



IN THE NAME OF ALLAH, MOST GRACIOUS,  
MOST MERCIFUL



COMPUTER APPLICATIONS  
**MS<sup>®</sup> EXCEL FOR ENGINEERS**



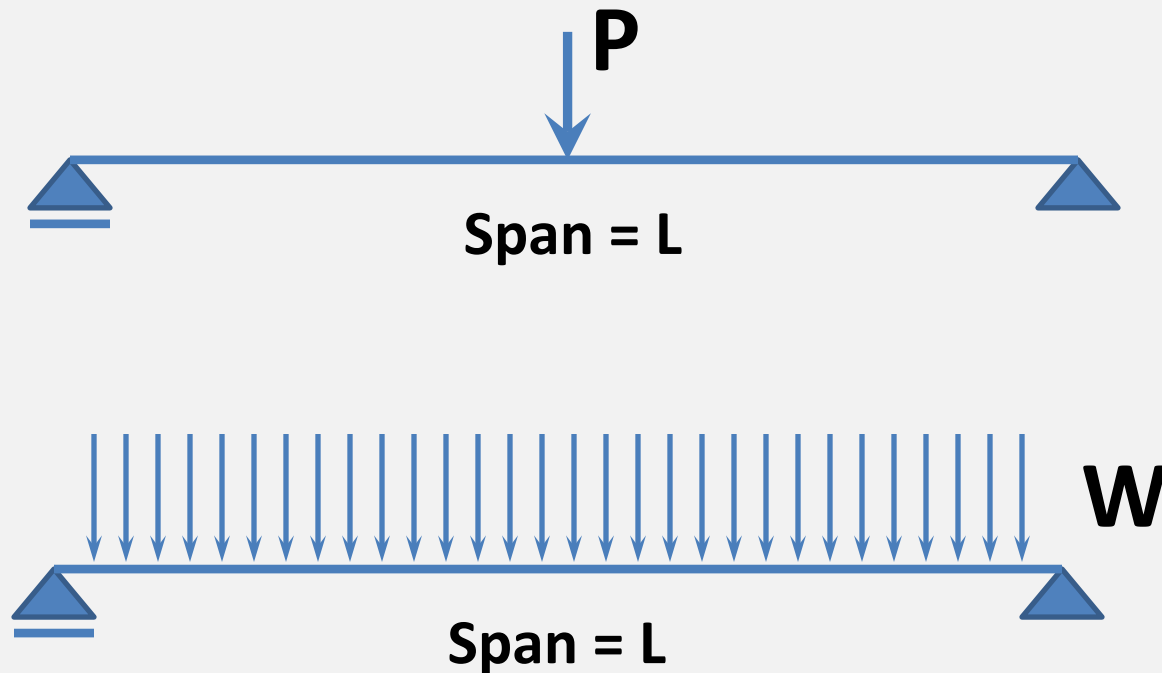
LECTURE 3  
**USING EXCEL FORMULA**

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# TARGET APPLICATION

- We need to calculate reactions, maximum bending moment, and deflection of the below simply supported beam





- **Operators in Excel**
  - **Arithmetic operators:** to combine numerical values to produce a numerical value.
  - **String operator:** to combine two strings.
  - **Logical operators:** to compare one operand with another, resulting in a condition that is either true or false.



- **Arithmetic operators**

<i>Operators</i>	<i>Purpose</i>	<i>Example</i>
<b>+</b>	<b>Addition</b>	<b>A1+B1</b>
<b>-</b>	<b>Subtraction</b>	<b>A1-B1</b>
<b>*</b>	<b>Multiplication</b>	<b>A1*B1</b>
<b>/</b>	<b>Division</b>	<b>A1/B1</b>
<b>^</b>	<b>Exponentiation</b>	<b>A1^3</b>
<b>%</b>	<b>Percentage (divide by 100)</b>	<b>A1%</b>



