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Class: MSc

Subject : Application of IT- Basics and Advance Excel

Chapter: Unit 1 Chapter 7

Chapter Name: Conditional Formatting and Goal Seek

Meaning – Goal Seek

- *'Goal Seek' is a built-in tool in Excel that would help you find the right value to get your desired result.*
- *You can think of it as some sort of a reverse tool wherein you have the (desired) result but you don't have the right value to get at that result. Normally, the result is what you have to find from the data set.*
- *Here are a few examples of real-life problems that can be solved by the Goal Seek tool:*
 - *Finding out the passing grade*
 - *Needed votes for the election*
 - *Finding the affordable loan amount (or interest rate)*

How to use

- *The Goal Seek tool is simple to use.*
- *There are three parameters you should know about:*
 - *Set cell (the formula of the result)*
 - *To value (the desired result of the formula)*
 - *By changing cell (the value you want to adjust)*

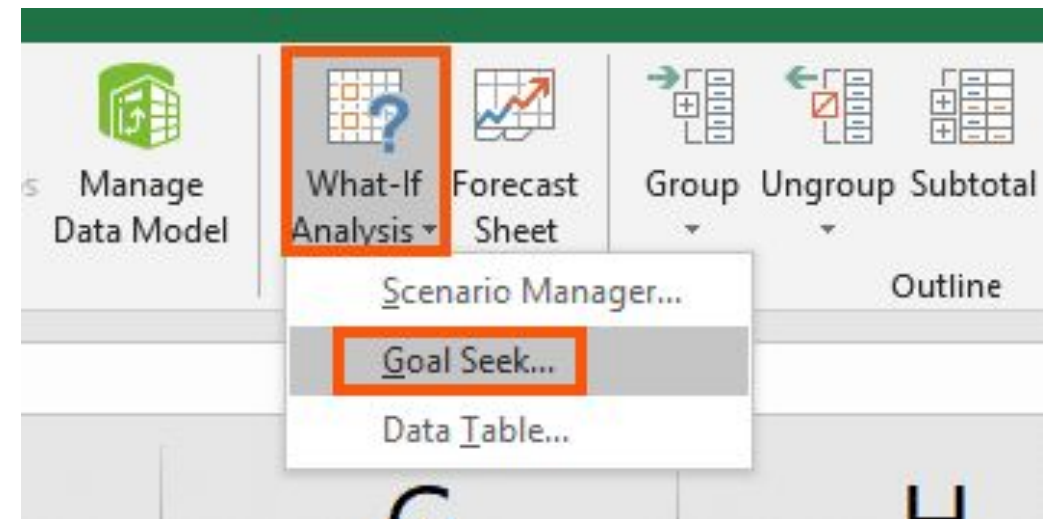
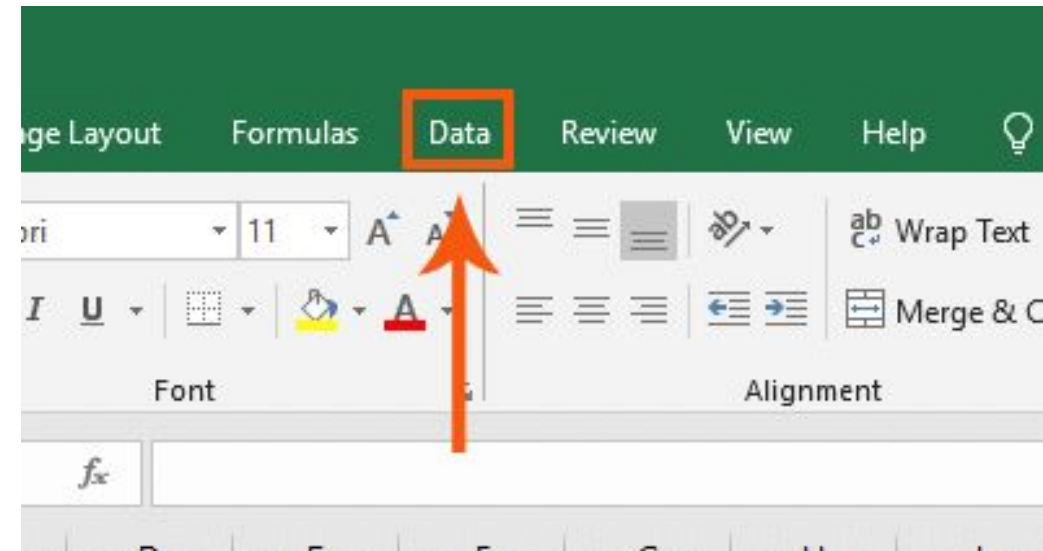
How to use

