



*How did you ever do without it?*

- from the first VisiCalc ad, 1979



# Accountant's Paper Ledger

2-Dimensional representation of accounting data

		Initials Date						
		Prepared by:						
		Approved by:						
		1	2	3	4	5	6	
1	UNIT PRICE							1
2	UNIT SALES		1 2 0 0					2
3	GROSS PROFIT		24 0 0 0					3
4								4
5	EXPENSES							5
6	PRODUCTION		10 0 0 0					6
7	DISTRIBUTION		1 2 0 0					7
8	MARKETING		5 0 0 0					8
9	OVERHEAD		3 0 0 0					9
10	TOTAL EXPENSES		19 2 0 0					10
11								11
12	NET PROFIT		4 8 0 0					12



# Spreadsheet Cells

- Worksheets are 2-dimensional arrays of cells.
- Each cell is referred to by its **cell reference**.
  - Examples: A1, E10, AZ1024
- Cells can be grouped as a **range**.
  - Examples: A1 : E10, C5 : Q8



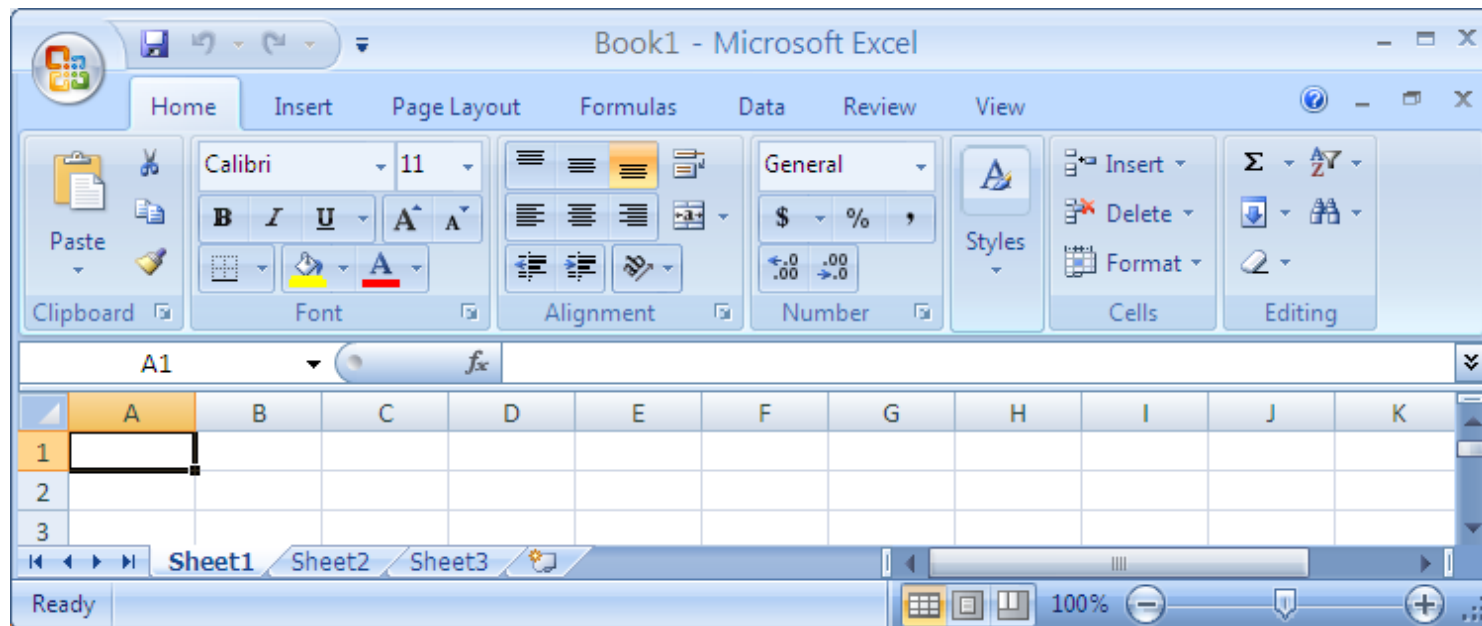
# Spreadsheet Values

- Constants/literals
  - numbers, text labels, etc.
- Formulas (always begins with an =) and can contain: cells, numbers, arithmetic, functions.  
$$=A7 + AVERAGE(E4:E10)$$
- Worksheet contents are updated in real time.
  - i.e., when you change a cell, all other cells that *depend* on it are updated.
- Select the cell where you want the results to be.