- **String operator**

*Operators*

**&**

*Purpose*

**Combine 2 strings**

*Example*

**A1&B1**

- **Logical operators**

*Operators*

**>**

**Greater than**

**C1 > 100**

**>=**

**Greater than or equal**

**C1 >= 100**

**<**

**Less than**

**C1 < 100**

**<=**

**Less than or equal**

**C1 <= 100**

**=**

**Equal**

**C1 = C2**

**<>**

**Not equal**

**C1 <> C2**



- Operator Precedence**

## *Operator Precedence*

**1**

## *Operators*

**Percentage (%)**

**2**

**Exponentiation (^)**

**3**

**Multiplication and division (\* and /)**

**4**

**Addition and subtraction (+ and -)**

**5**

**Combining (&)**

**6**

**Comparisons (>, >=, <, <=, =, <>)**

- Cell Reference
  - *Relative Reference*

C2		fx		=A2+B2	
	A	B	C	D	
1	Value 1	Value 2	Sum		
2	84	35	119		
3					

Copy and Paste →

F4		fx		=D4+E4			
	A	B	C	D	E	F	G
1	Value 1	Value 2	Sum				
2	84	35	119				
3			0				
4						0	
5							
6							

- *Absolute Reference*

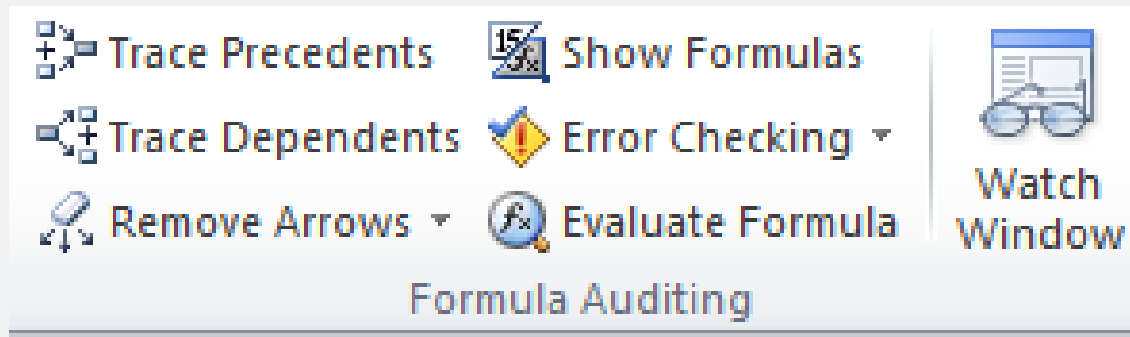
C2		fx		=A2+B2	
	A	B	C	D	
1	Value 1	Value 2	Sum		
2	84	35	119		
3					

Copy and Paste →

E5		fx		= \$A\$2+\$B\$2		
	A	B	C	D	E	F
1	Value 1	Value 2	Sum			
2	84	35	119			119
3			119			
4			119			119
5			119	119	119	
6			119			
7			119			



- **Formula Auditing**



- *Trace Precedents*

	A	B	C	D
	<b>Input Parameters</b>			
		Load =	100 kN	
		Span =	6 m	
		E =	210000000 kN/m <sup>2</sup>	
		I =	0.0000025 m <sup>4</sup>	
	<b>Output</b>			
		Reaction	50 kN	
		Moment	150 kN.m	
		Deflection	0.8571429 m	



- **Formula Auditing**
  - *Trace Dependents*

	A	B	C	D	
1	<b>Input Parameters</b>				
2		Load =	100 kN		
3		Span =	6 m		
4		E =	210000000 kN/m <sup>2</sup>		
5		I =	0.0000025 m <sup>4</sup>		
6					
7	<b>Output</b>				
8		Reaction	50 kN		
9		Moment	150 kN.m		
10		Deflection	0.8571429 m		
11					



- **Formula Auditing**
  - *Show Formula*

	A	B	C	D
1	<b>Input Parameters</b>			
2		Load =	100	kN
3		Span =	6	m
4		E =	210000000	kN/m <sup>2</sup>
5		I =	0.0000025	m <sup>4</sup>
6				
7	<b>Output</b>			
8		Reaction	=C2/2	kN
9		Moment	=C2*C3/4	kN.m
10		Deflection	=C2*C3^3/(48*C4*C5)	m
11				

- **Formula Auditing**
  - *Error Checking*

	A	B	C	D	E	F	G
1		Units Sold	Price	Sales	Cost Per Item	Overhead	Profit
2	Item 1	400	4.99	#NAME?	2.5	20	#NAME?
3	Item 2	356	6.5	2314	3	30	1216
4	Item 3	25	199.99	4999.75	120	100	1899.75
5	Item 4	780	2.99	2332.2	1.8	60	868.2
6	Item 5	23	600	13800	300	120	6780

**Error Checking**

Error in cell D2  
=B\*C2

Invalid Name Error  
The formula contains unrecognized text.

