

## Project 3 – Excel Math Functions

In this project, we will create two artifacts that will go over topics that we discussed in Section 4 – Math Functions. The first will be an internal labor cost tracker leveraging hourly rates from the countries where the resource resides. The second artifact will be a business case that will feature functions related to Internal Rate of Return (IRR) and Net Present Value (NPV).

**Step 1:** Download the spreadsheet “Project 3 – Excel Math Functions” so that you don’t have to do the data entry from scratch. This spreadsheet can be found here:

[www.DanRiveraPMP.com/ms-excel-for-project-managers](http://www.DanRiveraPMP.com/ms-excel-for-project-managers)

**Step 2:** Within Cell F4, enter either of the below formulas:

- =C4+D4+E4. Here you are leveraging individual cells.
- =sum(C4:E4). Here you are leveraging a range of cells.

Either of the above formulas will produce the below result in cell F4.

	A	B	C	D	E	F	G
1							
2			2020 - 1st Quarter				
3	Internal Resources	Label	January	February	March	TOTALS	Average
4	Project Manager	Hours	40	35	25	100	
5		Value					
6	Business Analyst	Hours	20	25	40		
7		Value					
8	Software Developer	Hours	25	25	40		
9		Value					
10	Quality Assurance	Hours	25	25	25		
11		Value					
12	TOTAL OPERATING		\$ -				

## Project 3 – Excel Math Functions

**Step 3:** Copy the above formula into cells F6, F8, and F10.

	A	B	C	D	E	F	G
1							
2			2020 - 1st Quarter				
3	Internal Resources	Label	January	February	March	TOTALS	Average
4	Project Manager	Hours	40	35	25	100	
5		Value					
6	Business Analyst	Hours	20	25	40	85	
7		Value					
8	Software Developer	Hours	25	25	40	90	
9		Value					
10	Quality Assurance	Hours	25	25	25	75	
11		Value					
12	TOTAL OPERATING		\$ -				

**Step 4:** Click on cell A15 where the cell is merged with the value of \$80. If you look at the top left, you will notice that the cell reference is A15. This is important to know so that you know the cell reference of this merged cell when you leverage formulas.

File Home Insert Draw Page Layout Formulas Data Review View Developer							
A15				X ✓ fx		80	
	A	B	C	D	E	F	G
1							
2			2020 - 1st Quarter				
3	Internal Resources	Label	January	February	March	TOTALS	Average
4	Project Manager	Hours	40	35	25	100	
5		Value					
6	Business Analyst	Hours	20	25	40	85	
7		Value					
8	Software Developer	Hours	25	25	40	90	
9		Value					
10	Quality Assurance	Hours	25	25	25	75	
11		Value					
12	TOTAL OPERATING		\$ -				
13							
14	Rates	Country					
15	\$ 80.00	United States					
16		Canada					
17	\$ 45.00	Puerto Rico					
18		Mexico					

## Project 3 – Excel Math Functions

**Step 5:** In cell C5, enter the formula  $=C4*\$A\$15$  to calculate the cost for the Project Manager for the 1<sup>st</sup> Quarter of 2020. We leverage a relative cell reference for the Hours as we want to leverage the hours for each month. We use an absolute reference for the country hourly rate because we *only* want the hourly rate for the United States. If we use relative references, we will pick up the hourly rates for other countries in error. Copy the formula to the right leveraging the cell handle until you reach Column E.

	A	B	C	D	E	F	G
1							
2			2020 - 1st Quarter				
3	Internal Resources	Label	January	February	March	TOTALS	Average
4		Project Manager	40	35	25	100	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00		
6		Business Analyst	20	25	40	85	
7		Value					
8		Software Developer	25	25	40	90	
9		Value					
10		Quality Assurance	25	25	25	75	
11		Value					
12	TOTAL OPERATING		\$ 3,200.00				
13							
14	Rates	Country					
15	\$ 80.00	United States					
16		Canada					
17	\$ 45.00	Puerto Rico					
18		Mexico					

**Step 6:** In cell C7, enter the formula  $=C6*\$A\$19$  as the Business Analyst resides in Australia. Copy the formula to the right leveraging the cell handle until Column E.