# Let's Make a Simple Budget

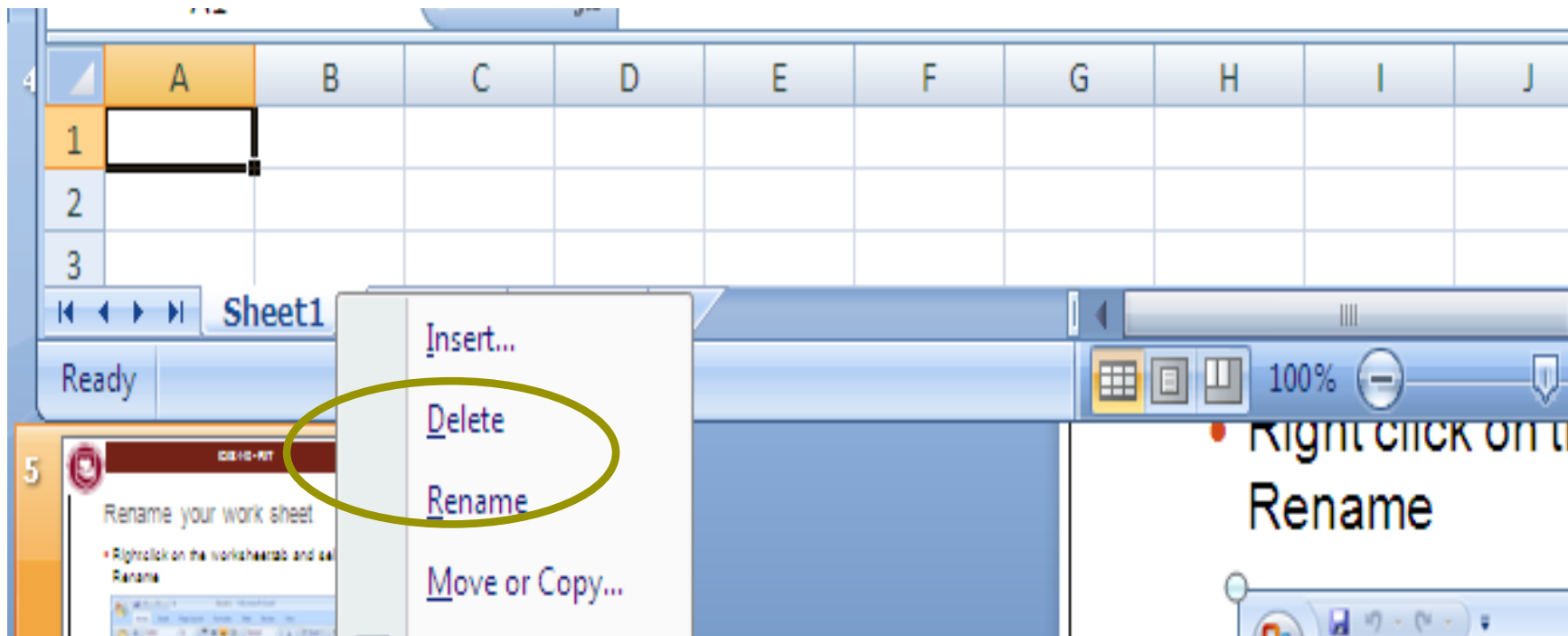
- Worksheets are saved together in a single file called a workbook.





