$$\text{COD} = \frac{\text{Average Deviation}}{\text{Median}} \times 100(\%) = \frac{4.08}{31.75} \times 100(\%) = 12.85\%$$

Calculate the PRD for Township #2.

**PRICE-RELATED DIFFERENTIAL
P R D**

Assessed Value	Sale Price	Sales Ratio
\$ 27,000	\$ 80,000	33.75
3,000	7,500	40.00
19,200	60,000	32.00
3,400	11,400	29.82
2,800	6,500	43.08
23,200	83,600	27.75
17,100	50,000	34.20
17,900	59,900	29.88
19,400	61,300	31.65
3,500	7,600	46.05
4,300	9,900	43.43
25,800	75,000	34.40
18,000	57,400	31.36
26,500	92,700	28.59
28,500	98,000	29.08
20,300	80,000	25.38
14,000	70,000	20.00
10,000	86,800	11.52
<hr/>		
Totals: 283,900	÷ 997,600	571.94 ÷ 18 = 31.77
	28.46	

Price -Related Differential = $\frac{31.17}{28.46} = 1.12$

Does this indicate a possible bias based on the value of the property? Yes

Complete the sales ratio study for the following township.

**TOWNSHIP
SALES RATIO STUDY**

Using the chart below, find:

Median Level of Assessment _____

Coefficient of Dispersion (COD) _____

Coefficient of Concentration (COC) _____

Price-Related Differential (PRD) _____

Prior Year AV	Curr Year SP	Sales Ratio (%)	Ranked	Dev	Ranked
\$22,097	\$ 124,000	_____	_____	_____	_____
36,098	117,500	_____	_____	_____	_____
28,064	62,900	_____	_____	_____	_____
10,475	24,600	_____	_____	_____	_____
18,931	72,400	_____	_____	_____	_____
22,258	58,200	_____	_____	_____	_____
5,210	12,800	_____	_____	_____	_____
31,845	113,000	_____	_____	_____	_____
27,407	82,900	_____	_____	_____	_____
7,319	18,700	_____	_____	_____	_____
20,744	69,500	_____	_____	_____	_____
31,548	92,300	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Complete the sales ratio study for the following township.

**TOWNSHIP
SALES RATIO STUDY**

Using the chart below, find:

Median Level of Assessment	33.62%
Coefficient of Dispersion (COD)	18.26%
Coefficient of Concentration (COC)	25.00%
Price Related Differential (PRD)	1.09

	Av	SP	Sales Ratio (%)	Ranked	Deviation	Ranked
\$	22,097	\$124,000	17.82	17.82	15.80	.56
	36,098	117,500	30.72	26.15	2.90	.56
	28,064	62,900	44.62	28.18	11.00	2.90
	10,475	24,600	42.58	29.85	8.96	3.77
	18,931	72,400	26.15	30.72	7.47	4.62
	22,258	58,200	38.24	33.06	4.62	5.44
	5,210	12,800	40.70	34.18	7.08	5.52
	31,845	113,000	28.18	38.24	5.44	7.08
	27,407	82,900	33.06	39.14	.56	7.47
	7,319	18,700	39.14	40.70	5.52	8.96
	20,744	69,500	29.85	42.58	3.77	11.00
	31,548	92,300	34.18	44.62	.56	15.80
<hr/>						
	261,996	848,800	405.24		73.68	

Answer Key for Unit Review Questions and Exercises

Answers for Review Questions are provided first with the Exercise answers following for each unit.

UNIT 1 Review Questions

1. T or F To calculate a sales ratio, the EAV is divided by the sales price.
2. T or F The mode for an array of numbers is the result located in the middle.
3. T or F A median is the number that shows up in an array of numbers the most times.
4. T or F Quartile ranges play no significant role in the sales ratio process.
5. T or F The formula to calculate a sales ratio contains the current year's EAV divided by the prior year's sales price.
6. What central point of tendency reflects the middle sales ratio result? Median
7. Calculate the lower and upper trim points from the following array of 15 numbers.

2.00, 15.46, 24.80, 24.80, 25.08, 26.10, 32.99, 33.24, 33.24, 34.15, 36.77, 50.86, 51.33, 77.33, 105.66

From your results, what, if any ratios will be removed from the data? None are removed. Upper limit is 207.22 and lower limit is -131.56.

Unit 1 Exercises

Exercise 1-1, Decimal and Percentages

Calculate the missing component(s) below:

EAV	Sales Price	Decimal	Percentage
40,000	125,000	.3200	32.00
35,000	105,000	.3333	33.33
60,000	190,450	.3150	31.50
150,000	583,500	.2571	25.71
120,000	90,000	1.3333	133.33
2,500	50,000	.0500	5.00
75,000	166,500	.4505	45.05

Exercise 1-2, Statistical Measures

Another statistical measure that would provide a more practical result when discussing Sales Ratio Studies is the **median**. This is the middle occurrence for the total group of SR for a county. Using the first set of numbers as the guide, what is the median?

Median = 62.50

Exercise 1-3

The final statistical centrally located result when evaluating SR is the **mode**. This is the number that is displayed the most in an array of figures. Using the first or second set of numbers above, what would the mode be? 110

Exercise 1-4, Sales Ratio

Deed for the sale is dated: 2015 = 2014 Assessment
Deed for the sale is dated: 2012 = 2011 Assessment
Deed for the sale is dated: 2014 = 2013 Assessment
Deed for the sale is dated: 2016 = 2015 Assessment

Exercise 1-5, Quartiles

Answer the questions for following array of numbers.

19.25, 22.46, 32.57, 32.99, 34.20, 36.59, 36.59, 37.46, 37.89, 38.80, 38.99, 39.99, 42.76, 44.98, 87.25

What is the First Quartile in the above group of numbers?

$$(0.25)(15) + 0.25 = 4$$

What is the Third Quartile in the above group of numbers?

$$(0.75)(15) + 0.75 = 12$$

Interquartile

Exercise 1-6

From the above example, were there any sales removed from this study? 87.25

For the above example, what is the ratio range for this township before removal of outliers? 68.00 after the removal of outliers? 25.73

What was the median for this set of data before removal of any outliers? 37.46

What is the median for set of data after removal of outliers, if applicable? 37.03

Exercise 1-7

15.25, 25.46, 26.57, 38.99, 39.20, 39.59, 39.59, 41.46, 43.89, 44.80, 45.99, 45.99, 50.76, 90.98, 107.25

From the above example, were there any sales removed from this study? 90.98, 107.25

For the above example, what is the ratio range for this township before removal of outliers? 92.00 after the removal of outliers? 35.51

What was the median for this set of data before removal of any outliers? 41.46

What is the median for set of data after removal of outliers, if applicable? 39.59

Exercise 1-8

2.38, 21.46, 26.57, 38.99, 39.20, 39.59, 39.59, 41.46, 43.89, 45.80, 45.99, 45.99, 50.76, 54.85, 55.67, 79.88, 90.98, 157.25, 166.88

From the above example, were there any sales removed from this study? 157.25, 166.88

For the above example, what is the ratio range for this township before removal of outliers? 164.50 after the removal of outliers? 88.60

What was the median for this set of data before removal of any outliers? 45.80

What is the median for set of data after removal of outliers, if applicable? 43.89

Exercise 1-9

1.25, 25.46, 26.57, 38.99, 39.20, 39.59, 39.59, 41.46, 43.89, 44.80, 45.99, 45.99, 50.76, 88.92, 127.25

From the above example, were there any sales removed from this study? 88.92, 127.25

For the above example, what is the ratio range for this township before removal of outliers? 126.00 after the removal of outliers? 49.51

What was the median for this set of data before removal of any outliers? 41.46

What is the median for set of data after removal of outliers, if applicable? 39.59

Exercise 1-10

15.25, 25.46, 26.57, 38.99, 39.20, 39.59, 39.59, 40.72, 41.46, 43.89, 44.80, 45.99, 45.99, 50.76, 75.98, 107.25, 110.68, 111.25, 138.55

From the above example, were there any sales removed from this study? No

For the above example, what is the ratio range for this township before removal of outliers? 123.30 after the removal of outliers? 123.30

What was the median for this set of data before removal of any outliers? 43.89

What is the median for set of data after removal of outliers, if applicable? 43.89

Exercise 1-11

1.25, 4.38, 5.50, 15.25, 25.46, 36.57, 38.99, 39.20, 39.59, 39.59, 40.99, 41.46, 42.66, 43.89, 44.80, 45.99, 45.99, 49.98, 50.76, 75.22, 90.98, 97.25, 145.33

From the above example, were there any sales removed from this study? 145.33

For the above example, what is the ratio range for this township before removal of outliers? 144.08 after the removal of outliers? 96.00

What was the median for this set of data before removal of any outliers? 41.46

What is the median for set of data after removal of outliers, if applicable? 41.23