Options...

Help on this error

Show Calculation Steps...

Ignore Error

Edit in Formula Bar

Previous

Next

- **Formula Auditing**
  - *Evaluate Formula*

The screenshot shows the Microsoft Excel interface with the 'Evaluate Formula' dialog box open. The dialog box displays the following information:

Reference:	Evaluation:
Sheet1!\$G\$2	= D2-(B2*E2+F2)

Below the dialog box, a portion of the Excel spreadsheet is visible, showing a table with the following data:

Overhead	Profit
20	976
30	1216
100	1899.75
60	868.2

The 'Evaluate' button in the dialog box is highlighted, indicating the current step in the formula auditing process.

- **Formula Auditing**
  - *Watch Window*

Watch Window

Book	Sheet	Name	Cell	Value	Formula
sales s...	Sheet1		G2	\$976.00	=D2-(B2*E2+F2)



- **Formula Errors Debugging**

- *Division by Zero*

	A	B	C	D
1	100			
2	200		#DIV/0!	
3	300			

Formula bar: C2 =A2/B2

- *Value is too large for cell width*

D	E	F
#####		

Formula bar: 9999999999999999



- **Formula Errors Debugging**

- *Incorrect Cell Reference*

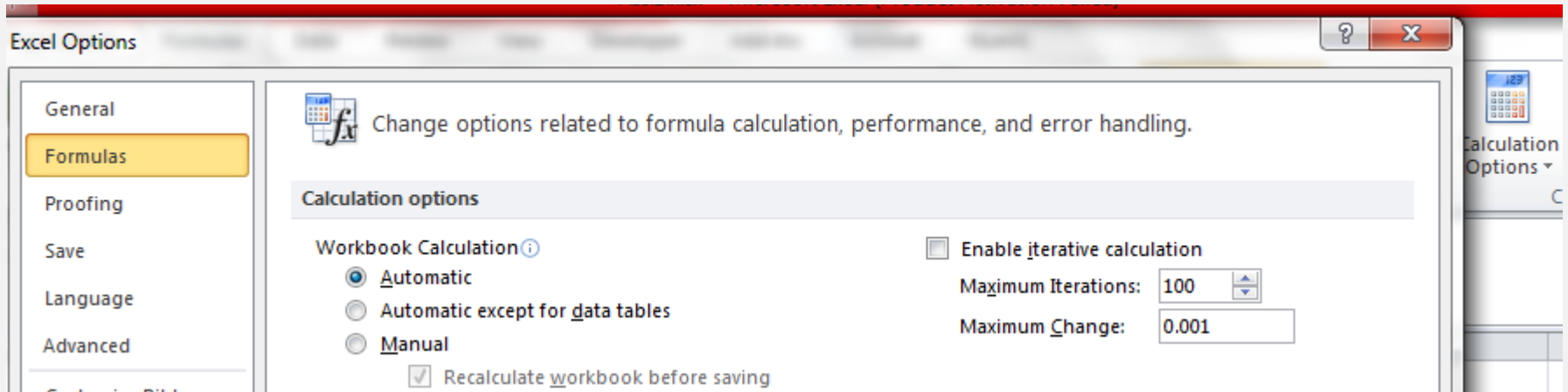
	A	B	C	D	E
1					
2		#REF!			

