The Internal Rate of Return

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The Internal Rate of Return

- The internal rate of return takes the time value of money into account.
- With internal rate of return a new term comes into play – Threshold.
- Threshold, if you do not earn more than threshold, you do not cross the doorway into the proposal.
- The internal rate of return is the threshold.

The Internal Rate of Return

- This is the setup for this presentation.
- “Intense” so we can have irregular cash flows.

Setup information:	
Historic cost of the machine:	$850,000.00
Estimated residual or salvage value:	$25,000.00
Expected useful life of the machine:	10
Year 1 expected sales revenues from machine:	$345,000.00
Year 2 expected sales revenues from machine:	$350,000.00
Year 3 expected sales revenues from machine:	$355,000.00
Year 4 expected sales revenues from machine:	$355,000.00
Year 5 expected sales revenues from machine:	$350,000.00
Year 6 expected sales revenues from machine:	$350,000.00
Year 7 expected sales revenues from machine:	$345,000.00
Year 8 expected sales revenues from machine:	$345,000.00
Year 9 expected sales revenues from machine:	$330,000.00
Year 10 expected sales revenues from machine:	$310,000.00
Cost of goods sold as a percentage of sales:	65.00%
Required internal rate of return / threshold:	15.00%

The Internal Rate of Return

- The first step, since we are dealing with net cash inflows from operations, is to compute the straight-line annual depreciation.

Calculation of annual, straight-line depreciation:	
Historic cost of the machine:	$850,000.00
Estimated residual or salvage value:	25,000.00
Depreciable value:	$825,000.00
Expected useful life of the machine:	10
Annual straight-line depreciation expense:	$82,500.00

The Internal Rate of Return

- The second step is to compute the estimated cash inflows from this machine.
- This is Sales Revenues less Cost of Goods Sold ***PLUS*** Annual Depreciation.

			Annual Cost of Goods Sold:	Annual Depreciation Expense:	Annual Cash Inflows:
Historic cost of the machine:		($850,000.00)			($850,000.00)
Years and expected sales revenues from machine:	1	$345,000.00	$224,250.00	$82,500.00	$203,250.00
	2	350,000.00	227,500.00	82,500.00	205,000.00
	3	355,000.00	230,750.00	82,500.00	206,750.00
	4	355,000.00	230,750.00	82,500.00	206,750.00
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	7	345,000.00	224,250.00	82,500.00	203,250.00
	8	345,000.00	224,250.00	82,500.00	203,250.00
	9	330,000.00	214,500.00	82,500.00	198,000.00
	10	310,000.00	201,500.00	82,500.00	191,000.00

The Internal Rate of Return

- In a manufacturing process depreciation is part of cost of goods manufactured and therefore part of cost of goods sold.

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The Internal Rate of Return

- In our efforts to attain cash flows related to our proposal we need to add the non-cash depreciation expense back into gross profit / contribution margin to get cash inflows.

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		Microsoft Excel IRR formula results:			20.19%

The Internal Rate of Return

- At the bottom of the last column I have the internal rate of return, IRR, formula for the year.

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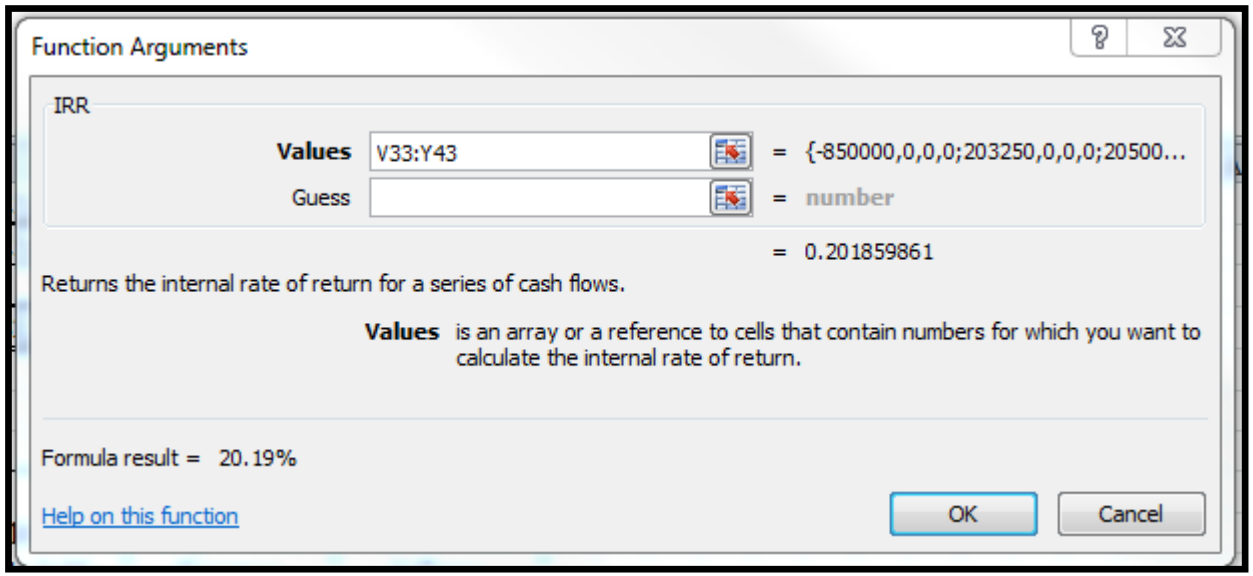
The Internal Rate of Return