Unit 2: Review Questions

1. T or F A sale of property between relatives will be included in the sales ratio study.
2. T or F A sale for an exempt property will not be included in the sales ratio study.
3. T or F The median level of assessments is found by ranking sales ratios in ascending order.
4. T or F A property has to be advertised with a realtor to be an arm's length transaction.
5. T or F To calculate the upper and lower trim points for an array of data, the first step is to identify the first and second quartiles.
6. T or F The calculation for the county's urban weighted sales ratio median includes all classes of property.
7. What are some of the uses for the sales ratio study? Used for assessment appeal, as an analytical tool to evaluate local assessment practices, determine eligibility for assessor bonus award and reimbursement of 50% of the CCAO's salary.
8. If a house assessed at \$74,250 recently sold for \$198,000, the sales ratio is 37.50. Was the house was (over, statutorily, or under) assessed?
9. The 2014 study would use sales from 2014 and assessed values for these same properties from 2013.
10. List two deed types that would be included in the sale the sales ratio study: Warranty (including Corporation Warranty deed) and Trustee deed.
11. List five uses of property that would exclude a sale from the sales ratio study: Farm, Governmental, Charitable, Railroad, Model home, Developer's lot, fraternal organization. Answers can vary.
12. List two other reasons why a sale would be excluded from the sales ratio study. Overlaps townships (non-farm parcels) or recorded in wrong county. Answers can vary.

Unit 2 Exercises

Exercise 2-1

Prior Year Assessed Value	Current Year Sale Price	Sales Ratio (%)	Ranked (%)
\$ 26,000	\$ 80,000	<u>32.50</u>	<u>29.88</u>
3,000	7,500	<u>40.00</u>	<u>29.90</u>
19,200	60,000	<u>32.00</u>	<u>30.02</u>
4,200	11,400	<u>36.84</u>	<u>32.00</u>
2,800	6,500	<u>43.08</u>	<u>32.50</u>
25,000	83,600	<u>29.90</u>	<u>34.20</u>
17,100	50,000	<u>34.20</u>	<u>36.84</u>
17,900	59,900	<u>29.88</u>	<u>40.00</u>
18,400	61,300	<u>30.02</u>	<u>43.08</u>

Median 32.50%

Note: This exercise is for classroom purposes only. There must be 25 useable sales in order to calculate a median level of assessments.

Exercise 2-2

	Prior year Assessed Value	Current Year Sale Price	Sales Ratio	Ranked
\$	10,000	86,800	<u>11.52</u>	<u>11.52</u>
	15,600	70,000	<u>22.29</u>	<u>22.29</u>
	20,300	80,000	<u>25.38</u>	<u>25.38</u>
	26,000	80,000	<u>32.50</u>	<u>28.75</u>
	3,000	7,500	<u>40.00</u>	<u>29.08</u>
	19,200	60,000	<u>32.00</u>	<u>29.34</u>
	4,200	11,400	<u>36.84</u>	<u>29.88</u>
	2,800	6,500	<u>43.08</u>	<u>29.90</u>
	25,000	83,600	<u>29.90</u>	<u>30.02</u>
	17,100	50,000	<u>34.20</u>	<u>32.00</u>
	17,900	59,900	<u>29.88</u>	<u>32.50</u>
	18,400	61,300	<u>30.02</u>	<u>34.20</u>
	3,500	7,600	<u>46.05</u>	<u>34.40</u>
	4,300	9,900	<u>43.43</u>	<u>36.84</u>
	25,800	75,000	<u>34.40</u>	<u>40.00</u>
	16,500	57,400	<u>28.75</u>	<u>43.08</u>
	27,200	92,700	<u>29.34</u>	<u>43.43</u>
	28,500	98,000	<u>29.08</u>	<u>46.05</u>

Median = 31.01%

Exercise 2-3

28.75, 29.08, 29.34, 29.88, 29.90, 30.02, 32.00, 32.50, 34.20, 34.40, 36.84, 40.00, 43.08, 43.43, 46.05

Median level of assessments (from above set of data) 32.50

First Quartile 29.88

Third Quartile 40.00

Lower trim point 30.84

Upper trim point 100.72

Median level of assessments after trimming 32.50

Urban Weighted Median Ratio

In order to calculate a county median, it is necessary to know both the total assessed values in the county and the total market value of property in the county. What class of properties are included for the assessed values? Non-farm properties such as residential, commercial, industrial and other land/improvements.

Exercise 2-4

	Assessed Value (000's)	Median Ratio (%)	Estimated Full Value (000's)
Township 1	3,648	32.50	<u>11,225</u>
Township 2	10,450	33.10	<u>31,571</u>
Township 3	6,279	31.62	<u>19,858</u>
All other townships	<u>30,560</u>	<u>32.20</u>	<u>94,907</u>
Total	50,937	<u>32.33</u>	<u>157,561</u>

Urban weighted ratio – County's Median Level of Assessments 32.33

Exercise 2-5

Assessed Value	Median Ratio (000's)	Estimated Full (%)	Value (000's)
Township 1	5,700	32.50	<u>17,538</u>
Township 2	12,555	33.10	<u>37,931</u>
Township 3	7,859	31.62	<u>24,855</u>
Township 4	14,667	34.88	<u>42,050</u>
Township 5	22,885	29.44	<u>77,734</u>
All other townships	<u>30,560</u>	<u>32.81</u>	<u>93,142</u>
Total	94,226	<u>32.13</u>	<u>293,250</u>

Urban weighted ratio – County's Median Level of Assessments 32.13

Exercise 2-6

Assessed Value	Median Ratio (000's)	Estimated Full (%)	Value (000's)
Township 1	6,500	32.50	<u>20,000</u>
Township 2	14,887	33.10	<u>44,976</u>
Township 3	9,534	31.62	<u>30,152</u>
Township 4	20,080	34.88	<u>57,569</u>
Township 5	62,331	29.44	<u>211,722</u>
All other townships	<u>46,788</u>	<u>32.81</u>	<u>142,603</u>
Total	<u>160,120</u>	<u>31.58</u>	<u>507,022</u>
Urban weighted ratio – County's Median Level of Assessments			<u>31.58</u>

Unit 3 Review Questions

1. T or F Individual sales that are clustered around a township's median indicates a high COD result.
2. T or F A lower COC result indicates an issue with uniformity assessment.
3. T or F A PRD of 1.05 indicates a bias for assessments for higher-valued properties to be assessed higher than lower-valued properties.
4. Calculate the COD, COC and PRD for the following set of data:

<u>ASSESSED VALUE</u>	<u>SALES PRICE</u>	<u>SALES RATIO</u>	<u>RANKED</u>	<u>MEDIAN</u>	<u>DEVIATION</u>
\$ 4,000	16,000	<u>25.00</u>	<u>21.15</u>	<u>33.51</u>	<u>8.51</u>
2,000	7,600	<u>26.32</u>	<u>22.22</u>	<u>33.51</u>	<u>7.19</u>
13,000	32,000	<u>40.63</u>	<u>24.82</u>	<u>33.51</u>	<u>7.12</u>
8,000	29,500	<u>27.12</u>	<u>25.00</u>	<u>33.51</u>	<u>6.39</u>
5,000	18,800	<u>26.60</u>	<u>26.32</u>	<u>33.51</u>	<u>6.91</u>
3,500	14,100	<u>24.82</u>	<u>26.60</u>	<u>33.51</u>	<u>8.69</u>
14,700	35,800	<u>41.06</u>	<u>26.60</u>	<u>33.51</u>	<u>7.55</u>
2,200	10,400	<u>21.15</u>	<u>26.67</u>	<u>33.51</u>	<u>12.36</u>
8,000	30,000	<u>26.67</u>	<u>27.12</u>	<u>33.51</u>	<u>6.84</u>
2,200	9,900	<u>22.22</u>	<u>28.06</u>	<u>33.51</u>	<u>11.29</u>
19,400	54,000	<u>35.93</u>	<u>30.51</u>	<u>33.51</u>	<u>2.42</u>
8,700	31,000	<u>28.06</u>	<u>31.09</u>	<u>33.51</u>	<u>5.45</u>
8,300	26,700	<u>31.09</u>	<u>35.93</u>	<u>33.51</u>	<u>2.42</u>
3,600	11,800	<u>30.51</u>	<u>37.95</u>	<u>33.51</u>	<u>3.00</u>
19,500	47,300	<u>41.23</u>	<u>40.31</u>	<u>33.51</u>	<u>7.72</u>
9,700	23,200	<u>41.81</u>	<u>40.63</u>	<u>33.51</u>	<u>8.30</u>
3,100	7,500	<u>41.33</u>	<u>41.06</u>	<u>33.51</u>	<u>7.82</u>
18,500	45,900	<u>40.31</u>	<u>41.23</u>	<u>33.51</u>	<u>6.80</u>
12,000	25,000	<u>48.00</u>	<u>41.33</u>	<u>33.51</u>	<u>14.49</u>
20,000	52,700	<u>37.95</u>	<u>41.81</u>	<u>33.51</u>	<u>4.44</u>
4,100	8,000	<u>51.25</u>	<u>48.00</u>	<u>33.51</u>	<u>17.74</u>
25,200	51,700	<u>48.74</u>	<u>48.08</u>	<u>33.51</u>	<u>15.23</u>
5,000	10,400	<u>48.08</u>	<u>48.74</u>	<u>33.51</u>	<u>14.57</u>
13,300	50,000	<u>26.60</u>	<u>51.25</u>	<u>33.51</u>	<u>6.91</u>
<hr/>					
233,000	649,300	832.48			200.16

