

Excel & Business Math
Video/Class Project #34
MEDIAN Function for FICA Social Security & Medicare Payroll Deductions

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1) FICA Payroll Taxes

FICA Taxes (Deductions from employee's paycheck)

Social Security Taxes

Federal taxes levied on employees and employers

Proceeds used for:

Pension payments after a worker has reached 62 years or later

Disability benefits for disabled worker and dependents

Social Security tax rate is 6.2% on the first \$130,500 wages paid.

Medicare Taxes

Federal taxes levied on employees and employers

Proceeds used for medical insurance for eligible elderly and disabled people

The Medicare tax rate is 1.45% on the first \$200,000 and 2.35% above \$200,000.

Self Employed Workers

Self Employed Workers must pay both the employees' and employers' taxes

2) Video Example for FICA Payroll Taxes Calculations Long Hand Example #1 (Below The Hurdle)

	A	B	C	D
1	Social Security Payroll Tax Deduction Calculations for Friday, November 24, 2017			
2	Social Security Hurdle	\$130,500.00		
3	Social Security Tax Rate for first \$130,500 of Gross Pay	6.20%		
4	Social Security Tax Rate for Gross Pay ABOVE \$130,500	0.00%		
5	Date	Friday, November 24, 2017		
6	Employee:	Sioux Radcoolinator		
7	Cumulative Gross Pay for Year To Date	\$129,000.00		
8	Gross Pay for This Week	\$1,000.00		
9	Cumulative Gross Pay after this Week's Pay	\$130,000.00	=SUM(B7:B8)	
10	Is Employee Over Social Security Hurdle BEFORE this week's pay?	FALSE	=B7>B2	
11	Is Employee Over Social Security Hurdle AFTER this week's pay?	FALSE	=B9>B2	
12	How Much of Week Gross Pay is Taxed for Social Security?	\$1,000.00	=B8	
13	Social Security Tax Deduction	\$62.00	=ROUND(B12*B3,2)	
14	Medicare Hurdle	\$200,000.00		
15	Medicare Tax Rate for first \$200,000 of Gross Pay	1.45%		
16	Medicare Tax Rate for Gross Pay ABOVE \$200,000	2.35%		
17	Is Employee Over Medicare Hurdle BEFORE this week's pay?	FALSE	=B7>B14	
18	Is Employee Over Medicare Hurdle AFTER this week's pay?	FALSE	=B9>B14	
19	How Much of Week Gross Pay is Taxed at 1.45% Medicare Rate?	\$1,000.00	=B8	
20	How Much of Week Gross Pay is Taxed at 2.35% Medicare Rate?	\$0.00		
21	Social Security Tax Deduction	\$14.50	=ROUND(B19*B15,2)	
22	Net Pay After Deductions	\$923.50	=B8-B13-B21	

3) Video Example for FICA Payroll Taxes Calculations Long Hand Example #2 Jump (Over The Hurdle)

	A	B	C	D	E	F	G
1	Social Security Payroll Tax Deduction Calculations for Friday, December 01, 2017						
2	Social Security Hurdle	\$130,500.00					
3	Social Security Tax Rate for first \$130,500 of Gross Pay	6.20%					
4	Social Security Tax Rate for Gross Pay ABOVE \$130,500	0.00%					
5	Date	Friday, December 01, 2017					
6	Employee:	Sioux Radcoolinator					
7	Cumulative Gross Pay for Year To Date	\$130,000.00					
8	Gross Pay for This Week	\$1,000.00					
9	Cumulative Gross Pay after this Week's Pay	\$131,000.00	=SUM(B7:B8)				
10	Is Employee Over Social Security Hurdle BEFORE this week's pay?	FALSE	=B7>B2				
11	Is Employee Over Social Security Hurdle AFTER this week's pay?	TRUE	=B9>B7				
12	How Much of Week Gross Pay is Taxed for Social Security?	\$500.00	=B2-B7				
13	Social Security Tax Deduction	\$31.00	=ROUND(B12*B3,2)				\$131,000.00
14	Medicare Hurdle	\$200,000.00					
15	Medicare Tax Rate for first \$200,000 of Gross Pay	1.45%		\$130,000.00			
16	Medicare Tax Rate for Gross Pay ABOVE \$200,000	2.35%					
17	Is Employee Over Medicare Hurdle BEFORE this week's pay?	FALSE	=B7>B14	Cumulative Gross Pay for Year To Date			
18	Is Employee Over Medicare Hurdle AFTER this week's pay?	FALSE	=B9>B14				
19	How Much of Week Gross Pay is Taxed at 1.45% Medicare Rate?	\$1,000.00	=B8				
20	How Much of Week Gross Pay is Taxed at 2.35% Medicare Rate?	\$0.00					
21	Social Security Tax Deduction	\$14.50	=ROUND(B19*B15,2)				
22	Net Pay After Deductions	\$954.50	=B8-B13-B21				