	A	B	C	D	E	F	G
1							
2			2020 - 1st Quarter				
3	Internal Resources	Label	January	February	March	TOTALS	Average
4		Project Manager	40	35	25	100	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00		
6		Business Analyst	20	25	40	85	
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00		
8		Software Developer	25	25	40	90	
9		Value					
10		Quality Assurance	25	25	25	75	
11		Value					
12	TOTAL OPERATING		\$ 4,400.00				
13							
14	Rates	Country					
15	\$ 80.00	United States					
16		Canada					
17	\$ 50.00	Puerto Rico					
18		Mexico					
19	\$ 60.00	Australia					
20		Singapore					
21		China					
22	\$ 40.00	Malaysia					
23		India					

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### Project 3 – Excel Math Functions

**Step 7:** In cell C9, enter the formula =C8\*\$A\$21. We are now calculating the hourly cost for the Software Developer residing in China. Copy the formula to the right leveraging the cell handle until Column E.

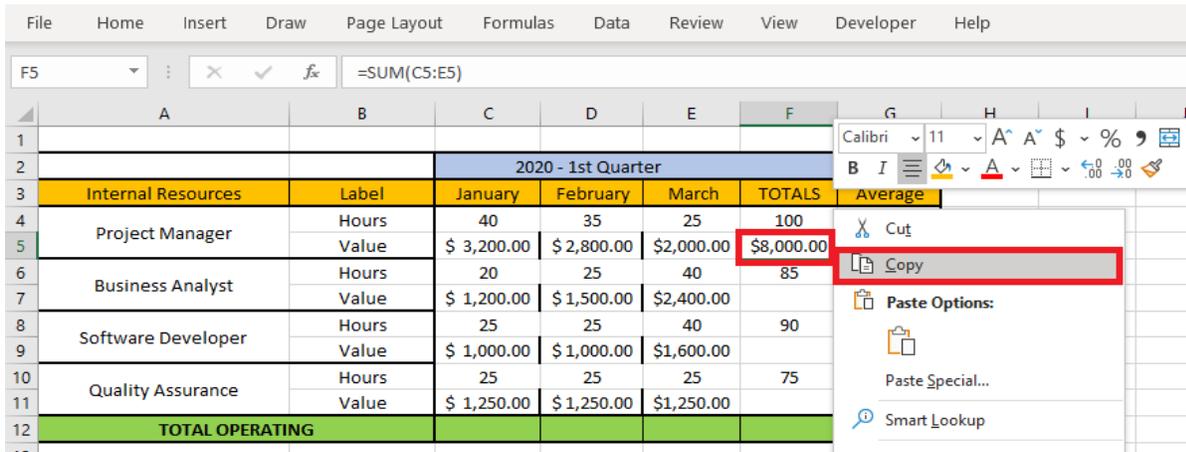
	A	B	C	D	E	F	G
1							
2			2020 - 1st Quarter				
3	Internal Resources	Label	January	February	March	TOTALS	Average
4	Project Manager	Hours	40	35	25	100	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00		
6	Business Analyst	Hours	20	25	40	85	
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00		
8	Software Developer	Hours	25	25	40	90	
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00		
10	Quality Assurance	Hours	25	25	25	75	
11		Value					
12	TOTAL OPERATING		\$ 4,400.00				
13							
14	Rates	Country					
15	\$ 80.00	United States					
16		Canada					
17	\$ 50.00	Puerto Rico					
18		Mexico					
19	\$ 60.00	Australia					
20		Singapore					
21	\$ 40.00	China					
22		Malaysia					
23		India					

**Step 8:** In cell C11, enter the formula =C10\*\$A\$17. We are now calculating the hourly cost for the Quality Assurance person residing in Puerto Rico. Copy the formula to the right leveraging the cell handle until Column E.