1. Median Level of Assessment 33.51%

2. Coefficient of Dispersion (COD) 24.89%

Sum of Deviations = 200.16

Average Deviation = $\frac{200.16}{24} = 8.34$

$COD = \frac{\text{Average Deviation}}{\text{Median}} \times 100\% = \frac{8.34}{33.51} = .2489 \times 100(\%)$

3. Price Related Differential (PRD) .97

Sales-Based Average Ratio = $\frac{\text{Sum of AV}}{\text{Sum of SP}} = \frac{233,000}{649,300} \times 100(\%) = 35.88$

Mean Assessment Ratio = Average S R = $\frac{\text{Sum of S R}}{\# \text{ of Ratios}} = \frac{832.48}{24} = 34.69$

$PRD = \frac{\text{Mean Assessment Ratio}}{\text{Sales-Based Average Ratio}} = \frac{34.69}{35.88} = .9668$

4. Coefficient of Concentration (COC) 12.5%

Unit 3 EXERCISES:
Exercise 3-1

Prior Year Assessed Value	Current Year Sale Price	Sales Ratio (%)	Median (%)	Deviation
\$ 26,000	\$ 80,000	<u>32.50</u>	<u>33.35</u>	<u>0.85</u>
3,000	7,500	<u>40.00</u>	<u>33.35</u>	<u>6.65</u>
19,200	60,000	<u>32.00</u>	<u>33.35</u>	<u>1.35</u>
4,200	11,400	<u>36.84</u>	<u>33.35</u>	<u>3.49</u>
2,800	6,500	<u>43.08</u>	<u>33.35</u>	<u>9.73</u>
25,000	83,600	<u>29.90</u>	<u>33.35</u>	<u>3.45</u>
17,100	50,000	<u>34.20</u>	<u>33.35</u>	<u>0.85</u>
17,900	59,900	<u>29.88</u>	<u>33.35</u>	<u>3.47</u>

Total Deviations:

29.84

$$\text{Average Deviation} = \frac{\text{Sum of Deviations}}{\text{Number of Sales}} = \frac{29.84}{8} = 3.73\%$$

$$\text{COD} = \frac{\text{Average Deviation}}{\text{Median}} \times 100\% = \frac{3.73}{33.35} \times 100 (\%) = 11.18\%$$

Step 1. Find the median sales ratio.

33.35

Step 2. Find the number which is 10% below the median by multiplying the median ratio by .9.
 (100% -10% = 90% = .90 = .9)

30.02

Step 3. Find the number which is 10% above the median by multiplying the median ratio by 1.1.
 (100% + 10% = 110% = 1.10 = 1.1)

36.69

Step 4. Count the number of ratios between the high and low values computed in steps 2 and 3.

32.00,32.50 and 34.20

Step 5. Divide the number of ratios from step 4 by the total number of sales ratios and multiply by 100%.

3/8

What is the COC for this set of sales ratios?

37.50

Exercise 3-2

EAV	Sale Price	Sales Ratio (%)	Median (%)	Absolute Deviation
\$ 20,000	\$ 65,000	<u>30.77</u>	<u>32.96</u>	<u>2.19</u>
5,000	7,500	<u>66.67</u>	<u>32.96</u>	<u>33.71</u>
24,300	47,800	<u>50.84</u>	<u>32.96</u>	<u>17.88</u>
6,200	13,200	<u>46.97</u>	<u>32.96</u>	<u>14.01</u>
9,800	28,500	<u>34.39</u>	<u>32.96</u>	<u>1.43</u>
16,850	70,450	<u>23.92</u>	<u>32.96</u>	<u>9.04</u>
17,250	54,900	<u>31.42</u>	<u>32.96</u>	<u>1.54</u>
18,600	59,000	<u>31.53</u>	<u>32.96</u>	<u>1.43</u>
Total Deviations:				<u>81.23</u>

$$\text{Average Deviation} = \frac{\text{Sum of Deviations}}{\text{Number of Sales}} = \frac{81.23}{8} = 10.15\%$$

$$\text{COD} = \frac{\text{Average Deviation}}{\text{Median}} \times 100\% = \frac{10.15}{32.96} \times 100 (\%) = 30.79\%$$

- Step 1. Find the median sales ratio. 32.96
- Step 2. Find the number which is 10% below the median by multiplying the median ratio by .9.
(100% - 10% = 90% = .90 = .9) 29.66
- Step 3. Find the number which is 10% above the median by multiplying the median ratio by 1.1.
(100% + 10% = 110% = 1.10 = 1.1) 36.26
- Step 4. Count the number of ratios between the high and low values computed in steps 2 and 3. 30.77, 31.42, 31.53, 34.39
- Step 5. Divide the number of ratios from step 4 by the total number of sales ratios and multiply by 100%. 4/8
- What is the COC for this set of sales ratios? 50.00

Exercise 3-3

	EAV	Sale Price	Sales Ratio (%)	Median (%)	Absolute Deviation
\$	35,500	\$ 90,000	<u>39.44</u>	<u>34.96</u>	<u>4.48</u>
	2,500	7,000	<u>35.71</u>	<u>34.96</u>	<u>.75</u>
	18,000	56,000	<u>32.14</u>	<u>34.96</u>	<u>2.82</u>
	6,500	16,400	<u>39.63</u>	<u>34.96</u>	<u>4.67</u>
	4,000	11,900	<u>33.61</u>	<u>34.96</u>	<u>1.35</u>
	29,500	84,900	<u>34.75</u>	<u>34.96</u>	<u>.21</u>
	30,000	88,000	<u>34.09</u>	<u>34.96</u>	<u>.87</u>
	45,000	128,000	<u>35.16</u>	<u>34.96</u>	<u>.20</u>

Total Deviations:

15.35

$$\text{Average Deviation} = \frac{\text{Sum of Deviations}}{\text{Number of Sales}} = \frac{15.35}{8} = 1.92\%$$

$$\text{COD} = \frac{\text{Average Deviation}}{\text{Median}} \times 100\% = \frac{1.92}{34.96} \times 100 (\%) = 5.49\%$$

Step 1. Find the median sales ratio. 34.96

Step 2. Find the number which is 10% below the median by multiplying the median ratio by .9.
(100% - 10% = 90% = .90 = .9) 31.46

Step 3. Find the number which is 10% above the median by multiplying the median ratio by 1.1.
(100% + 10% = 110% = 1.10 = 1.1) 38.46

Step 4. Count the number of ratios between the high and low values computed in steps 2 and 3. 32.14, 33.61, 34.09, 34.75, 35.16, 35.71

Step 5. Divide the number of ratios from step 4 by the total number of sales ratios and multiply by 100%. 6/8

What is the COC for this set of sales ratios? 75.00

Exercise 3-4

Prior Year Assessed Value	Current Year Sale Price	Sales Ratio (%)	Median (%)	Deviation
\$ 20,000	\$ 39,100	<u>51.15</u>	<u>44.63</u>	<u>6.52</u>
10,000	9,500	<u>105.26</u>	<u>44.63</u>	<u>60.63</u>
15,400	12,000	<u>128.33</u>	<u>44.63</u>	<u>83.70</u>
5,500	8,100	<u>67.90</u>	<u>44.63</u>	<u>23.27</u>
4,000	10,500	<u>38.10</u>	<u>44.63</u>	<u>6.53</u>
9,500	83,600	<u>11.36</u>	<u>44.63</u>	<u>33.27</u>
14,300	50,000	<u>28.60</u>	<u>44.63</u>	<u>16.03</u>
13,800	59,900	<u>23.04</u>	<u>44.63</u>	<u>21.59</u>

Total Deviations:

251.54

$$\text{Average Deviation} = \frac{\text{Sum of Deviations}}{\text{Number of Sales}} = \frac{251.54}{8} = 31.44\%$$

$$\text{COD} = \frac{\text{Average Deviation}}{\text{Median}} \times 100\% = \frac{31.44}{44.63} \times 100 (\%) = 70.45\%$$