- This is the dialog box for the formula.
- The requirement by Microsoft Excel is that the first value be negative if the remaining values are positive.

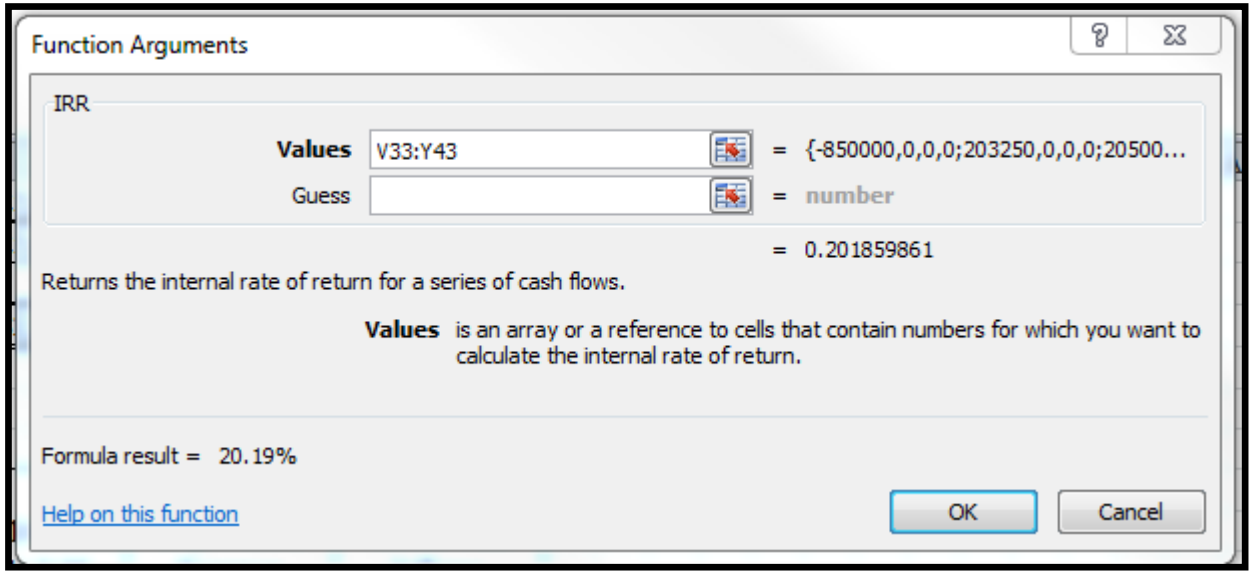


The Internal Rate of Return

- The Microsoft Excel formula to manually enter it would be

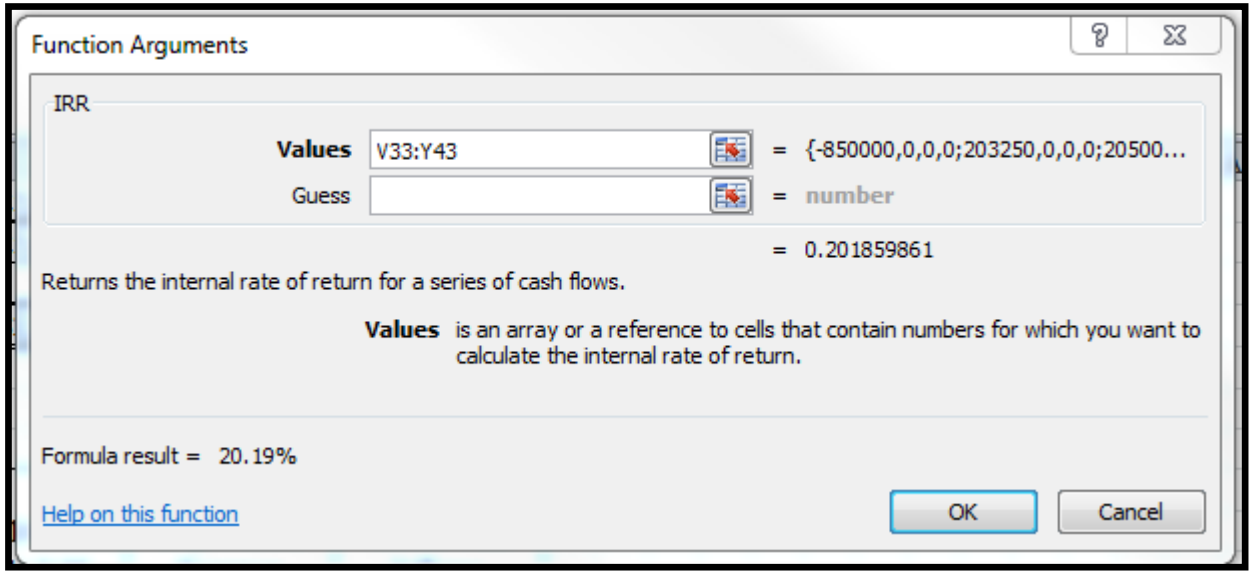
=IRR(V33:Y43)

- The Guess field is not usually required.



The Internal Rate of Return

- Microsoft Excel is going to provide an early look at the answer, “0.2018959861” as you enter the formula.
- You can format the receiving cell to percentages.



The Internal Rate of Return

- Microsoft Excel computed the IRR for our cash inflows as 20.19%.
- Our internal rate of return threshold is 15%.

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The Internal Rate of Return

- Utilizing tools such as Microsoft Excel eases the task of accountants and analysts significantly.

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- When presenting the information, try for clarity and completeness without confusion.
- For a meeting I would probably round this to whole dollars.