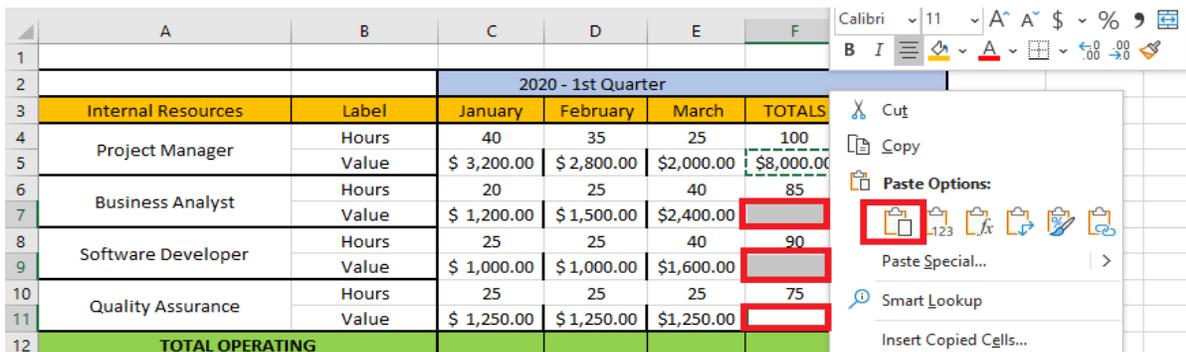
	A	B	C	D	E	F	G
1							
2			2020 - 1st Quarter				
3	Internal Resources	Label	January	February	March	TOTALS	Average
4	Project Manager	Hours	40	35	25	100	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00		
6	Business Analyst	Hours	20	25	40	85	
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00		
8	Software Developer	Hours	25	25	40	90	
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00		
10	Quality Assurance	Hours	25	25	25	75	
11		Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00		
12	TOTAL OPERATING						
13							
14	Rates	Country					
15	\$ 80.00	United States					
16		Canada					
17	\$ 50.00	Puerto Rico					
18		Mexico					

## Project 3 – Excel Math Functions

**Step 9:** In cell F5, enter the formula `=SUM(C5:E5)`. After doing this, right-click on cell F5 and select *Copy* from the shortcut menu.



**Step 10:** While holding the *CTRL* key, select cells F7, F9, and F11. Right-click on any of these cells and select the *Paste* option from the shortcut menu. You now have the total cost for each resource for 1<sup>st</sup> quarter-ending 2020.



**Step 11:** We now want to capture the average of both the hours worked and the cost of each resource in the 1<sup>st</sup> quarter of 2020. In cell G4 enter the following formula `=AVERAGE(C4:E4)`.

2020 - 1st Quarter						
Internal Resources	Label	January	February	March	TOTALS	Average
Project Manager	Hours	40	35	25	100	33.3333333
	Value	\$ 3,200.00	\$ 2,800.00	\$ 2,000.00	\$8,000.00	
Business Analyst	Hours	20	25	40	85	
	Value	\$ 1,200.00	\$ 1,500.00	\$ 2,400.00	\$5,100.00	
Software Developer	Hours	25	25	40	90	
	Value	\$ 1,000.00	\$ 1,000.00	\$ 1,600.00	\$3,600.00	
Quality Assurance	Hours	25	25	25	75	
	Value	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$3,750.00	
<b>TOTAL OPERATING</b>						

## Project 3 – Excel Math Functions

**Step 12:** We want to decrease the amount of decimal places to only 2 for cell G4. Select cell G4, then click on the *Decrease Decimal* icon within the *Number* group under the *Home* menu. You will notice that one decimal place disappeared. Continue to click on this icon until you only have 2 decimal places.

The screenshot shows the Excel Home ribbon with the 'Number' group selected. The 'Decrease Decimal' icon (a left-pointing arrow) is highlighted with a red box. The formula bar for cell G4 displays the formula `=AVERAGE(C4:E4)`.

	A	B	C	D	E	F	G	H
1								
2			2020 - 1st Quarter					
3	Internal Resources	Label	January	February	March	TOTALS	Average	
4		Hours	40	35	25	100	33.33	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$8,000.00		
6		Hours	20	25	40	85		
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$5,100.00		
8		Hours	25	25	40	90		
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$3,600.00		
10		Hours	25	25	25	75		
11		Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$3,750.00		
12	TOTAL OPERATING							

**Step 13:** Click on the cell handle for cell G4 and copy the average formula down the column until row 11.

The screenshot shows the same Excel spreadsheet as in Step 12, but now the average formula has been copied down to row 11. The values in column G are: 33.33, 2666.67, 28.33, 1700.00, 30.00, 1200.00, 25.00, and 1250.00.