- Step 1. Find the median sales ratio. 44.63
- Step 2. Find the number which is 10% below the median by multiplying the median ratio by .9.
(100% -10% = 90% = .90 = .9) 40.17
- Step 3. Find the number which is 10% above the median by multiplying the median ratio by 1.1.
(100% + 10% = 110% = 1.10 = 1.1) 49.09
- Step 4. Count the number of ratios between the high and low values computed in steps 2 and 3. None
- Step 5. Divide the number of ratios from step 4 by the total number of sales ratios and multiply by 100%. 0/8
- What is the COC for this set of sales ratios? 0.00

Price Related Differential

Exercise 3-1

- Step 1. Determine the Sum of the Assessed Values. 115,200
- Step 2. Determine the Sum of the Sales Prices. 358,900
- Step 3. Determine the **Sales-Based Average Ratio** by dividing the sum of the Assessed Values by the sum of the Sales Prices.

$$\text{Sales-Based Average Ratio} = \frac{\text{Sum of AV's}}{\text{Sum of SP's}} \times 100\%$$

$$\frac{115,200}{358,900} = 32.10\%$$

- Step 4. Determine the Sum of the Sale Ratios. 278.40
- Step 5. Determine the **Mean Assessment Ratio** by dividing the sum of the Sales Ratios by the number of Sales Ratios.

$$\text{Mean Assessment Ratio} = \frac{\text{Sum of the Sales Ratios}}{\text{Number of Ratios}}$$

$$\frac{278.40}{8} = 34.80\%$$

- Step 6. Determine the **Price-Related Differential** by dividing the Mean Assessment Ratio by the Sales-Based Average Ratio.

Do not change the result to a percent. Calculate the PRD to 2 decimal places.

$$\text{Price-Related Differential} = \frac{\text{Mean Assessment Ratio}}{\text{Sales-Based Average Ratio}}$$

$$\frac{34.80}{32.10} = 1.08$$

Exercise 3-2

- Step 1. Determine the Sum of the Assessed Values. 118,000
- Step 2. Determine the Sum of the Sales Prices. 346,350
- Step 3. Determine the **Sales-Based Average Ratio** by dividing the sum of the Assessed Values by the sum of the Sales Prices.

$$\text{Sales-Based Average Ratio} = \frac{\text{Sum of AV's}}{\text{Sum of SP's}} \times 100\%$$

$$\frac{118,000}{346,350} = 34.07\%$$

- Step 4. Determine the Sum of the Sale Ratios. 316.51
- Step 5. Determine the **Mean Assessment Ratio** by dividing the sum of the Sales Ratios by the number of Sales Ratios.

$$\text{Mean Assessment Ratio} = \frac{\text{Sum of the Sales Ratios}}{\text{Number of Ratios}}$$

$$\frac{316.51}{8} = 39.56\%$$

- Step 6. Determine the **Price-Related Differential** by dividing the Mean Assessment Ratio by the Sales-Based Average Ratio.

Do not change the result to a percent. Calculate the PRD to 2 decimal places.

$$\text{Price-Related Differential} = \frac{\text{Mean Assessment Ratio}}{\text{Sales-Based Average Ratio}}$$

$$\frac{39.56}{34.07} = 1.16$$

Exercise 3-3

- Step 1. Determine the Sum of the Assessed Values. 171,000
- Step 2. Determine the Sum of the Sales Prices. 482,200
- Step 3. Determine the **Sales-Based Average Ratio** by dividing the sum of the Assessed Values by the sum of the Sales Prices.

$$\text{Sales-Based Average Ratio} = \frac{\text{Sum of AV's}}{\text{Sum of SP's}} \times 100\%$$

$$\frac{171,000}{482,200} = 35.46\%$$

- Step 4. Determine the Sum of the Sale Ratios. 284.53
- Step 5. Determine the **Mean Assessment Ratio** by dividing the sum of the Sales Ratios by the number of Sales Ratios.

$$\text{Mean Assessment Ratio} = \frac{\text{Sum of the Sales Ratios}}{\text{Number of Ratios}}$$

$$\frac{284.53}{8} = 35.57\%$$

- Step 6. Determine the **Price-Related Differential** by dividing the Mean Assessment Ratio by the Sales-Based Average Ratio.

Do not change the result to a percent. Calculate the PRD to 2 decimal places.

$$\text{Price-Related Differential} = \frac{\text{Mean Assessment Ratio}}{\text{Sales-Based Average Ratio}}$$

$$\frac{35.57}{35.46} = 1.00$$

Exercise 3-4

- Step 1. Determine the Sum of the Assessed Values. 92,500
- Step 2. Determine the Sum of the Sales Prices. 272,700
- Step 3. Determine the **Sales-Based Average Ratio** by dividing the sum of the Assessed Values by the sum of the Sales Prices.

$$\text{Sales-Based Average Ratio} = \frac{\text{Sum of AV's}}{\text{Sum of SP's}} \times 100\%$$

$$\frac{92,500}{272,700} = 33.92\%$$

- Step 4. Determine the Sum of the Sale Ratios. 453.74
- Step 5. Determine the **Mean Assessment Ratio** by dividing the sum of the Sales Ratios by the number of Sales Ratios.

$$\text{Mean Assessment Ratio} = \frac{\text{Sum of the Sales Ratios}}{\text{Number of Ratios}}$$

$$\frac{453.74}{8} = 56.72\%$$

- Step 6. Determine the **Price-Related Differential** by dividing the Mean Assessment Ratio by the Sales-Based Average Ratio.

Do not change the result to a percent. Calculate the PRD to 2 decimal places.

$$\text{Price-Related Differential} = \frac{\text{Mean Assessment Ratio}}{\text{Sales-Based Average Ratio}}$$

$$\frac{56.72}{33.92} = 1.67$$

Exercise 3-5

Using the following set of data, calculate each of the following measures of uniformity.

COD 17.99 5.95/33.08

COC 44.44 33.08 x 0.9 = 29.77
 33.08 x 1.1 = 36.39
 4 ratios within range / 9 = 44.44

PRD 1.14 35.64/31.24 = 1.14

What conclusions can be drawn from the above results? Are there any issues with the uniformity of the assessments? The COD result indicates fairly good uniformity of the assessments while the COC is fairly low indicating that most sales ratio results are not within 10% of the median, either higher or lower. The PRD does show a bias towards higher priced properties having lower assessed values than lower priced properties.

	EAV	Sale Price	Sales Ratio (%)	Median (%)	Absolute Deviation
\$	23,000	\$ 80,000	<u>28.75</u>	<u>33.08</u>	<u>4.33</u>
	4,000	7,500	<u>53.33</u>	<u>33.08</u>	<u>20.25</u>
	19,850	60,000	<u>33.08</u>	<u>33.08</u>	<u>0.00</u>
	4,800	12,000	<u>40.00</u>	<u>33.08</u>	<u>6.92</u>
	2,800	6,500	<u>43.08</u>	<u>33.08</u>	<u>10.00</u>
	25,000	88,000	<u>28.41</u>	<u>33.08</u>	<u>4.67</u>
	17,100	50,000	<u>34.20</u>	<u>33.08</u>	<u>1.12</u>
	17,900	59,900	<u>29.88</u>	<u>33.08</u>	<u>3.20</u>
	18,400	61,300	<u>30.02</u>	<u>33.08</u>	<u>3.06</u>
Total			<u>320.75</u>		<u>53.55</u>
			/ 9 = <u>35.64</u>		/ 9 = <u>5.95</u>
Total	<u>132,850</u>	<u>425,200</u>	<u>31.24</u>		

Unit 4 Review Questions

1. An **equalization** factor will uniformly increase or decrease assessed values of all properties in the county except for **farmland** , **farm buildings**, **wind turbines**, **coal**, and **state – assessed** properties.

2. The township assessor is calculating a township multiplier for this year.

Median Level of Assessment for 3 years ago	32.79
Median Level of Assessment for 2 years ago	31.92
Median Level of Assessment for last year	31.58

a. The prior 3-year average median level of assessments for this township is: 32.10%

b. The township equalization factor will be: 1.0383

3. Another township assessor is calculating a township multiplier for this year.

Median Level of Assessment for 3 years ago:	32.45
Median Level of Assessment for 2 years ago:	31.09
Median Level of Assessment for last year:	30.36

a. The prior 3-year average median level of assessments for Washington township is: 31.30%

b. The township equalization factor will be: 1.0649

Unit 4 Exercises

Exercise 4-1

<u>COUNTY</u>	<u>3 YEARS PRIOR</u>	<u>2 YEARS PRIOR</u>	<u>PREVIOUS YEAR</u>	<u>3-YEAR AVERAGE</u>	<u>CURRENT MULTIPLIER</u>
"A"	32.09	31.81	30.61	<u>31.50</u>	<u>1.0581</u>
"B"	34.25	33.33	33.78	<u>33.79</u>	<u>.9864</u>
"C"	30.19	29.16	30.78	<u>30.04</u>	<u>1.1095</u>
"D"	33.26	33.98	32.75	<u>33.33</u>	<u>1.0000</u>
"E"	31.18	31.95	31.19	<u>31.44</u>	<u>1.0601</u>
"F"	30.60	30.23	31.27	<u>30.70</u>	<u>1.0857</u>
"G"	34.15	32.62	34.09	<u>33.62</u>	<u>.9914*</u>

*Note: According to 35 ILCS 200/17-25, no factor will be issued if aggregate assessed value is within 99% and 101% of 33 1/3% of fair cash value. The factor for county "G" would be 1.0000.