Because we jumped over the hurdle this pay period the calculation is:
SS Max - Cumulative Gross Pay for Year To Date

\$130,500.00
Social Security Hurdle

4) Video Example for FICA Payroll Taxes Calculations Long Hand Example #3 Over The Hurdle

	A	B	C	D
1	Social Security Payroll Tax Deduction Calculations for Friday, December 08, 2017			
2	Social Security Hurdle	\$130,500.00		
3	Social Security Tax Rate for first \$130,500 of Gross Pay	6.20%		
4	Social Security Tax Rate for Gross Pay ABOVE \$130,500	0.00%		
5	Date	Friday, December 08, 2017		
6	Employee:	Sioux Radcoolinator		
7	Cumulative Gross Pay for Year To Date	\$131,000.00		
8	Gross Pay for This Week	\$1,000.00		
9	Cumulative Gross Pay after this Week's Pay	\$132,000.00	=SUM(B7:B8)	
10	Is Employee Over Social Security Hurdle BEFORE this week's pay?	TRUE	=B7>B2	
11	Is Employee Over Social Security Hurdle AFTER this week's pay?	TRUE	=B9>B7	
12	How Much of Week Gross Pay is Taxed for Social Security?	\$0.00		
13	Social Security Tax Deduction			
14	Medicare Hurdle	\$200,000.00		
15	Medicare Tax Rate for first \$200,000 of Gross Pay	1.45%		
16	Medicare Tax Rate for Gross Pay ABOVE \$200,000	2.35%		
17	Is Employee Over Medicare Hurdle BEFORE this week's pay?	FALSE	=B7>B14	
18	Is Employee Over Medicare Hurdle AFTER this week's pay?	FALSE	=B9>B14	
19	How Much of Week Gross Pay is Taxed at 1.45% Medicare Rate?	\$1,000.00	=B8	
20	How Much of Week Gross Pay is Taxed at 2.35% Medicare Rate?	\$0.00		
21	Social Security Tax Deduction	\$14.50	=ROUND(B19*B15,2)	
22	Net Pay After Deductions	\$985.50	=B8-B13-B21	

5) MEDIAN Function

1. The MEDIAN Function will always pick on the number that is in the middle of a sorted list
2. If there are an odd number of numbers, then the MEDIAN Function will pick the number in the middle of the sorted list. For example, in the sorted list: -2, 0, 3, the MEDIAN Function will pick out the number zero: 0.
3. If there are an even number of numbers, then the MEDIAN Function will pick the two numbers in the middle of the sorted list and average them. For example, in the sorted list: -1, 2, 3, 5 the MEDIAN Function will pick out the two middle numbers and calculate the average, like: $(2+3)/2 = 2.5$.

6) Three Situations When Calculating a Tax Deduction and there is a Hurdle Amount

1. In order to use the MEDIAN Function to make our FICA Tax Excel Formulas less complicated, we need to recognize that the number we must multiply by the tax rate used when the Cumulative Gross Pay is below the will always be the median of the number 0, the gross pay for the pay period or the difference between the Hurdle Amount and the Cumulative Gross Pay for the Year To Date as seen in the flowing three examples:

Example 1:

	A	B	C	D	E
1	Social Security Payroll Tax Deduction Calculations for Friday, December 08, 2017				
2	Social Security Hurdle	\$130,500.00			
3	Social Security Tax Rate for first \$130,500 of Gross Pay	6.20%			
4	Social Security Tax Rate for Gross Pay ABOVE \$130,500	0.00%			
5	Date	Friday, December 08, 2017			
6	Employee:	Sioux Radcoolinator			
7	Cumulative Gross Pay for Year To Date	\$129,000.00			
8	Gross Pay for This Week	\$1,000.00			
9	Cumulative Gross Pay after this Week's Pay	\$130,000.00	=SUM(B7:B8)		
10					
11	Situation #3 Over The Hurdle Before This Week. Here is Taxable Earnings:	0			
12	Situation #1: Under The Hurdle After This Week. Here is Taxable Earnings:	\$1,500.00	=B2-B7		
13	Situation #2: Jump Over the Hurdle This Week. Here is Taxable Earnings:	\$1,000.00	=B8		
14					
15	Which Number is Middle? This will always be the correct amount to multiply by the Tax Rate for Under the Hurdle	\$1,000.00	=MEDIAN(B11:B13)		
16					
17	The MEDIAN Function will always pick the number that is in the middle				