	A	B	C	D	E	F	G	H
1								
2			2020 - 1st Quarter					
3	Internal Resources	Label	January	February	March	TOTALS	Average	
4		Hours	40	35	25	100	33.33	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$8,000.00	2666.67	
6		Hours	20	25	40	85	28.33	
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$5,100.00	1700.00	
8		Hours	25	25	40	90	30.00	
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$3,600.00	1200.00	
10		Hours	25	25	25	75	25.00	
11		Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$3,750.00	1250.00	
12	TOTAL OPERATING							

## Project 3 – Excel Math Functions

**Step 14:** While holding down the CTRL key, click on cells G5, G7, G9, and G11. Then, click on the *dollar icon* within the *Number* group on the *Home* menu. Now, all the cost values for the resources are in currency format.

2020 - 1st Quarter						
Internal Resources	Label	January	February	March	TOTALS	Average
Project Manager	Hours	40	35	25	100	33.33
	Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$8,000.00	\$ 2,666.67
Business Analyst	Hours	20	25	40	85	28.33
	Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$ 5,100.00	\$ 1,700.00
Software Developer	Hours	25	25	40	90	30.00
	Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$ 3,600.00	\$ 1,200.00
Quality Assurance	Hours	25	25	25	75	25.00
	Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$ 3,750.00	\$ 1,250.00
<b>TOTAL OPERATING</b>						

**Step 15:** In cell C12, enter the following formula `=SUM(C5, C7, C9, C11)`. Notice how the sum function also allows specific cells to be referenced in addition to cell ranges. Then, leveraging the cell handle, copy the formula to the right through Column G. In cell G12, you will now have the grand total of the resource cost for the 1<sup>st</sup> Quarter of 2020.

2020 - 1st Quarter						
Internal Resources	Label	January	February	March	TOTALS	Average
Project Manager	Hours	40	35	25	100	33.33
	Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$ 8,000.00	\$ 2,666.67
Business Analyst	Hours	20	25	40	85	28.33
	Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$ 5,100.00	\$ 1,700.00
Software Developer	Hours	25	25	40	90	30.00
	Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$ 3,600.00	\$ 1,200.00
Quality Assurance	Hours	25	25	25	75	25.00
	Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$ 3,750.00	\$ 1,250.00
<b>TOTAL OPERATING</b>		\$ 6,650.00	\$ 6,550.00	\$7,250.00	\$20,450.00	\$ 6,816.67

Project 3 – Excel Math Functions

**Step 16:** We will now work with the IF function to determine high cost resources. In cell H3 enter the column title of *High Cost*. In cell H5, enter the formula to determine resources costing more than \$7000: =IF(F5>7000, "Yes", "No")

The first parameter for the IF function above is the condition measuring if the total cost for the resource is greater than \$7000. The second parameter is the value returned if the condition is true and the third parameter is the value returned if the value is false.

	A	B	C	D	E	F	G	H
1								
2			2020 - 1st Quarter					
3	Internal Resources	Label	January	February	March	TOTALS	Average	High Cost
4	Project Manager	Hours	40	35	25	100	33.33	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$ 8,000.00	\$ 2,666.67	Yes
6	Business Analyst	Hours	20	25	40	85	28.33	
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$ 5,100.00	\$ 1,700.00	
8	Software Developer	Hours	25	25	40	90	30.00	
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$ 3,600.00	\$ 1,200.00	
10	Quality Assurance	Hours	25	25	25	75	25.00	
11		Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$ 3,750.00	\$ 1,250.00	
12	TOTAL OPERATING		\$ 6,650.00	\$ 6,550.00	\$7,250.00	\$20,450.00	\$ 6,816.67	

**Step 17:** Copy the formula in cell H5 into cells H7, H9, and H11. Leverage the same process to copy as in steps 9 and 10 previously mentioned in this document.

	A	B	C	D	E	F	G	H
1								
2			2020 - 1st Quarter					
3	Internal Resources	Label	January	February	March	TOTALS	Average	High Cost
4	Project Manager	Hours	40	35	25	100	33.33	
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$ 8,000.00	\$ 2,666.67	Yes
6	Business Analyst	Hours	20	25	40	85	28.33	
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$ 5,100.00	\$ 1,700.00	No
8	Software Developer	Hours	25	25	40	90	30.00	
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$ 3,600.00	\$ 1,200.00	No
10	Quality Assurance	Hours	25	25	25	75	25.00	
11		Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$ 3,750.00	\$ 1,250.00	No
12	TOTAL OPERATING		\$ 6,650.00	\$ 6,550.00	\$7,250.00	\$20,450.00	\$ 6,816.67	

## Project 3 – Excel Math Functions

**Step 18:** The next thing we'll do is to find resources who are either averaging 30 or more hours per week or more than a cost of \$2000. For this solution, we'll leverage the OR function.