In order to calculate the equalization factor for 2015, an assessor would need the median levels of assessments for the following years:

2012 2013 2014

Exercise 4-2

YR	MEDIAN '12 S/A Adjusted	'12 S/A Chgs	'12 B/R Chgs	'13 S/A Chgs	'13 B/R Chgs	'14 S/A Chgs	'14 B/R Chgs	'15 TA Chgs	Median
2012	29.65	+6.60%	0.00%	0.00%	0.00%	0.00%	-1.95%	0.00%	<u>30.99</u>
2013	28.54	0.00%	0.00%	0.00%	0.00%	0.00%	-1.95%	0.00%	<u>27.98</u>
2014	32.07	0.00%	0.00%	0.00%	0.00%	0.00%	-1.95%	0.00%	<u>31.44</u>

The 3-year average median level for this township is: 30.14 %.

The equalization factor is: 1.1058

Exercise 4-3

For the data listed, calculate the median and the COD.

SALES	ASSESSED <u>VALUE</u>	SALES <u>PRICE</u>	RANKED <u>RATIO</u>	<u>RATIO</u>	<u>DEVIATION</u>
	42,630	110,000	38.75	24.67	1.45
	46,100	120,000	38.42	28.54	1.12
	44,400	117,000	37.95	29.63	.65
	41,600	106,200	39.17	31.88	1.87
	38,800	103,800	37.38	32.85	.08
	42,140	109,400	38.52	33.35	1.22
	39,360	99,300	39.64	33.78	2.34
	37,620	98,200	38.31	33.78	1.01
	38,710	100,500	38.52	34.58	1.22
	40,580	101,700	39.90	34.59	2.60
	39,550	106,300	37.21	35.93	.09
	41,710	107,900	38.66	36.27	1.36
	36,920	110,700	33.35	37.21	3.95
	37,770	109,200	34.59	37.38	2.71
	40,080	110,500	36.27	37.95	1.03
	47,140	118,300	39.85	38.31	2.55
	36,900	106,700	34.58	38.42	2.72
	36,000	100,200	35.93	38.52	1.37
	24,320	98,600	24.67	38.52	12.63
	27,770	97,300	28.54	38.63	8.76
	28,770	97,100	29.63	38.66	7.67
	30,600	96,000	31.88	38.75	5.42
	31,400	95,600	32.85	39.17	4.45
	30,400	90,000	33.78	39.64	3.52
	38,630	100,000	38.63	39.85	1.33
	37,160	110,000	33.78	39.90	3.52

1. Median

37.30

2. COD

7.91

3. If the median level of assessments has been the same as the current level for the past 3 years, calculate the equalization factor. **.8936**

Apply the equalization factor.

A V	EAV	SALES PRICE	S R	RANKED	DEV
42,630	38,094	110,000	<u>34.63</u>	<u>22.04</u>	<u>1.30</u>
46,100	41,195	120,000	<u>34.33</u>	<u>25.50</u>	<u>1.00</u>
44,400	39,676	117,000	<u>33.91</u>	<u>26.48</u>	<u>.58</u>
41,600	37,174	106,200	<u>35.00</u>	<u>28.48</u>	<u>1.67</u>
38,800	34,672	103,800	<u>33.40</u>	<u>29.35</u>	<u>.07</u>
42,140	37,656	109,400	<u>34.42</u>	<u>29.80</u>	<u>1.09</u>
39,360	35,172	99,300	<u>35.42</u>	<u>30.18</u>	<u>2.09</u>
37,620	33,617	98,200	<u>34.23</u>	<u>30.19</u>	<u>0.90</u>
38,710	34,591	100,500	<u>34.42</u>	<u>30.90</u>	<u>1.09</u>
40,580	36,262	101,700	<u>35.66</u>	<u>30.91</u>	<u>2.33</u>
39,550	35,342	106,300	<u>33.25</u>	<u>32.11</u>	<u>.08</u>
41,710	37,272	107,900	<u>34.54</u>	<u>32.41</u>	<u>1.21</u>
36,920	32,992	110,700	<u>29.80</u>	<u>33.25</u>	<u>3.53</u>
37,770	33,751	109,200	<u>30.91</u>	<u>33.40</u>	<u>2.42</u>
40,080	35,815	110,500	<u>32.41</u>	<u>33.91</u>	<u>.92</u>
47,140	42,124	118,300	<u>35.61</u>	<u>34.23</u>	<u>2.28</u>
36,900	32,974	106,700	<u>30.90</u>	<u>34.33</u>	<u>2.43</u>
36,000	32,170	100,200	<u>32.11</u>	<u>34.42</u>	<u>1.22</u>
24,320	21,732	98,600	<u>22.04</u>	<u>34.42</u>	<u>11.29</u>
27,770	24,815	97,300	<u>25.50</u>	<u>34.52</u>	<u>7.83</u>
28,770	25,709	97,100	<u>26.48</u>	<u>34.54</u>	<u>6.85</u>
30,600	27,344	96,000	<u>28.48</u>	<u>34.63</u>	<u>4.85</u>
31,400	28,059	95,600	<u>29.35</u>	<u>35.00</u>	<u>3.98</u>
30,400	27,165	90,000	<u>30.18</u>	<u>35.42</u>	<u>3.15</u>
38,630	34,520	100,000	<u>34.52</u>	<u>35.61</u>	<u>1.19</u>
37,160	33,206	110,000	<u>30.19</u>	<u>35.66</u>	<u>3.14</u>

Total

68.49/26

1. Multiply each of the assessed values by the equalization factor.
2. Calculate the new median 33.33%
3. Calculate the COD 7.89%

Unit 5 Review Questions

1. The Lincoln township assessor is applying for the bonus for this year. The COD is 15.92%.

Median Level of Assessment for 3 years ago	32.79
Median Level of Assessment for 2 years ago	31.92
Median Level of Assessment for last year	31.58

- a. If the population of the county is less than 50,000, will the assessor receive his or her bonus? Yes
- b. If the population of the county is greater than 50,000, will the assessor receive his or her bonus? No
2. A Washington township assessor is applying for the bonus for this year. The COD is 14.80%.

Median Level of Assessment for 3 years ago:	32.45
Median Level of Assessment for 2 years ago:	31.09
Median Level of Assessment for last year:	30.36

- a. If the population of the county is less than 50,000, will the assessor receive his or her bonus? No
- b. If the population of the county is greater than 50,000, will the assessor receive his or her bonus? No
3. In order to qualify for the assessor bonus award, the assessor must be in a **qualified position**, have a **three** - year average median level of assessments between **31 1/3%** and **35 1/3%**, and a COD no greater than **30%** (assuming that the population of the county is 50,000 or less).

Unit 5 Exercises

Exercise 5-1

Eligibility for the Assessor's Bonus

<u>Population</u>	<u>3 Years Ago</u>	<u>2 Years Ago</u>	<u>Last Year</u>	<u>3-year average</u>	<u>COD</u>	<u>Y / N</u>
66,241	29.07 %	33.59 %	27.63 %	30.10 %	16.4 %	No
39,582	37.38	31.72	36.24	35.11	27.3	Yes
81,769	32.85	33.57	36.48	34.30	11.5	Yes
47,391	29.63	31.02	33.58	31.41	34.8	No
52,089	32.55	34.60	33.72	33.62	18.6	No
107,464	36.82	31.09	35.98	34.63	14.3	Yes
183,697	29.75	28.04	32.56	30.12	9.4	No
28,434	31.99	32.48	35.79	33.42	16.7	Yes

Unit 6 Review Questions

1. What would the trending factor be if the 2014 sales were trended back to 2013?
.9618

county medians
2012 median = 28.72
2013 median = 31.69
2014 median = 30.48

township medians
2012 median = 32.51
2013 median = _____
2014 median = 29.86

2. If an assessor were trending sales from 2012 to 2013, the assessed values on those properties would be from 2012.
3. In order to trend 2014 sales back to 2013, multiply the 2014 sales by the trending factor. Then divide the 2012 assessed values by the 2014 sales trended back to 2013 market value. (Insert years.)