- *Null Error*

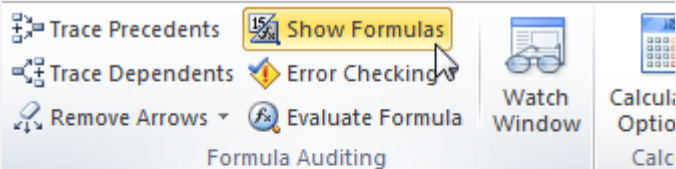
	A	B	C	D	E
1	100				
2	200		#NULL!		
3	300				
4					



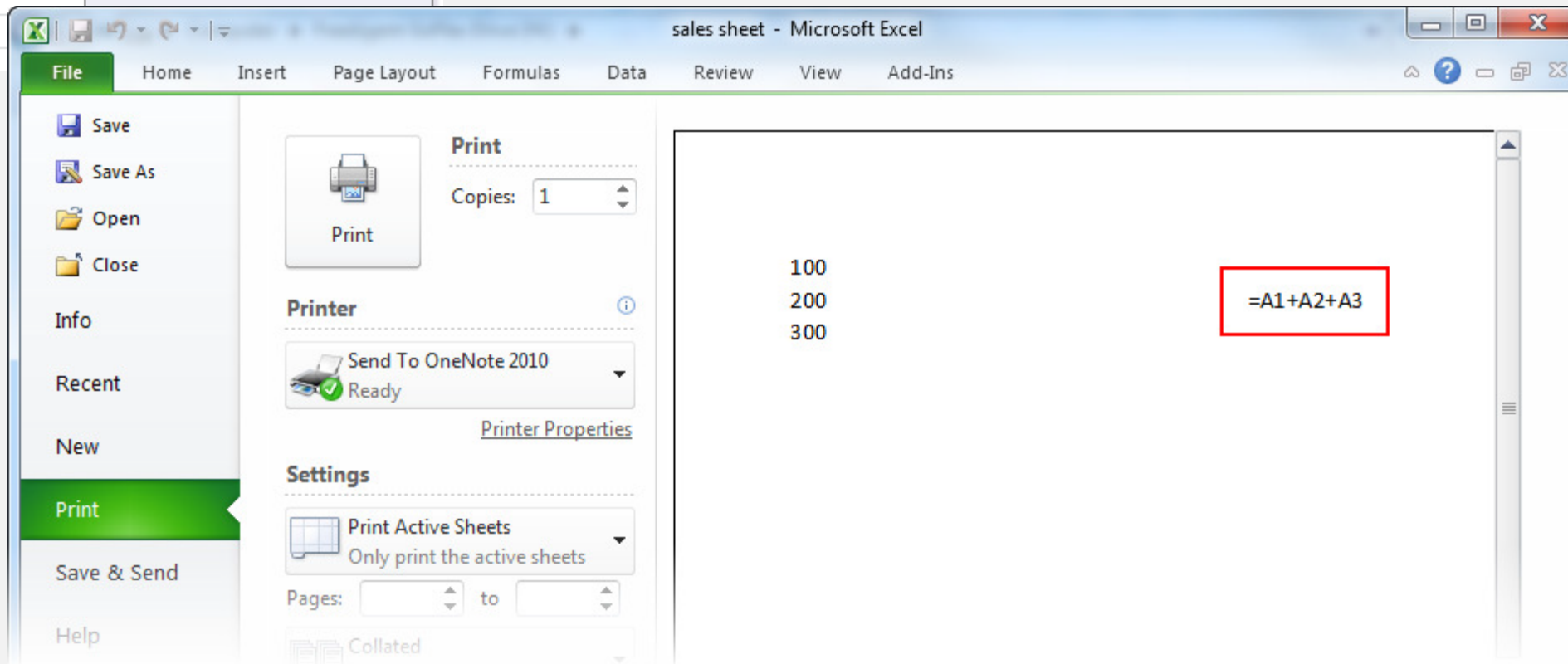
- **Calculation Options**




- **Displaying and Printing Formula**




**Show Formulas (Ctrl+')**  
Display the formula in each cell instead of the resulting value.





**EXCEL FORMULA REVIEW  
QUESTIONS**





**LECTURES CAN BE FOUND AT:**

[HTTP://WWW.BU.EDU.EG/PORTAL/INDEX.PHP?ACT=135&P  
ROF ID=2453&COURSE ID=6281](http://www.bu.edu.eg/portal/index.php?act=135&prof_id=2453&course_id=6281)





**THANKS FOR YOUR KIND  
ATTENTION**

