MS 365 Excel Basics #3

Number Formatting and the ROUND Function

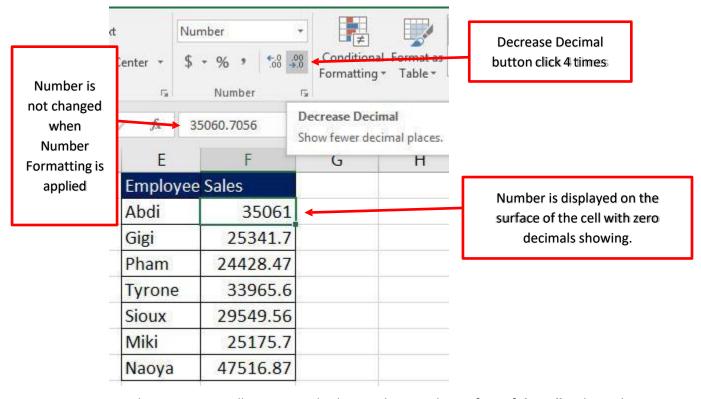
Goal of Video #3: Learn that Number Formatting can sometimes make formula answers look like the wrong answer, or cause the wrong answer when you do not properly use the ROUND function.

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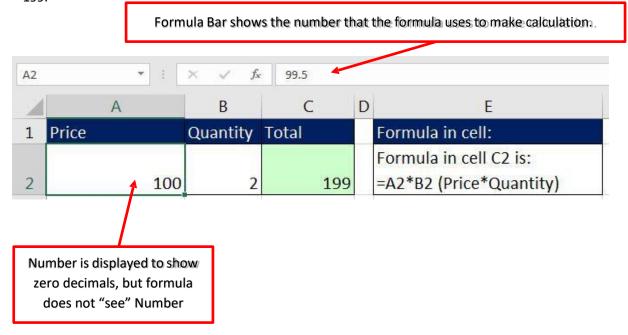
Number Formatting

- 1) What does Number Formatting do?
 - i. Number Formatting allows you to change how the Number is displayed without actually changing the underlying number that sits in the cell.
 - 1. For example, in this picture, the Decrease Decimal button is used to display no decimals, but we can still see the decimals in the Formula Bar:

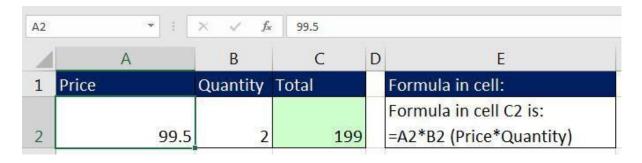


- 2. Number Formatting allows you to display numbers on the *surface of the cell* without changing the number that *sits in the cell*.
- 3. You can think of Number Formatting as a "Façade". In the above picture, the Façade shows the number 35061, but underneath that façade is the actual number 35060.7056.

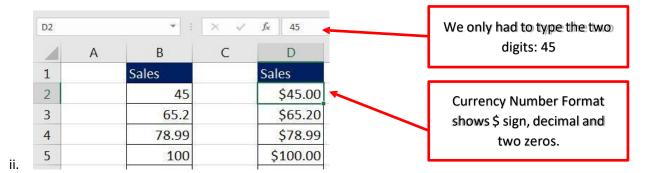
- 2) Formulas do not "see" Number Formatting.
 - i. Formulas make calculations on the underlying number that sits in the cell.
 - ii. Formulas do NOT make calculations on the Number Formatting that you see on the surface of the cell.
 - iii. For example, in this picture, the formula shows an answer of 199, but 100*2 is really 200!! What is going on? If you look in the Formula Bar it shows that the value in cell A2 is really 99.5. Because formulas make calculations on the underlying number that sits in the cell, the formula makes the calculation on 99.5*2 = 199.



- iv. Formulas make their calculation on the actual numbers in the cells, not the numbers that are displayed on the surface of the cells.
- v. To fix this visual mistake, we need to increase the decimals for cell A2. This picture shows the decimals increased for cell A2:



- 3) Number Formatting can save us a lot of time with data entry.
 - i. In the picture below the numbers on the right are the digits that you type in. The numbers on the left have Currency Number Format applied so the dollar signs and decimal point and decimals are displayed.