Unit 6 Exercises

Exercise 6-1

Calculate the trending factors (**to 4 decimal places**) if a **county's** urban-weighted medians are:

2012	2013	2014
31.57	30.48	32.95

- | | | | |
|-------------------------------|-----------------|---|---------------|
| 1. Trend 2012 forward to 2013 | Trending Factor | = | <u>1.0358</u> |
| 2. Trend 2014 back to 2013 | Trending Factor | = | <u>1.0810</u> |
| 3. Trend 2013 back to 2012 | Trending Factor | = | <u>0.9655</u> |
| 4. Trend 2013 forward to 2014 | Trending Factor | = | <u>0.9250</u> |

Using the information from the above exercise, determine from what year the assessed values would come.

- | | | |
|-------------------------------|----------------------|-------------|
| 1. Trend 2012 forward to 2013 | Assessed Values from | <u>2012</u> |
| 2. Trend 2014 back to 2013 | Assessed Values from | <u>2012</u> |
| 3. Trend 2013 back to 2012 | Assessed Values from | <u>2011</u> |
| 4. Trend 2013 forward to 2014 | Assessed Values from | <u>2013</u> |

Exercise 6-2

Calculate the trending factors (**to 4 decimal places**) if a **county's** urban-weighted medians are:

2012	2013	2014
30.08	35.32	29.54

5. Trend 2012 forward to 2013	Trending Factor	=	<u>0.8516</u>
6. Trend 2014 back to 2013	Trending Factor	=	<u>0.8364</u>
7. Trend 2013 back to 2012	Trending Factor	=	<u>1.1742</u>
8. Trend 2013 forward to 2014	Trending Factor	=	<u>1.1957</u>

Using the information from above exercise, determine from what year the assessed values would come.

5. Trend 2012 forward to 2013	Assessed Values from	<u>2012</u>
6. Trend 2014 back to 2013	Assessed Values from	<u>2012</u>
7. Trend 2013 back to 2012	Assessed Values from	<u>2011</u>
8. Trend 2013 forward to 2014	Assessed Values from	<u>2013</u>

Exercise 6-3

Sales Ratios from 2014:

11.67	22.95	23.87	24.50	24.87	24.95	25.21
25.69	26.40	26.73	27.12	29.33	29.53	

(Calculated from 2014 sales and the AV of those sales from 2013.)

Trend 2013 (year) sales forward to be combined with 2014 sales.

Trending factor = 1.0545 (4 decimal places)

Sale #	2013	Trending Factor	ADJ 2014	2013 AV	2014
	Sales Price		Market Value		Sales Ratio
1	\$ 250,000	1.0545	263,625	\$ 55,299	20.98
2	489,500	1.0545	516,178	109,607	21.23
3	386,000	1.0545	407,037	89,017	21.87
4	335,000	1.0545	353,258	84,071	23.80
5	1,300,000	1.0545	1,370,850	349,802	25.52
6	272,000	1.0545	286,824	73,473	25.62
7	169,900	1.0545	179,160	46,735	26.09
8	267,500	1.0545	282,079	76,321	27.06
9	222,000	1.0545	234,099	63,687	27.21
10	840,200	1.0545	885,991	254,365	28.71
11	388,000	1.0545	409,146	127,540	31.17
12	287,000	1.0545	302,642	100,797	33.31

11.67	23.80	25.21	26.40	28.71
20.98	23.87	25.52	26.73	29.33
21.23	24.50	25.62	27.06	29.53
21.87	24.87	25.69	27.12	31.17
22.95	24.95	26.09	27.21	33.31

2014 Township Median = 25.62

2015 Township Equalization Factor = 1.2294

Trending Backward

Ratios for 2012 sales: (18 sales)

13.50	28.10	31.20	38.20	49.40
15.30	29.30	33.50	38.30	64.40
22.60	29.70	35.80	39.20	
26.00	31.20	37.20	39.30	

Trending Factor = .9714

Exercise 6-4

Find the new 2012 sales ratios

Sale #	2013 SP	Trending Factor	2012 Adjusted SP	2011 AV	2012 Ratios
1	58,400	.9714	56,730	11,914	21.00
2	29,000	.9714	28,171	6,198	22.00
3	34,100	.9714	33,125	7,288	22.00
4	14,200	.9714	13,794	3,311	24.00
5	44,500	.9714	43,227	10,807	25.00
6	4,000	.9714	3,886	972	25.01
7	40,000	.9714	38,856	10,103	26.00
8	33,000	.9714	32,056	8,335	26.00
9	24,500	.9714	23,799	6,426	27.00
10	19,500	.9714	18,942	5,115	27.00
11	18,000	.9714	17,485	5,071	29.00
12	59,900	.9714	58,187	17,457	30.00
13	32,900	.9714	31,959	10,227	32.00
14	23,000	.9714	22,342	7,150	32.00
15	26,000	.9714	25,256	8,335	33.00
16	10,000	.9714	9,714	3,497	36.00
17	13,500	.9714	13,114	4,721	36.00
18	13,800	.9714	13,405	4,826	36.00
19	15,000	.9714	14,571	5,537	38.00
20	22,000	.9714	21,371	9,190	43.00
21	56,500	.9714	54,884	27,443	50.00
22	6,500	.9714	6,314	3,346	52.99
23	9,000	.9714	8,743	5,421	62.00
24	9,800	.9714	9,520	6,188	65.00
25	3,500	.9714	3,400	2,312	68.00
26	1,500	.9714	1,457	1,501	103.02
27	3,000	.9714	2,914	3,409	116.99
28	2,000	.9714	1,943	2,506	128.98

Find the median using all of the ratios.

13.50	24.00	27.00	30.00	33.50	38.00	49.40	68.00
15.30	25.00	27.00	31.20	35.80	38.20	50.00	103.02
21.00	25.01	28.10	31.20	36.00	38.30	52.99	116.99
22.00	26.00	29.00	32.00	36.00	39.20	62.00	128.98
22.00	26.00	29.30	32.00	36.00	39.30	64.40	
22.60	26.00	29.70	33.00	37.20	43.00	65.00	

The 2012 median (**32.50**) is the average of the 23rd and the 24th ratios.

Hoover Township's medians are:

2012 =	32.50
2013 =	32.94
2014 =	33.24

The township equalization factor would be: 1.0134

Unit 7 Review Questions

Assessment Ratios for FLORAL COUNTY

1. What was the median assessment ratio for Carnation township? 30.17
2. Begonia township was under-assessed, statutorily assessed, or over-assessed? under-assessed
3. Which township was assessing closest to the statutory level? Phlox (32.21)
4. Considering only the COD, name the township that was:
 - a. least uniformly assessed. Briar

Township	COD	Township	COD
Azalea	13.04	Azalea	13.04
Begonia	16.13	Begonia	16.13
Briar	22.68	Briar	22.68
Carnation	13.78	Carnation	13.78
Daisy	15.60	Daisy	15.60
Holly	9.01	Holly	9.01
Iris	16.31	Iris	16.31
Peony	17.45	Peony	17.45
Phlox	12.07	Phlox	12.07
Rose	13.57	Rose	13.57
Wisteria	15.01	Wisteria	15.01
All Others	15.38	All Others	15.38

The COD for Briar is the highest for any of the townships, including “All Others”. This indicates the greatest variation in assessment ratios.

- a. most uniformly assessed Holly
 The COD for Holly township is the smallest, indicating the most uniformly assessed considering only the COD.

Unit 7 Exercises

Exercise 7-1

There are 11 counties in this classroom sales ratio study. Looking at the “Total County” row and the “Median” column, find the county whose calculated median is closest to 33.33%. Harrison (32.00)

Find the county with the median of 29.57% Grant.