# Rename your worksheet

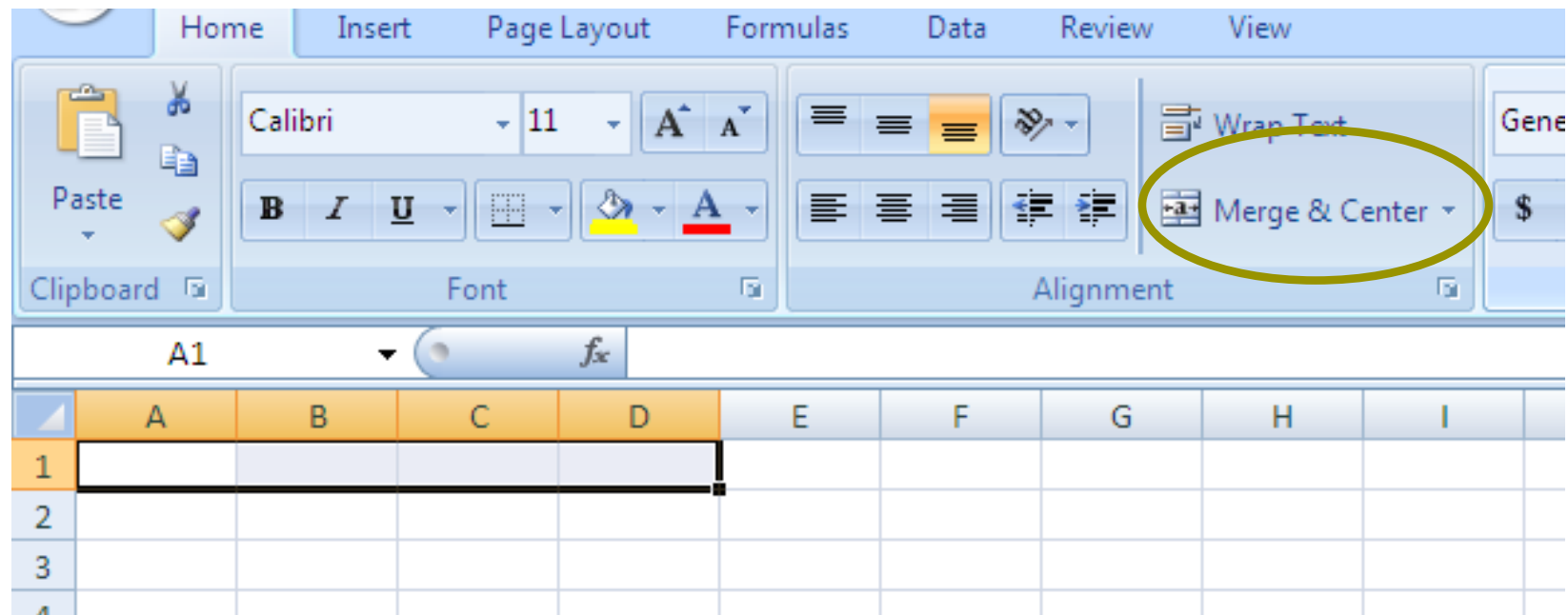
- Right click on the worksheet tab and select Rename. Then key in the new name “Budget”





# Add a header

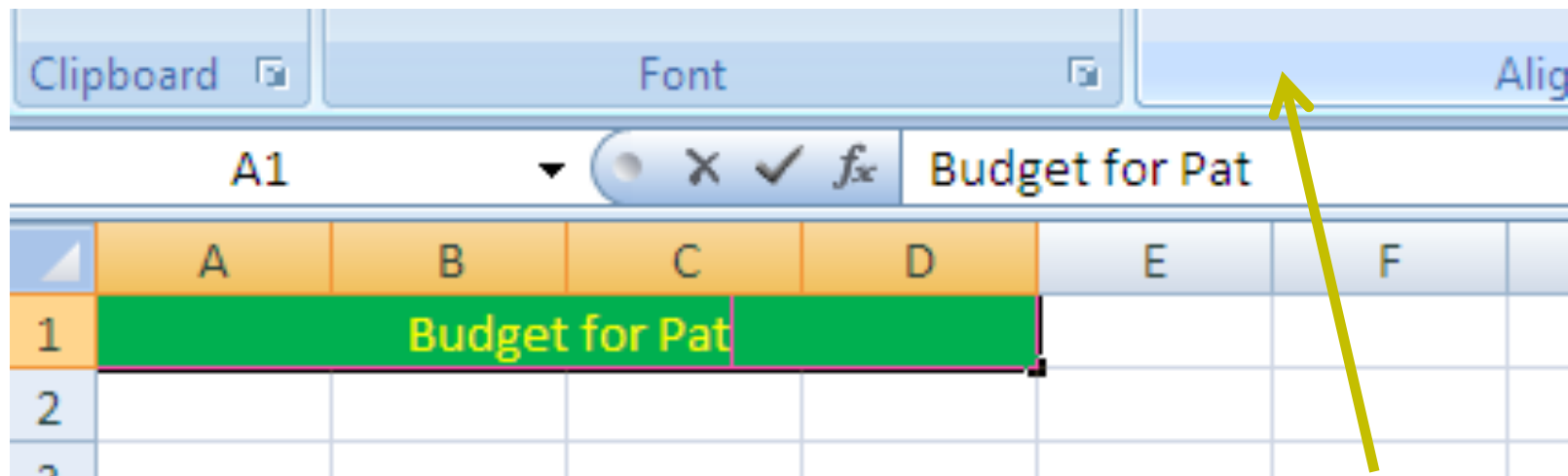
- Go to cell A1, hold down your left mouse button and “drag” it four cells across. Then, click on the merge and center tool.