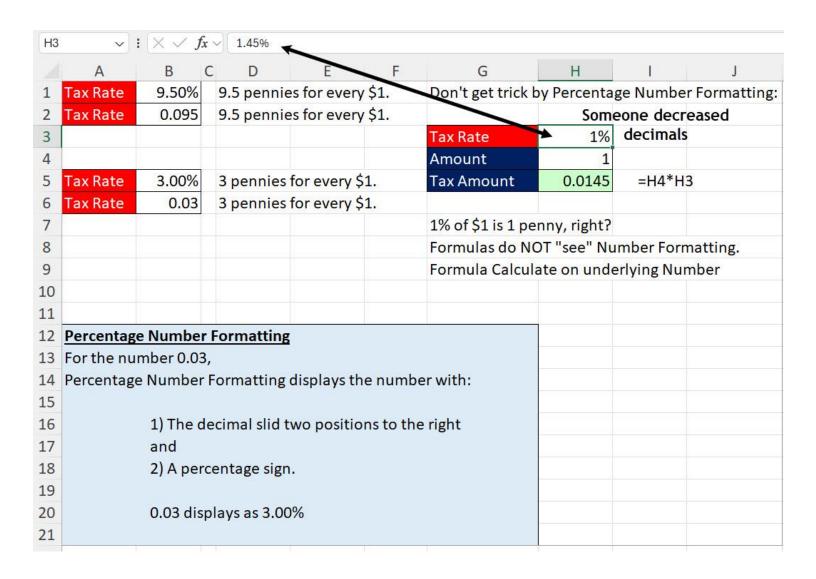


- 4) Compare General Number Formatting, Currency Number Format and Accounting Number Format:
 - 1. General Number Formatting:
 - i. General Number Formatting = What you see is what is in the cell.
 - ii. If you apply General Number Formatting, it will wipe away all of the previously applied Number Formatting to reveal what number actually sits in the cell.
 - iii. Applying General Number Formatting ERASES all previously applied Number Formatting.
 - iv. General Number Formatting is the default Number Formatting on all cells.
 - 2. Accounting Number Format:
 - i. Fixed dollar sign (left edge of cell).
 - ii. Negatives are in parenthesis.
 - iii. Zeros are dashes.
 - iv. Decimals always line up.
 - v. When you use Accounting Number Format it may hide decimals by displaying fewer decimals than are actually in the cell. This may lead to formula errors due to fact the formula calculates on the underlying number and not the displayed number.
 - 3. Currency:
 - i. Floating dollar sign.
 - ii. You choose how to show negatives.
 - iii. Zeros are zeros.
 - iv. Decimals usually line up.
 - v. When you use Currency Number Format it may hide decimals by displaying fewer decimals than are actually in the cell. This may lead to formula errors due to fact the formula calculates on the underlying number and not the displayed number.
 - 4. Example:

i.

General	Currency	Accounting
Sales	Sales	Sales
45	\$45.00	\$ 45.00
0	\$0.00	\$ -
78.99	\$78.99	\$ 78.99
100	\$100.00	\$ 100.00
-101	-\$101.00	\$ (101.00)
98.2	\$98.20	\$ 98.20
20	\$20.00	\$ 20.00

- 5) Percentage Number Formatting:
 - i. What is a percentage?
 - 1. How many parts out of 100?
 - i. If the tax rate is 9.95%, this means that you must pay 9.95 pennies out of every 100 pennies (or one dollar).
 - ii. What Percentage Number Format does:
 - 1. For the number 0.03, Percentage Number Formatting displays the number with:
 - . The decimal slid two positions to the right and
 - ii. A percentage sign.
 - iii. 0.03 displays as 3.00%
 - 2. For a tax rate of 1.45%, you have to remember that the underlying number is 0.0145.



Reminder of how we round numbers by hand:

How to round by hand?

- 1) Pick position you want to round to
- 2) look at digit to right:

5 or bigger ==>> add one to position you are rounding to and remove unwanted digits 4 or less ==>> remove unwanted digits

52.727625 52.7**2**7625 52.72**7**625 52.7**(2+1)**7625 52.73

52.724584 52.7**2**4584 52.72**4**584 52.7**(2+0)**4584 52.72

We can use the ROUND function to remove unwanted decimals

- 1) We can use the ROUND function to remove unwanted decimals.
- 2) ROUND Function arguments:
 - i. **Number** argument contains the number you want to round. In this picture we want to round the Tax Deduction Amount, B13*\$B\$18:

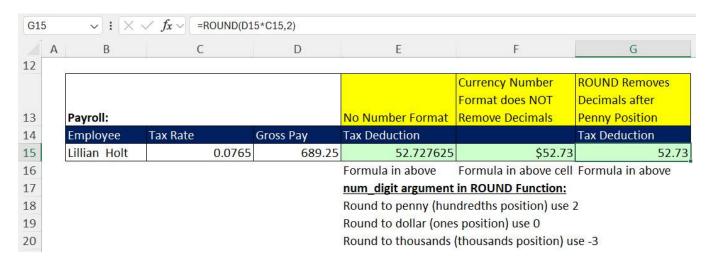
12	Payroll:		No ROUND	ROUND	
13	Employee	Gross Pay	Tax Deduction	Tax Deduction	
14	Lillian Holt	689.25	\$52.73	=ROUND(B14:B16*B1	19,2)
15	Jasmine Phelps	765.71	\$58.58	ROUND(number , num_digits)	
16	Sadie Hudson	687.43	\$52.59	\$52.59	
17		Total	\$163.89	\$163.90	
18					
19	Tax Rate	0.0765			

ii. **Num_digits** argument is the position you would like to round to. For example, because the penny position is two digits to the right of the decimal, you would use a 2 for rounding to the penny. Like in this picture:

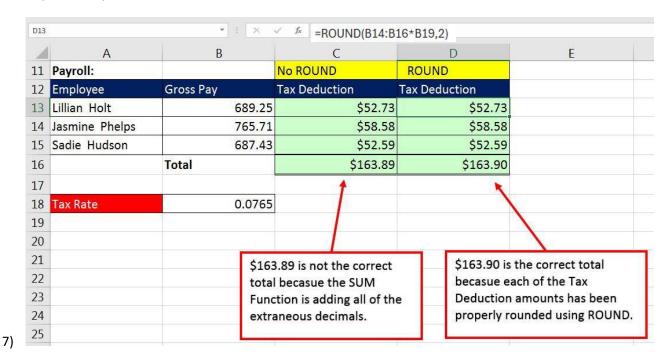
12	Payroll:		No ROUND	ROUND
13	Employee	Gross Pay	Tax Deduction	Tax Deduction
14	Lillian Holt	689.25	\$52.73	=ROUND(B14:B16*B19,2)
15	Jasmine Phelps	765.71	\$58.58	ROUND(number, num_digits)
16	Sadie Hudson	687.43	\$52.59	\$52.59
17		Total	\$163.89	\$163.90
18				
19	Tax Rate	0.0765		

- 3) Some options for the num_digits argument in ROUND:
 - i. Round to penny (hundredths position) = 2
 - ii. Round to dollar (ones position) = 0
 - iii. Round to thousands (thousands position) = -3

4) Here is an example of how we use ROUND to remove unwanted decimals, rather than Number Formatting:



- 5) When you MUST use ROUND:
 - i. You are required to round, like with Money.
 - ii. You have extraneous decimals, like past the penny position.
 - iii. You will use formula result in a subsequent formula.
- 6) If you don't use ROUND when you are required to, you may calculate the incorrect amounts, like in the following Payroll example:



- In business we mostly need to use round when we are multiplying decimals and the unit is Money.
 - i. Examples:
 - 1. Payroll
 - 2. Invoices
 - 3. Taxes
- 9) You are not required to use round if you will never use the formula result in another formula. Then you can just use Number Formatting to display the numbers with the correct number of decimals.

10) Invoice example:

	Α	В	С	D	E	F	G
22	Invoicing:					Tax Rate	
23	Invoice Number	1025				9.75%	
24	Item	Price	Units	Total		101 100 100 100 100 100 100	
25	1" screws	0.0513	31	\$1.59		=ROUND(B25:B27*C25:0	227,2)
26	2" screws	0.0775	21	\$1.63			
27	6" lock pads	1.057	11	\$11.63			
28	ė		Subtotal	\$14.85		=SUM(D25:D27)	
29			Tax	\$1.45		=ROUND(D28*F23,2)	
30)	8.79	Total	\$16.30		=SUM(D28:D29)	
31		Thanks for	your Order!				a

11) Income Tax Example:

	А	В	С	D		
33	**Payroll Taxes and Invoices often times have to round to the penny.					
34	**Sometimes for INCOME TAXES you have to round to the dollar.					
35	1					
36	Tax Rate					
37		0.155				
38	Income Tax:					
		Tax				
39	Taxable Amount	rounded to dollar				
40	\$2,345.98	\$364.00	=ROUND(A40:A43	*B37,0)		
41	\$345.49	\$54.00				
42	\$235.80	\$37.00				
43	\$2,541.12	\$394.00				
44	Toatl	\$849.00				