Table 1 Assessment Ratios

Find the adjusted median level of assessments for:

Jaguar Township, Autobahn County	<u>29.72</u>
Big Valley Township, Duke County	<u>--</u>
Carnation Township, Floral County	<u>31.13</u>
Wyoming Township, Hayes County	<u>32.02</u>
Aspen Township, Lincoln County	<u>29.67</u>

Find the COD for:

Pole Cat Township, Duke County	<u>22.18</u>
Hidden Valley Township, Grant County	<u>30.54</u>
Abilene Township, Harrison County	<u>13.90</u>
Red Maple Township, Lincoln County	<u>8.45</u>
Tennyson Township, Roosevelt County	<u>21.13</u>
Best COD <u>Red Maple Township</u>	

Find the PRD for:

Yugo Township, Autobahn County	<u>1.16</u>
Tennyson Township, Roosevelt County	<u>1.03</u>
Mulberry Pie Township, Baker County	<u>1.03</u>
Water Well Township, Duke County	<u>.97</u>
Holly Township, Lincoln County	<u>1.00</u>
Best PRD <u>Holly Township</u>	

Find the COC for:

Lamborghini Township, Autobahn County	<u>30.00</u>
Abilene Township, Harrison County	<u>45.28</u>
Peach Cobbler Township, Baker Count	<u>52.00</u>
Daisy Township, Duke County	<u>31.91</u>
Walnut Grove Township, Lincoln County	<u>71.93</u>
Best COC <u>Walnut Grove Township</u>	

Township		COD	Sales	Ratio Range	PRD	COC
Blue Spruce	Urban					
	Imp	<u>18.50</u>	96	45.21	<u>1.04</u>	<u>41.67</u>
	Unimp	43.11	46	64.23	1.26	10.87
Cherry	Urban					
	Imp	<u>9.60</u>	512	46.47	<u>1.01</u>	<u>66.41</u>
	Unimp	23.84	25	32.92	1.10	40.00
Cottonwood	Urban					
	Imp	<u>8.97</u>	332	22.45	<u>1.00</u>	<u>65.36</u>
	Unimp	25.82	28	45.25	1.26	35.71
Hawthorn	Urban					
	Imp	<u>8.47</u>	1223	26.70	<u>1.00</u>	<u>68.27</u>
	Unimp	133.81	33	23.74	1.12	6.06

a. For the COD:

Improved

Unimproved

Blue Spruce	<u>18.50</u>	<u>43.11</u>
Cherry	<u>9.60</u>	<u>23.84</u>
Cottonwood	<u>8.97</u>	<u>25.82</u>
Hawthorn	<u>8.47</u>	<u>133.81</u>

Most uniform (COD) is (unimproved, improved) improved

b. For the COC:

Improved

Unimproved

Blue Spruce	<u>41.67</u>	<u>10.87</u>
Cherry	<u>66.41</u>	<u>40.00</u>
Cottonwood	<u>65.36</u>	<u>35.71</u>
Hawthorn	<u>68.27</u>	<u>6.06</u>

Most uniform (COC) is (unimproved, improved) improved

c. For the PRD :	Improved	Unimproved
Blue Spruce	<u>1.04</u>	<u>1.26</u>
Cherry	<u>1.01</u>	<u>1.10</u>
Cottonwood	<u>1.00</u>	<u>1.26</u>
Hawthorn	<u>1.00</u>	<u>1.12</u>

Most uniform (PRD) is (unimproved, improved) improved

Overall, which type of property should she concentrate on for reassessment?
unimproved

I-E Class Sales Ratio Study

Table 1

Assessment Ratios

GEOGRAPHIC AREA	ADJ	COEF		QUARTILES		RATIO		95% CONFIDENCE INTERVAL		COEF CONC	
		MEDIAN	OF DISP	SALES	1st	3rd	RANGE	PRD			
Arthur County											
Total County	Urban	*-	31.66	18.82	708	28.17	35.81	89.32	1.05	31.17 - 32.27	44.21
Townships											
Rabbit Trail	Urban	32.55	32.44	19.13	113	28.84	36.20	65.04	1.06	31.62 - 33.78	44.25
Deer Lick	Urban	31.72	31.35	20.80	79	26.93	35.26	74.36	1.04	29.63 - 33.26	36.71
Little Creek	Urban	30.78	31.12	21.47	26	26.72	35.19	48.22	1.03	28.54 - 33.22	42.31
Stag Hollow	Urban	33.60	32.90	17.01	71	29.53	38.02	54.19	1.04	31.19 - 34.34	46.48
Raccoon Lodge	Urban	32.07	31.18	17.81	33	28.46	35.41	39.51	1.02	28.73 - 33.18	51.52
Snake in the Grass	Urban	32.26	31.29	16.02	268	28.42	35.18	61.13	1.03	30.78 - 32.00	47.39
All Others	Urban	31.63	31.08	23.87	118	25.85	36.56	84.14	1.09	30.05 - 32.90	35.59
Autobahn County											
Total County	Urban	-	29.14	33.17	307	21.93	34.48	110.94	1.09	27.90 - 30.05	28.99
Townships											
Ferrari	Urban	30.11	28.62	24.28	31	20.31	31.12	51.76	1.10	25.18 - 30.59	45.16
Jaguar	Urban	29.72	28.62	47.42	36	17.74	36.14	89.80	1.23	24.69 - 34.47	16.67
Lamborghini	Urban	29.83	29.24	24.59	70	21.30	34.02	33.28	1.03	25.89 - 30.97	30.00
Porsche	Urban	30.56	30.49	23.75	67	26.54	35.63	58.45	1.06	28.78 - 31.76	41.79
Yugo	Urban	28.38	27.50	35.52	32	20.01	33.50	76.42	1.16	21.53 - 32.40	15.62
All Others	Urban	29.60	28.20	47.34	71	20.20	36.61	108.39	1.14	24.52 - 30.85	23.94
Baker County											
Total County	Urban	-	30.59	21.97	543	24.49	34.76	69.57	0.99	29.95 - 30.91	32.78
Townships											
Apple River	Urban	24.81	23.61	26.43	141	18.37	29.50	68.57	1.03	22.17 - 25.81	22.70
	Imp	-	25.81	13.74	31	22.49	30.20	15.32	1.03	23.13 - 28.04	35.48
	Unimp	-	22.95	29.75	110	16.89	28.92	68.57	1.27	20.03 - 25.50	16.36
Orange Grove	Urban	32.94	32.94	18.62	168	27.58	36.83	46.95	1.01	31.60 - 33.73	39.88
	Imp	-	33.28	10.23	80	30.83	36.25	18.60	1.02	32.55 - 34.23	58.75
	Unimp	-	31.60	27.04	88	23.33	38.70	46.95	1.09	27.77 - 33.44	26.14
Peach Cobbler	Urban	33.72	31.66	22.32	25	28.50	35.46	64.79	1.06	28.50 - 33.67	52.00
Pear Tart	Urban	31.18	31.18	18.10	54	28.03	36.25	42.41	1.04	30.06 - 33.86	42.59
Cherry Pit	Urban	31.05	30.68	15.61	28	24.47	33.72	21.78	1.04	24.61 - 33.42	35.71
Persimmon	Urban	31.15	31.15	18.61	28	25.73	36.08	51.64	1.06	26.49 - 35.51	39.29
Mulberry Pie	Urban	32.61	31.42	15.41	49	27.66	36.24	28.15	1.03	29.48 - 33.64	38.78
All Others	Urban	31.72	30.98	22.74	50	26.69	35.56	54.16	0.97	28.35 - 33.79	36.00
Cleveland County											
Total	Urban	31.65	30.72	34.57	49	25.57	41.52	114.20	1.07	27.75 - 38.08	24.49