- Firstly, type the column header *High Allocation* in cell I3. Then, in cell I5, type the following formula: `=OR(G4>=30, G5>2000)`. The two parameters are the conditions that are measured and if either is true, then true is returned. The only time False is returned if both conditions return False.
- Then, copy this formula into cells I7, I9, and I11.

	A	B	C	D	E	F	G	H	I
1									
2			2020 - 1st Quarter						
3	Internal Resources	Label	January	February	March	TOTALS	Average	High Cost	High Allocation
4	Project Manager	Hours	40	35	25	100	33.33		
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$ 8,000.00	\$ 2,666.67	Yes	TRUE
6	Business Analyst	Hours	20	25	40	85	28.33		
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$ 5,100.00	\$ 1,700.00	No	FALSE
8	Software Developer	Hours	25	25	40	90	30.00		
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$ 3,600.00	\$ 1,200.00	No	TRUE
10	Quality Assurance	Hours	25	25	25	75	25.00		
11		Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$ 3,750.00	\$ 1,250.00	No	FALSE
12	TOTAL OPERATING		\$ 6,650.00	\$ 6,550.00	\$7,250.00	\$20,450.00	\$ 6,816.67		

**Step 19:** Instead of just listing either *True* or *False* as the values, we'd like to have the user see either *Yes* or *No*. In cell I5, enter: `=IF(OR(G4>=30, G5>2000), "Yes", "No")`, then copy this formula to cells I7, I9, and I11.

	A	B	C	D	E	F	G	H	I
1									
2			2020 - 1st Quarter						
3	Internal Resources	Label	January	February	March	TOTALS	Average	High Cost	High Allocation
4	Project Manager	Hours	40	35	25	100	33.33		
5		Value	\$ 3,200.00	\$ 2,800.00	\$2,000.00	\$ 8,000.00	\$ 2,666.67	Yes	Yes
6	Business Analyst	Hours	20	25	40	85	28.33		
7		Value	\$ 1,200.00	\$ 1,500.00	\$2,400.00	\$ 5,100.00	\$ 1,700.00	No	No
8	Software Developer	Hours	25	25	40	90	30.00		
9		Value	\$ 1,000.00	\$ 1,000.00	\$1,600.00	\$ 3,600.00	\$ 1,200.00	No	Yes
10	Quality Assurance	Hours	25	25	25	75	25.00		
11		Value	\$ 1,250.00	\$ 1,250.00	\$1,250.00	\$ 3,750.00	\$ 1,250.00	No	No
12	TOTAL OPERATING		\$ 6,650.00	\$ 6,550.00	\$7,250.00	\$20,450.00	\$ 6,816.67		

### Project 3 – Excel Math Functions

**Step 20:** Next, we want to sum costs for resources that are above their average. Within cell J5, enter this formula: `=SUMIF(C5:E5,">"&G5)`. Then, copy this formula into cells J7, J9 and J11. Here, we only want to sum the cells in range C5 through E5 only if the cell value is greater than the average cost for each resource.

	A	B	C	D	E	F	G	H	I	J	
1											
2			2020 - 1st Quarter								
3	Internal Resources	Label	January	February	March	TOTALS	Average	High Cost	High Allocation	Above Avg	
4	Project Manager	Hours	40	35	25	100	33.33				
5		Value	\$ 3,200.00	\$ 2,800.00	\$ 2,000.00	\$ 8,000.00	\$ 2,666.67	Yes	Yes	\$ 6,000	
6	Business Analyst	Hours	20	25	40	85	28.33				
7		Value	\$ 1,200.00	\$ 1,500.00	\$ 2,400.00	\$ 5,100.00	\$ 1,700.00	No	No	\$ 2,400	
8	Software Developer	Hours	25	25	40	90	30.00				
9		Value	\$ 1,000.00	\$ 1,000.00	\$ 1,600.00	\$ 3,600.00	\$ 1,200.00	No	Yes	\$ 1,600	
10	Quality Assurance	Hours	25	25	25	75	25.00				
11		Value	\$ 1,250.00	\$ 1,250.00	\$ 1,250.00	\$ 3,750.00	\$ 1,250.00	No	No	\$ -	
12	TOTAL OPERATING		\$ 6,650.00	\$ 6,550.00	\$ 7,250.00	\$ 20,450.00	\$ 6,816.67				

**Step 21:** We want to find out the count of how many countries have hourly rate and how many countries are offering hourly rates above \$50 per hour. In cell F14, enter the following formula: `=COUNT(A15:A32)`.