Example 2:

	A	B	C	D	E
1	Social Security Payroll Tax Deduction Calculations for Friday, December 08, 2017				
2	Social Security Hurdle	\$130,500.00			
3	Social Security Tax Rate for first \$130,500 of Gross Pay	6.20%			
4	Social Security Tax Rate for Gross Pay ABOVE \$130,500	0.00%			
5	Date	Friday, December 08, 2017			
6	Employee:	Sioux Radcoolinator			
7	Cumulative Gross Pay for Year To Date	\$130,000.00			
8	Gross Pay for This Week	\$1,000.00			
9	Cumulative Gross Pay after this Week's Pay	\$131,000.00	=SUM(B7:B8)		
10					
11	Situation #3 Over The Hurdle Before This Week. Here is Taxable Earnings:	0			
12	Situation #1: Under The Hurdle After This Week. Here is Taxable Earnings:	\$500.00	=B2-B7		
13	Situation #2: Jump Over the Hurdle This Week. Here is Taxable Earnings:	\$1,000.00	=B8		
14					
15	Which Number is Middle? This will always be the correct amount to multiply by the Tax Rate for Under the Hurdle	\$500.00	=MEDIAN(B11:B13)		
16					
17	The MEDIAN Function will always pick the number that is in the middle				

Example 3:

	A	B	C	D	E
1	Social Security Payroll Tax Deduction Calculations for Friday, December 08, 2017				
2	Social Security Hurdle	\$130,500.00			
3	Social Security Tax Rate for first \$130,500 of Gross Pay	6.20%			
4	Social Security Tax Rate for Gross Pay ABOVE \$130,500	0.00%			
5	Date	Friday, December 08, 2017			
6	Employee:	Sioux Radcoolinator			
7	Cumulative Gross Pay for Year To Date	\$131,000.00			
8	Gross Pay for This Week	\$1,000.00			
9	Cumulative Gross Pay after this Week's Pay	\$132,000.00	=SUM(B7:B8)		
10					
11	Situation #3 Over The Hurdle Before This Week. Here is Taxable Earnings:	0			
12	Situation #1: Under The Hurdle After This Week. Here is Taxable Earnings:	-\$500.00	=B2-B7		
13	Situation #2: Jump Over the Hurdle This Week. Here is Taxable Earnings:	\$1,000.00	=B8		
14					
15	Which Number is Middle? This will always be the correct amount to multiply by the Tax Rate for Under the Hurdle	\$0.00	=MEDIAN(B11:B13)		
16					
17	The MEDIAN Function will always pick the number that is in the middle				

7) Video Example for MEDAIN Function to make our FICA Tax Excel Formulas Less Complicated

	A	B	C	D	E	F	G
1	Social Security Payroll Tax Deduction Calculations for Friday, November 24, 2017						
2	Social Security Hurdle	\$130,500.00					
3	Social Security Tax Rate for first \$130,500 of Gross Pay	6.20%					
4	Social Security Tax Rate for Gross Pay ABOVE \$130,500	0.00%					
5	Date	Friday, November 24, 2017					
6	Employee:	Sioux Radcoolinator					
7	Cumulative Gross Pay for Year To Date	\$200,500.00					
8	Gross Pay for This Week	\$1,000.00					
9	Cumulative Gross Pay after this Week's Pay	\$201,500.00	=SUM(B7:B8)				
10	How Much of Week Gross Pay is Taxed for Social Security?	\$0.00	=MEDIAN(0,B8,B2-B7)				
11	Social Security Tax Deduction	\$0.00	=ROUND(B10*B3,2)				\$201,500.00
12	Medicare Hurdle	\$200,000.00					
13	Medicare Tax Rate for first \$200,000 of Gross Pay	1.45%			\$200,500.00	\$200,000.00	
14	Medicare Tax Rate for Gross Pay ABOVE \$200,000	2.35%					
15	Is Employee Over Medicare Hurdle BEFORE this week's pay?	TRUE	=B7>B12		Cumulative Gross Pay for Year To Date	Medicare Hurdle	Cumulative Gross Pay after this Week's Pay
16	Is Employee Over Medicare Hurdle AFTER this week's pay?	TRUE	=B9>B12				
17	Jump Over Hurdle This Week?	FALSE	=B16+B15=1				
18	How Much of Week Gross Pay is Taxed at 1.45% Medicare Rate?	\$0.00	=MEDIAN(0,B8,B12-B7)				
19	How Much of Week Gross Pay is Taxed at 2.35% Medicare Rate?	\$1,000.00	=B8-I18				
20	Social Security Tax Deduction	\$23.50	=ROUND(SUM(B18*B13,B19*B14),2)				
21	Net Pay After Deductions	\$976.50	=B8-B11-B20				