# Some more formatting....

- With the new “single” cell, key in the header. Type in “Budget for Pat” (use your name instead of Pat) Use the standard MS Office tools for background colors.



\*Note: as you type, the “value” for the cell shows in the edit bar, too.





# Stretch out the width

- Move your mouse to the position between column A and B until it turns into a double arrow. Press your left mouse button and drag it to the right to widen column A. Do this for the remaining three columns.

	A	B	C	D
1	Budget for Pat			
2				
3				
4				
5				



# More setup

You know enough to add more. Modify the spreadsheet to look similar to the following (don't forget to use the merge and center tool when needed)

	A	B	C	D	E
1	Budget for Pat				
2	Income		Expenses		
3	Paycheck	500	Rent	300	BONUS RATE
4	Magazine article	100	Food	150	0.05
5	Allowance	10	Movies	20	
6	Bonus				
7					
8					
9	Totals				
10					
11	Monthly Surplus				



# Formatting

- We want to make sure that the numbers look appropriate. We want dollar signs and percent signs. So, click on column B. After it highlights, right click and choose **Format Cells**
- You will see a dialog box show up. Click on the **Number** tab. Then click on the option to format the numbers as currency. Then click on Okay.

Format Cells

Number Alignment Font Border Fill Protection

Category:

- General
- Number
- Currency
- Accounting
- Date
- Time
- Percentage
- Fraction
- Scientific
- Text
- Special
- Custom

Sample: \$500.00

Decimal places: 2

Symbol: \$

Negative numbers:

- \$1,234.10
- \$1,234.10
- (\$1,234.10)
- (\$1,234.10)

OK Cancel

Formatting, gives you this result.

	A	B	C	D	E
1	Budget for Pat				
2	Income		Expenses		
3	Paycheck	\$500.00	Rent	300	BONUS RATE
4	Magazine article	\$100.00	Food	150	0.05
5	Allowance	\$10.00	Movies	20	
6	Bonus				
7					
8					
9	Totals				
10					
11	Monthly Surplus				



# More formatting

- Do the same thing for column D.
- Then right click on cell with the Bonus rate (it has .05 in it), and choose Format cells. This time, select Percent in the number tab.

	A	B	C	D	E
	Budget for Pat				
	Income		Expenses		
	Paycheck	\$500.00	Rent	\$300.00	<b>BONUS RATE</b>
	Magazine article	\$100.00	Food	\$150.00	5.00%
	Allowance	\$10.00	Movies	\$20.00	
	Bonus				
	Totals				
0					
1	Monthly Surplus				



# Create totals

- Click on the cell next to “Totals”. In the far right hand corner, you will see an Sigma sign. Click on that, and you will see that cell filled in with a formula.

The screenshot shows the Microsoft Excel interface. The ribbon is set to the 'Formulas' tab, and the 'AutoSum' button (Sigma sign) is circled in yellow. A yellow arrow points from the Sigma sign to the 'Totals' cell in the spreadsheet. The spreadsheet shows a budget for Pat with income and expenses, and a formula bar displaying '=SUM(B3:B8)'.

Budget for Pat					
Income		Expenses		BONUS RATE	
check	\$500.00	Rent	\$300.00	5.00%	
magazine article	\$100.00	Food	\$150.00		
allowance	\$10.00	Movies	\$20.00		
Totals					

Formula bar: `=SUM(B3:B8)`

Tooltip: `SUM(number1, [number2], ...)`



# Try it yourself

- Hit the enter key -- a total should appear.
- Now do the same thing for the Expenses column.

	A	B	C	D	E
1	Budget for Pat				
2	Income		Expenses		
3	Paycheck	\$500.00	Rent	\$300.00	BONUS RATE
4	Magazine article	\$100.00	Food	\$150.00	5.00%
5	Allowance	\$10.00	Movies	\$20.00	
6	Bonus				
7					
8					
9	Totals	\$610.00		=SUM(D3:D8)	
10					
11	Monthly Surplus				
12					



# Set the bonus

- Enter the following in the cell next to Bonus:  
$$=B3 * \$E\$4$$
- You will see this is the Paycheck times the percentage bonus.
- The dollar signs ensure that we always refer to just cell E4.
- See the next slide for the example.