	A	B	C	D	E	F
13						
14	Rates	Country		Country Count		6
15	\$ 80.00	United States				
16		Canada				
17	\$ 50.00	Puerto Rico				
18		Mexico				
19	\$ 60.00	Australia				
20		Singapore				
21	\$ 40.00	China				
22		Malaysia				
23		India				
24	\$ 90.00	Switzerland				
25		Norway				
26		Netherlands				
27		France				
28		Belgium				
29		Spain				
30		Germany				
31	United Kingdom					
32	\$ 70.00	Czech Republic				
33		Hungary				
34		Romania				

Project 3 – Excel Math Functions

**Step 22:** Next, in cell F15, enter the following formula =COUNTIF(A15:A32, ">50"). You now get the count of countries paying over \$50 per hour. Here, we will only count the cells noted in the above range only if the specific cell value is greater than \$50 per hour.

	A	B	C	D	E	F
13						
14	<b>Rates</b>	<b>Country</b>		Country Count		6
15	\$ 80.00	United States		Countries over \$50:		4
16		Canada				
17	\$ 50.00	Puerto Rico				
18		Mexico				
19	\$ 60.00	Australia				
20		Singapore				
21		China				
22	\$ 40.00	Malaysia				
23		India				
24		Switzerland				
25		Norway				
26		Netherlands				
27	\$ 90.00	France				
28		Belgium				
29		Spain				
30		Germany				
31		United Kingdom				
32		Czech Republic				
33	\$ 70.00	Hungary				
34		Romania				

### Project 3 – Excel Math Functions

Now, we will leverage a business case Excel sheet to discuss the Net Present Value (NPV) and Internal Rate of Return (IRR) functions. Below, we will have a discussion about the spreadsheet first before getting into the mechanics of NPV and IRR. You can find this spreadsheet at my website here: [www.DanRiveraPMP.com/ms-excel-for-project-managers](http://www.DanRiveraPMP.com/ms-excel-for-project-managers)

	A	B	C	D	E	F	G	H	I	J	K
1	<b>Investments</b>			<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>Total</b>	
2	<b>Capital</b>										
3		Hardware Purchase		\$ 100,000	\$ 100,000					\$ 200,000	
4		Software Purchase		\$ 100,000	\$ 100,000					\$ 200,000	
5		Software License		\$ 50,000	\$ 50,000					\$ 100,000	
6		Vendor Labor		\$ 125,000	\$ 125,000					\$ 250,000	
7		Internal Labor		\$ 125,000	\$ 125,000					\$ 250,000	
8	<b>Total Investment</b>			<b>\$ 500,000</b>	<b>\$ 500,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,000,000</b>	<b>A</b>
9	<b>Operating</b>										
11		Annual Software License				\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 4,000	
12		Project Internal Labor		\$ 50,000	\$ 50,000					\$ 100,000	
13		Time & Expense		\$ 10,000	\$ 10,000					\$ 20,000	
14		Support Internal Labor				\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 60,000	
15	<b>Total Operating</b>			<b>\$ 60,000</b>	<b>\$ 60,000</b>	<b>\$ 16,000</b>	<b>\$ 16,000</b>	<b>\$ 16,000</b>	<b>\$ 16,000</b>	<b>\$ 184,000</b>	<b>B</b>
16	<b>Benefits</b>										
18		Spend Reduction			\$1,630,000	\$2,200,000	\$2,200,000	\$2,200,000	\$2,200,000	\$ 10,430,000	
19		Increased Sales									
20	<b>Total Benefits</b>			<b>\$ -</b>	<b>\$1,630,000</b>	<b>\$2,200,000</b>	<b>\$2,200,000</b>	<b>\$2,200,000</b>	<b>\$2,200,000</b>	<b>\$ 10,430,000</b>	<b>C</b>
21	<b>Cash Impact</b>			<b>\$(560,000)</b>	<b>\$1,070,000</b>	<b>\$2,184,000</b>	<b>\$2,184,000</b>	<b>\$2,184,000</b>	<b>\$2,184,000</b>	<b>\$ 9,246,000</b>	<b>D</b>

In the above spreadsheet, we have the projections of our IT project through 2025. There will be project costs that will be captured by the Capital and Operating portions of the above sheet. In this case, the Benefits section details the savings from spending reduction every year from 2021 through 2025. This spend reduction will come from the decommissioning of old systems and the savings from software licenses and the contractors that supported those old systems.