I-E Class Sales Ratio Study

Table 1

Assessment Ratios

GEOGRAPHIC AREA	ADJ	COEF		SALES	QUARTILES		RATIO RANGE	PRD	95% CONFIDENCE INTERVAL		COEF CONC	
		MEDIAN	OF DISP		1st	3rd						
Duke County												
Total County	Urban	–	29.65	25.23	211	24.20	34.22	100.33	1.07	28.74 - 30.34	32.23	
Townships												
Big Valley	Urban	–	29.20	30.48	56	21.55	34.12	88.99	1.14	24.46 - 30.34	33.93	
Daisy	Urban	–	28.74	19.26	47	24.47	33.06	40.63	1.03	26.07 - 31.72	31.91	
Pole Cat	Urban	–	29.81	22.18	33	25.98	36.24	54.65	1.08	27.67 - 33.37	36.36	
Water Well	Urban	–	32.41	23.71	44	24.21	35.52	50.60	0.97	29.16 - 33.72	43.18	
All Others	Urban	–	29.43	27.54	31	24.20	35.81	53.40	1.12	24.59 - 30.56	32.26	
* No adjustments were necessary because there were no significant assessment changes												
Floral County												
Total County	Urban	–	30.38	16.18	2486	27.43	33.43	72.68	1.06	30.13 - 30.53	50.16	
Townships												
Azalea	Urban	31.57	30.75	13.04	93	27.70	32.94	48.76	0.99	29.82 - 31.50	58.06	
Begonia	Urban	29.15	28.28	16.13	28	26.22	33.89	20.77	1.01	26.24 - 32.43	42.86	
Briar	Urban	30.16	28.75	22.68	57	25.98	32.94	65.88	1.14	27.26 - 31.30	43.86	
Carnation	Urban	31.13	30.17	13.78	233	27.60	33.41	54.64	1.01	29.47 - 30.88	53.65	
Daisy	Urban	31.64	31.43	15.60	45	26.51	33.94	42.12	1.00	28.85 - 32.40	51.11	
Holly	Urban	31.18	30.48	9.01	150	28.19	32.02	36.38	1.01	29.63 - 30.88	68.67	
Iris	Urban	31.08	30.57	16.31	91	27.64	34.12	58.40	1.05	28.89 - 31.71	47.25	
Peony	Urban	31.50	30.45	17.45	1550	27.43	33.96	69.20	1.07	30.23 - 30.73	48.26	
Phlox	Urban	32.21	31.59	12.07	25	28.42	33.32	27.45	1.01	28.88 - 33.06	64.00	
Rose	Urban	30.96	29.72	13.57	106	27.61	33.12	39.38	1.03	29.12 - 31.03	55.66	
Wisteria	Urban	31.43	30.59	15.01	29	26.06	33.89	21.79	1.00	26.74 - 32.79	41.38	
All Others	Urban	29.63	28.74	15.38	79	26.16	32.18	40.91	1.01	27.54 - 29.69	46.84	
Grant County												
Total County	Urban	–	29.57	22.02	548	24.72	34.06	94.14	0.99	28.87 - 30.53	33.39	
Townships												
Hidden Valley	Urban	28.79	26.17	30.54	152	18.32	31.52	94.14	1.04	23.78 - 27.47	23.68	
Homers Pass	Urban											
Mountain Home	Urban	31.64	31.64	18.92	179	27.78	35.42	53.94	1.00	30.65 - 32.64	39.66	
	Imp	–	32.44	11.78	104	29.22	35.44	29.33	1.01	31.28 - 33.41	54.81	
	Unimp	–	29.21	29.63	75	24.25	35.19	53.94	1.07	26.80 - 31.75	25.33	
Pleasant Hills	Urban	31.12	29.64	21.59	34	26.00	35.14	54.76	1.03	27.28 - 31.79	41.18	
Sunset View	Urban	34.48	34.48	14.49	43	28.45	37.78	28.03	1.05	30.63 - 35.36	39.53	
Sleepy Hollow	Urban	29.44	29.44	13.18	56	25.33	31.89	24.89	1.01	26.26 - 30.95	42.86	
All Others	Urban	29.86	28.74	18.21	84	24.89	33.31	33.22	1.04	27.16 - 30.56	30.95	

I-E Class Sales Ratio Study

Table 1 Assessment Ratios

GEOGRAPHIC AREA		ADJ		COEF		QUARTILES		RATIO		95%		COEF CONC
		MEDIAN	MEDIAN	DISP	SALES	1st	3rd	RANGE	PRD	CONFIDENCE INTERVAL		
Harrison County												
Total County	Urban	-	32.00	17.71	740	28.12	36.20	89.27	1.03	31.42 - 32.47	41.49	
Townships												
Abilene	Urban	30.47	30.79	13.90	53	26.76	34.55	26.21	1.01	28.44 - 32.47	45.28	
Mount Villa	Urban	32.43	32.43	16.67	539	29.06	36.36	62.50	1.02	31.90 - 32.88	43.97	
All Others	Urban	30.57	29.76	22.82	148	25.22	35.75	89.27	1.05	28.70 - 31.49	31.76	
* No adjustments were necessary because there were no significant assessment changes												
Hayes County												
Total County	Urban	-	30.95	16.56	187	27.23	33.90	58.15	1.01	29.64 - 31.74	47.06	
Townships												
Arizona	Urban	29.43	28.57	22.65	27	22.93	36.11	33.69	1.03	23.03 - 33.18	25.93	
Colorado	Urban	30.27	29.39	19.57	32	24.64	33.90	47.22	1.04	25.19 - 31.32	31.25	
New Mexico	Urban	31.72	31.72	9.21	69	29.48	33.56	24.81	1.01	30.69 - 32.59	66.67	
Wyoming	Urban	32.02	31.39	19.15	25	27.36	35.15	33.01	1.08	27.76 - 35.05	40.00	
All Others	Urban	31.15	29.86	22.06	34	25.62	33.33	45.80	1.00	26.07 - 32.45	38.24	
Lincoln County												
Total County	Urban	-	28.37	11.55	6906	26.02	30.62	66.76	1.03	28.26 - 28.45	59.30	
Townships												
Ash	Urban	30.86	29.67	15.37	153	26.36	32.79	52.65	1.03	28.43 - 30.93	42.48	
Aspen	Urban	29.67	29.34	5.86	26	28.12	30.95	8.72	1.00	28.27 - 30.88	76.92	
Blue Spruce	Urban	29.84	28.26	25.61	142	22.44	32.80	64.23	1.04	26.49 - 30.11	29.58	
	Imp	-	29.90	18.50	96	25.54	32.78	45.21	1.04	28.13 - 30.63	41.67	
	Unimp	-	22.52	43.11	46	16.79	35.27	64.23	1.26	18.37 - 27.71	10.87	
Buckeye	Urban	30.39	29.18	9.10	97	27.45	30.80	34.52	1.02	28.50 - 30.02	71.13	
Burr Oak	Urban	28.48	25.96	7.86	815	24.35	27.53	26.68	1.02	25.75 - 26.18	70.18	
Cherry	Urban	30.46	29.07	10.28	537	27.01	31.12	52.02	1.01	28.70 - 29.46	66.29	
	Imp	-	29.17	9.60	512	27.13	31.15	46.47	1.01	28.76 - 29.49	66.41	
	Unimp	-	27.78	23.84	25	17.44	30.20	32.92	1.10	17.55 - 29.46	40.00	
Cottonwood	Urban	29.48	28.69	10.31	360	26.51	30.81	45.25	1.00	28.27 - 29.19	62.78	
	Imp	-	28.88	8.97	332	26.65	30.80	22.45	1.00	28.37 - 29.26	65.36	
	Unimp	-	27.44	25.82	28	24.26	31.79	45.25	1.26	24.40 - 28.69	35.71	
Evergreen	Urban	32.38	30.97	13.08	65	27.30	32.64	36.54	1.02	29.21 - 31.88	52.31	
Hawthorn	Urban	29.36	27.56	9.73	1256	25.77	29.78	40.23	1.01	27.38 - 27.83	65.61	
	Imp	-	27.71	8.47	1223	25.89	29.83	26.70	1.00	27.47 - 27.91	68.27	
	Unimp	-	6.00	133.81	33	4.49	20.92	23.74	1.12	4.55 - 20.45	6.06	
Holly	Urban	32.57	32.57	13.27	30	29.50	35.97	24.68	1.00	29.98 - 35.03	50.00	
Mount Olive	Urban	31.67	29.40	9.24	516	27.70	31.31	43.83	1.03	29.10 - 29.70	72.67	

I-E Class Sales Ratio Study

Table 1

Assessment Ratios

GEOGRAPHIC AREA	ADJ	COEF				QUARTILES		RATIO		95% CONFIDENCE INTERVAL		COEF CONC
		MEDIAN	MEDIAN	DISP	SALES	1st	3rd	RANGE	PRD			
Pin Oak	Urban	29.99	28.34	8.48	822	26.33	30.06	44.64	1.01	28.06 - 28.57	70.07	
Red Maple	Urban	29.86	29.03	8.45	397	27.35	30.67	35.14	1.01	28.73 - 29.20	70.28	
Sassafras	Urban	31.26	31.26	15.56	26	27.84	34.80	35.24	1.01	28.44 - 33.75	53.85	
Silver Maple	Urban	29.98	29.07	16.64	924	25.80	32.42	64.98	1.03	28.69 - 29.46	44.70	
Sycamore	Urban	31.17	30.18	12.80	244	26.93	33.52	42.41	1.01	29.38 - 30.63	46.31	
Walnut Grove	Urban	30.31	29.62	8.27	57	28.29	31.12	26.00	1.01	28.62 - 30.17	71.93	
White Pine	Urban	29.72	28.89	7.67	371	27.10	30.45	28.01	1.06	28.45 - 29.22	74.93	
Willow	Urban	30.91	30.18	9.90	28	28.08	32.54	17.25	1.00	28.22 - 31.10	64.29	
All Others	Urban	28.78	27.66	29.28	40	20.86	31.65	44.00	0.97	22.54 - 29.12	37.50	

* No adjustments were necessary because there were no significant assessment changes

Roosevelt County

Total County	Urban	-	30.58	24.39	113	25.77	35.42	56.85	1.06	29.14 - 31.98	33.63	
Townships												
Tennyson	Urban	31.57	31.54	21.13	75	27.11	36.53	49.80	1.03	30.35 - 33.40	36.00	
All Others	Urban	28.91	28.19	29.83	38	21.26	33.16	56.85	1.06	22.41 - 31.41	28.95	

Exam Preparation

Examination Information

- 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.
- Tips for taking a multiple-choice exam:
 - 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 at a later time.
 - Guessing an answer is better than leaving it blank if time becomes an issue.