	A	B	C	D	E	F
1	Budget for Pat					
2	Income		Expenses			
3	Paycheck	\$500.00	Rent	\$300.00	BONUS RATE	
4	Magazine article	\$100.00	Food	\$150.00	5.00%	
5	Allowance	\$10.00	Movies	\$20.00		
6	Bonus	=B3*E4				
7						
8						
9	Totals	\$610.00		\$470.00		

After hitting enter, you should see....  
and notice the Totals for Income!

	A	B	C	D	E
1	Budget for Pat				
2	Income		Expenses		
3	Paycheck	\$500.00	Rent	\$300.00	BONUS RATE
4	Magazine article	\$100.00	Food	\$150.00	5.00%
5	Allowance	\$10.00	Movies	\$20.00	
6	Bonus	\$25.00			
7					
8					
9	Totals	\$635.00		\$470.00	
10					



# Now set up the bottom line

- Click on the cell next to Monthly Surplus and enter the following: =B9-D9 (or whatever is appropriate for the totals for income and expenses)


	A	B	C	D	E
1	Budget for Pat				
2	Income		Expenses		
3	Paycheck	\$500.00	Rent	\$300.00	BONUS RATE
4	Magazine article	\$100.00	Food	\$150.00	5.00%
5	Allowance	\$10.00	Movies	\$20.00	
6	Bonus	\$25.00			
7					
8					
9	Totals	\$635.00		\$470.00	
10					
11	Monthly Surplus	=B9-D9			
12					



# After you hit enter....

	A	B	C	D	E
1	Budget for Pat				
2	Income		Expenses		
3	Paycheck	\$500.00	Rent	\$300.00	BONUS RATE
4	Magazine article	\$100.00	Food	\$150.00	5.00%
5	Allowance	\$10.00	Movies	\$20.00	
6	Bonus	\$25.00			
7					
8					
9	Totals	\$635.00		\$470.00	
10					
11	Monthly Surplus	\$165.00			
12					
13					

AND

 =A14+(A14\*E4)

	A	B	C	D	E
2	Income		Expenses		
3	Paycheck	\$500.00	Rent	\$300.00	BONUS RATE
4	Magazine article	\$100.00	Food	\$150.00	5.00%
5	Allowance	\$10.00	Movies	\$20.00	
6	Bonus	\$25.00			
7					
8					
9	Totals	\$635.00		\$470.00	
10					
11	Monthly Surplus	\$165.00			
12					
13	Sample	Return with Bonus			
14	\$1,000.00	=A14+(A14*E4)			
15					



# Copying a formula...

- Add three more lines under “Sample” for 2000, 3000 and 4000
- Copy the formula in the cells next those new entries under the “Return with Bonus”
- You will notice something doesn’t look right.



The formula here is  $=A14+(A14*E4)$

12			
13	Sample		Return with Bonus
14		\$1,000.00	\$1,050.00
15		\$2,000.00	\$2,000.00
16		\$3,000.00	\$3,000.00
17		\$4,000.00	\$4,000.00
18			

The formula here is :  $=A17+(A17*E7)$



# Go back and ...

- Change the original formula to  
 $=A14+(A14 * \$E\$4)$
- Then copy and watch the difference.
- Note: The \$ sign on the reference to the BONUS figure forces each copy not to change the cell address reference (this is an absolute reference)



# Formula Gotchas

- The location of a formula is *not* in the formula.
  - select cell H17 and put a formula in it: you will not (and must not) have H17 in the formula.
- A formula starts with =
  - a space before it means it isn't a formula, just the characters " =".
  - no other =s in the formula
  - after the =, you can have spaces, functions, cell references, parentheses, etc.





# Formula Gotchas (continued)

- You should rarely have numbers in a formula
  - if you need to multiply by a number, put the value in a cell and reference it.
- A cell reference in a formula is relative and will change if you move/copy the formula.
  - Suppose you have a formula in C7 that references D4: D4 really means one column to the right and 3 rows up.
  - If you always want D4, write \$D\$4.



# Relative/Absolute Addressing

- Syntax:
  - Relative address: **A1**
  - Absolute address: **\$A\$1**
- When a formula is copied:
  - **relative addresses** are modified automatically
  - **absolute addresses** are **not** modified: they *always* refer to the same cell
- Use the F4 key to convert an address



# Spreadsheet Issues

- Powerful tools can create powerful problems.
- How to find bugs?
- “Garbage in, garbage out.”
- And, “Good stuff in, garbage processing, garbage out.”



# Technology and Humanity

- Working with technology can be dehumanizing.
  - Use it, but don't be used by it.
  - “Have dominion over it.”