8) Video Example for Full Payroll Table Example:

	A	B	C	D	E	F	G	H	I	J	K	L
1			Social Security Hurdle	Social Security Tax Rate for first \$130,500 of Gross Pay	Social Security Tax Rate for Gross Pay ABOVE \$130,500	Medicare Hurdle	Medicare Tax Rate for first \$200,000 of Gross Pay	Medicare Tax Rate for Gross Pay ABOVE \$200,000				
2			\$130,500.00	6.20%	0.00%	\$200,000.00	1.45%	2.35%				
3												
4	Date	Employee:	Cumulative Gross Pay for Year To Date	Gross Pay for This Week	Cumulative Gross Pay after this Week's Pay	Social Security Deduction	Medicare Deduction	Total Deductions	Net Pay After Taxes		Helper Medicare	Helper Medicare
5	11/24/2017	Sioux Radcoolinator	\$129,000.00	\$1,000.00	\$130,000.00	\$62.00	\$14.50	\$76.50	\$923.50		\$1,000.00	\$0.00
6	11/24/2017	Essie Hayes	\$130,000.00	\$1,000.00	\$131,000.00	\$31.00	\$14.50	\$45.50	\$954.50		\$1,000.00	\$0.00
7	11/24/2017	Tasha Wade	\$131,000.00	\$1,000.00	\$132,000.00	\$0.00	\$14.50	\$14.50	\$985.50		\$1,000.00	\$0.00
8	11/24/2017	Tyrone Ray	\$199,500.00	\$1,000.00	\$200,500.00	\$0.00	\$19.00	\$19.00	\$981.00		\$500.00	\$500.00
9	11/24/2017	Margaret Maldonado	\$200,500.00	\$1,000.00	\$201,500.00	\$0.00	\$23.50	\$23.50	\$976.50		\$0.00	\$1,000.00
10	11/24/2017	Muriel Murphy	\$27,893.00	\$1,000.00	\$28,893.00	\$62.00	\$14.50	\$76.50	\$923.50		\$1,000.00	\$0.00
11	11/24/2017	Lorenzo Hill	\$149,827.00	\$1,000.00	\$150,827.00	\$0.00	\$14.50	\$14.50	\$985.50		\$1,000.00	\$0.00
12	11/24/2017	Heather Farmer	\$55,740.00	\$1,000.00	\$56,740.00	\$62.00	\$14.50	\$76.50	\$923.50		\$1,000.00	\$0.00
13	11/24/2017	Emma Powers	\$141,315.00	\$1,000.00	\$142,315.00	\$0.00	\$14.50	\$14.50	\$985.50		\$1,000.00	\$0.00
14	11/24/2017	Thelma Ross	\$97,827.00	\$1,000.00	\$98,827.00	\$62.00	\$14.50	\$76.50	\$923.50		\$1,000.00	\$0.00
15	11/24/2017	Harvey Alexander	\$5,767.00	\$1,000.00	\$6,767.00	\$62.00	\$14.50	\$76.50	\$923.50		\$1,000.00	\$0.00
16	11/24/2017	Marcella Brewer	\$39,047.00	\$1,000.00	\$40,047.00	\$62.00	\$14.50	\$76.50	\$923.50		\$1,000.00	\$0.00
17	11/24/2017	Abdi Freeson	\$295,708.00	\$1,000.00	\$296,708.00	\$0.00	\$23.50	\$23.50	\$976.50		\$0.00	\$1,000.00
18												
19					Formula is E5:			Formula is H5:	Formula is I5:		Formula is K5:	Formula is L5:
20					=D5+C5	Formula is F5:		=SUM(F5:G5)	=D5-H5		=MEDIAN(0,D5,\$F\$2-C5)	=D5-MEDIAN(0,D5,\$F\$2-C5)
21								=ROUND(MEDIAN(0,D5,\$C\$2-C5)*\$D\$2,2)				
22								Formula is G5:				
23								=ROUND(SUM(MEDIAN(0,D5,\$F\$2-C5))*\$G\$2,(D5-MEDIAN(0,D5,\$F\$2-C5))*\$H\$2),2)				
24												