



Department of Local Government Finance

Ratio Study Problems and Answers

2024 Level I Tutorials



Ratio Study Problem and Answer Review

- Now we are going to review the various ratio study calculations in the Ratio Study Power Point. At the end of the review, please work problems 1 – 4.





Assessment Ratio Review

- An assessment ratio is calculated using the following formula: True Tax Value divided by Market Value in Use (Sales Price) = Ratio

	True Tax Value / Sale Price = Ratio		
Sale #	True Tax Value	Sale Price	Sales Ratio
1	\$45,800	\$49,800	0.920
2	\$48,200	\$52,400	0.920
3	\$42,200	\$40,000	1.055
4	\$57,150	\$58,125	0.983
5	\$55,300	\$51,450	1.075





Mean Calculation Review

- Measures of Central Tendency
- Mean (arithmetic average) – The result of adding all the individual ratios and dividing by the number of ratios.
- Mean = sum of ratios ÷ number of ratios

$$\text{True Tax Value} / \text{Sale Price} = \text{Ratio}$$

Sale #	True Tax Value	Sale Price	Sales Ratio
1	\$45,800	\$49,800	0.920
2	\$48,200	\$52,400	0.920
3	\$42,200	\$40,000	1.055
4	\$57,150	\$58,125	0.983
5	\$55,300	\$51,450	1.075
TOTAL OF SALES RATIOS			4.9530
TOTAL NUMBER OF RATIOS			5
MEAN			99.1%





Weighted Mean Calculation Review

- Measures of Central Tendency
- Weighted Mean – the total of the TTV’s for all sales divided by the total of the sales prices for all sales
- Weighted Mean = Sum of the TTV’s ÷ Sum of the Sales

Sale #	True Tax Value		Sale Price
1	\$45,800		\$49,800
2	\$48,200		\$52,400
3	\$42,200		\$40,000
4	\$57,150		\$58,125
5	\$55,300		\$51,450
	\$248,650	Divided by	\$251,775
		Weighted Mean	98.8%





Median Calculation Review

- Measures of Central Tendency
- Median – The middle ratio in a rank order of ratios. A rank order lists the ratios in ascending or descending order.
- Location of the Median in a rank order = $(\text{Number of ratios} + 1) \div 2$

Sales Ratio	Sales Ratios Ranked
0.9200	0.9200
0.9200	0.9200
1.0550	0.9830
0.9830	1.0550
1.0750	1.0750
Median	98.3%





Average Absolute Deviation Calculation Review

- Measures of Uniformity
- Average Absolute Deviation – The arithmetic average of the absolute deviations of the individual ratios from the median.

Sale #	True Tax Value	Sale Price	Sales Ratio	Median	ABS DEV
1	\$45,800	\$49,800	0.920	0.983	0.063
2	\$48,200	\$52,400	0.920	0.983	0.063
3	\$42,200	\$40,000	1.055	0.983	0.072
4	\$57,150	\$58,125	0.983	0.983	0.000
5	\$55,300	\$51,450	1.075	0.983	0.092
	\$248,650	\$251,775	Total Absolute Deviation		0.290
			Average Absolute Deviation		0.058





COD Calculation Review

- Measures of Uniformity
- Coefficient of Dispersion (COD) = Ave. Abs. Deviation ÷ Median

Sale #	True Tax Value	Sale Price	Sales Ratio	Median	ABS DEV
1	\$45,800	\$49,800	0.9200	0.9830	0.063
2	\$48,200	\$52,400	0.9200	0.9830	0.063
3	\$42,200	\$40,000	1.0550	0.9830	0.072
4	\$57,150	\$58,125	0.9830	0.9830	0.000
5	\$55,300	\$51,450	1.0750	0.9830	0.092
	\$248,650	\$251,775	Total Absolute Deviation		0.290
			Average Absolute Deviation		0.058
			Median		0.983
			COD		5.9%





PRD Calculation Review

- Measures of Regressivity/Progressivity
- Price-Related Differential (PRD) – The mean ratio divided by the weighted mean ratio.
- $PRD = \text{Mean} \div \text{Wtd. Mean}$

Mean percentage from Slide 16:		99.1%
Divided by		
Weighted Mean % from Slide 17:		98.8%
Equals a PRD of		100.30%



1.)	Please find the Median in the following set of Sales Ratios:								
	<table border="1"> <tr> <td data-bbox="377 139 631 219">0.8990</td> <td data-bbox="631 139 886 219">1.0980</td> <td data-bbox="886 139 1141 219">0.9430</td> <td data-bbox="1141 139 1396 219">0.9570</td> <td data-bbox="1396 139 1651 219">0.9890</td> <td data-bbox="1651 139 1905 219">1.2000</td> <td data-bbox="1905 139 2160 219">0.9190</td> </tr> </table>	0.8990	1.0980	0.9430	0.9570	0.9890	1.2000	0.9190	
0.8990	1.0980	0.9430	0.9570	0.9890	1.2000	0.9190			
2.)	A township within any class must have a median assessment ratio between what two percentages?								
3.)	The Price Related Differential (PRD) must be between what two percentages?								
4.)	In order to calculate a COD, you need divide the Average Absolute Deviation by the _____.								



1.)	Please find the Median in the following set of Sales Ratios:						
	0.8990	1.0980	0.9430	0.9570	0.9890	1.2000	0.9190
	Rank the above ratios in order and select the middle ratio						
Answer:	0.8990	0.9190	0.9430	<u>0.9570</u>	0.9890	1.0980	1.2000
2.)	A township within any class must have a median assessment ratio between what two percentages according to IAAO standards?						
Answer:	The median assessment ratio must be between 90% and 110%						
3.)	The Price Related Differential (PRD) must be between what two percentages according to IAAO standards?						
Answer:	The PRD must be between 98% and 103%						
4.)	In order to calculate a COD, you need divide the Average Absolute Deviation by the _____.						
Answer:	<u>Median</u>						





**Refer back to slide 28 of the
Ratio Study presentation.**



Ratio Study Problems and Answers

- This concludes the ratio study problems and answers packet and is a reminder that should you have questions you can email these questions to the Department.
- Please send emails to Level1@dlgf.in.gov