The Cash Impact line item (D) represents the Total Benefits (C) minus the Capital Investments (A) and the Operating Investments (B). We will leverage this line item to compute the IRR and NPV for our exercise.

## Project 3 – Excel Math Functions

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1			<b>Investments</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>Total</b>					
2			<b>Capital</b>										IRR		
3			Hardware Purchase	\$ 100,000	\$ 100,000					\$ 200,000			NPV		
4			Software Purchase	\$ 100,000	\$ 100,000					\$ 200,000			Expected Rate of Return		
5			Software License	\$ 50,000	\$ 50,000					\$ 100,000					
6			Vendor Labor	\$ 125,000	\$ 125,000					\$ 250,000					
7			Internal Labor	\$ 125,000	\$ 125,000					\$ 250,000					
8			<b>Total Investment</b>	<b>\$ 500,000</b>	<b>\$ 500,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,000,000</b>					
9															
10			<b>Operating</b>												
11			Annual Software License			\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 4,000					
12			Project Internal Labor	\$ 50,000	\$ 50,000					\$ 100,000					
13			Time & Expense	\$ 10,000	\$ 10,000					\$ 20,000					
14			Support Internal Labor			\$ 15,000	\$ 15,000	\$ 15,000	\$ 15,000	\$ 60,000					
15			<b>Total Operating</b>	<b>\$ 60,000</b>	<b>\$ 60,000</b>	<b>\$ 16,000</b>	<b>\$ 16,000</b>	<b>\$ 16,000</b>	<b>\$ 16,000</b>	<b>\$ 184,000</b>					
16															
17			<b>Benefits</b>												
18			Spend Reduction		\$ 1,630,000	\$ 2,200,000	\$ 2,200,000	\$ 2,200,000	\$ 2,200,000	\$ 10,430,000					
19			Increased Sales												
20			<b>Total Benefits</b>	<b>\$ -</b>	<b>\$ 1,630,000</b>	<b>\$ 2,200,000</b>	<b>\$ 2,200,000</b>	<b>\$ 2,200,000</b>	<b>\$ 2,200,000</b>	<b>\$ 10,430,000</b>					
21															
22			<b>Cash Impact</b>	<b>\$(560,000)</b>	<b>\$ 1,070,000</b>	<b>\$ 2,184,000</b>	<b>\$ 2,184,000</b>	<b>\$ 2,184,000</b>	<b>\$ 2,184,000</b>	<b>\$ 9,246,000</b>					

**Step 23:** In Column M, enter the parameters specified in the above image:

- *IRR* in cell M2
- *NPV* in cell M3
- *Expected Rate of Return* in cell M4

**Step 24:** In cell L2, enter this formula for IRR: `=IRR(D22:I22)`.

	L	M	N	O
1				
2	248%	IRR		
3		NPV		
4		Expected Rate of Return		

**Step 25:** In cell L4 enter *0.1* so that we are defining a 10% rate of return. Reformat this cell so that it appears as a percentage.

The screenshot shows the Excel Home ribbon with the Number group selected. The percentage symbol (%) is highlighted with a red box. Below the ribbon, the formula bar shows the value '0.1' and the spreadsheet grid shows cell L4 containing '0.1'.

## Project 3 – Excel Math Functions

**Step 26:** In cell L23, enter the formula for NPV: `=NPV($L$4, D22:I22)`

	L	M	N	O
1				
2	248%	IRR		
3	\$6,096,683	NPV		
4	0.1	Expected Rate of Return		

That's going to do it for this project 3. If you have any questions or comments you'd like to leave me, please do so at: [www.DanRiveraPMP.com/ms-excel-for-project-managers](http://www.DanRiveraPMP.com/ms-excel-for-project-managers).

Leverage the contact form at the bottom of the page to reach out to me.

Within the above noted webpage, I've also included an expanded discussion about Net Present Value (NPV) as well as the Internal Rate of Return (IRR).

Thanks and continue to stay safe!