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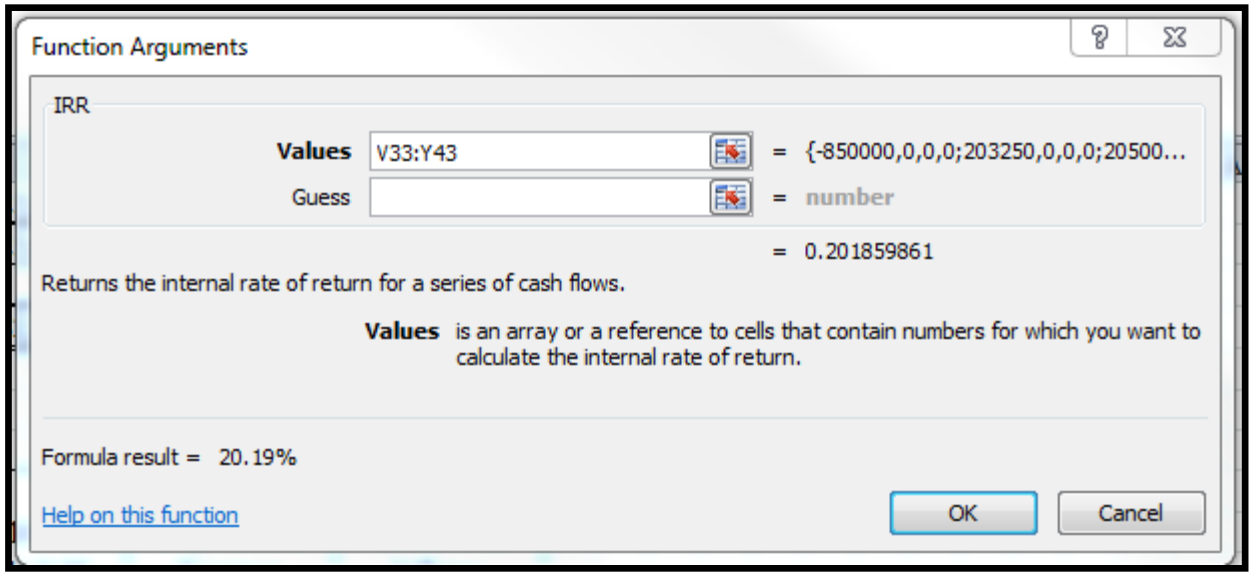
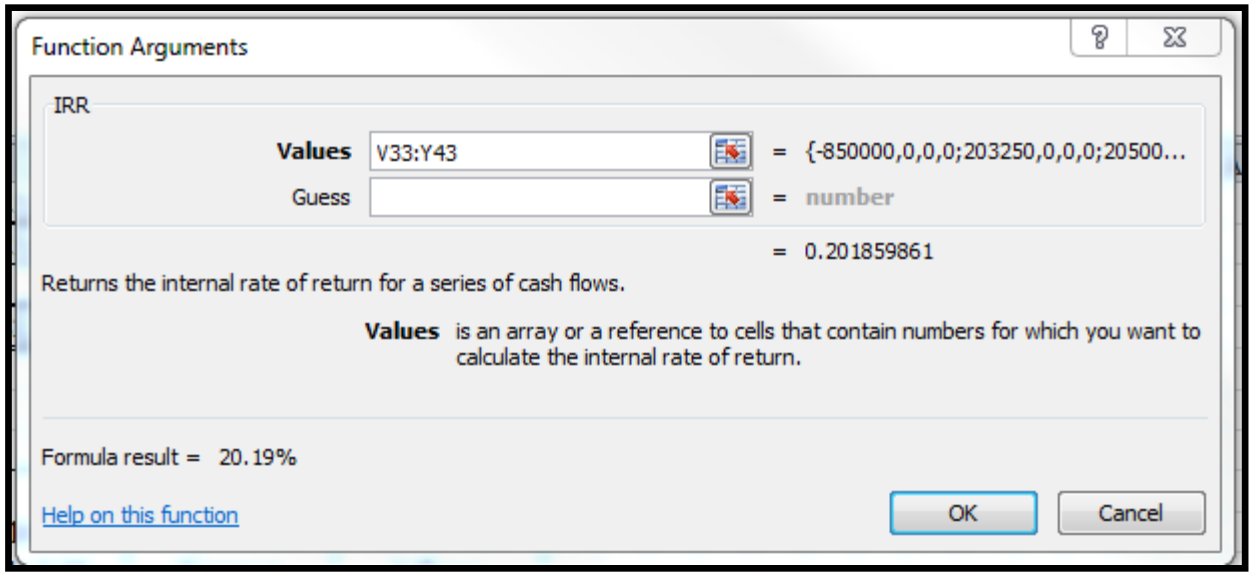
- Microsoft Excel's formulas work flawless usually and there is a "Help on this function" option on lower left corner the dialog box of most formula.



The Internal Rate of Return

- Most of these help screens are clear, accurate, and can be copied onto your Microsoft Excel template.



The Internal Rate of Return

- On the Microsoft Excel IRR help function screen Microsoft correctly states IRR works on cash inflows.

IRR function

This article describes the formula syntax and usage of the **IRR**function in Microsoft Excel.

Description

Returns the internal rate of return for a series of cash flows represented by the numbers in values. These cash flows do not have to be even, as they would be for an annuity. However, the cash flows must occur at regular intervals, such as monthly or annually. The internal rate of return is the interest rate received for an investment consisting of payments (negative values) and income (positive values) that occur at regular periods.

The Internal Rate of Return

- Further in the Microsoft Excel IRR help function screen Microsoft states Net income incorrectly.

-70,000	Initial cost of a business
12,000	Net income for the first year
15,000	Net income for the second year
18,000	Net income for the third year
21,000	Net income for the fourth year
26,000	Net income for the fifth year

The Internal Rate of Return

- Accounting is a science of consistency.
- Common sense and logic must be applied at all times.
- Here is an example of a very powerful and valuable tool with a simple typo that will change your results significantly.
- When Net Income is used the answer is 39.53%.

The Internal Rate of Return

- Learn to read what is there, not what you think is there.
- Apply logic and look for conflicts.
- Within managerial accounting, if you want IRR to work on net income, it will not violate any laws, it simply will not be consistent with the profession.

The Internal Rate of Return

The end.