- Now, let's apply them in a real-life scenario.
- This student whose grades are shown below would like to know how much he needs to score on the last quiz so he'll get at least an average grade of 75. Currently, his average stands at a failing grade, 71.50.

Quiz Grades	
Quiz 1	70
Quiz 2	75
Quiz 3	69
Quiz 4	72
Quiz 5	
Average	71.50

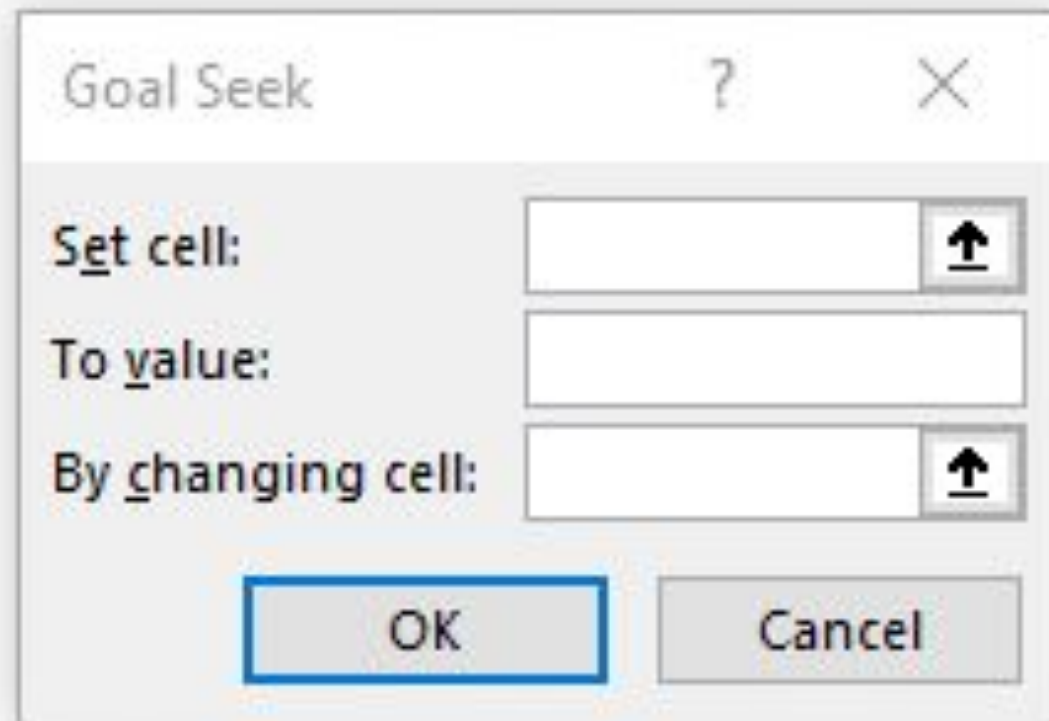
Goal Seek

- The first thing to do is to click **'Data'** on the tab list.
- From there, click the **'What-If Analysis'** icon on the **'Forecast'** group. Select **'Goal Seek'** from the dropdown.



Goal Seek

□ After that, the '**Goal Seek**' window will open where you input the needed parameters.



The image shows the 'Goal Seek' dialog box in Microsoft Excel. The dialog box has a title bar with 'Goal Seek', a question mark icon, and a close button. It contains three input fields with labels: 'Set cell:', 'To value:', and 'By changing cell:'. Each input field has a small icon to its right (an upward arrow for the first and third fields, and a downward arrow for the second). At the bottom, there are two buttons: 'OK' and 'Cancel'. The 'OK' button is highlighted with a blue border.

Goal Seek

From the data set, **enter the appropriate reference and value on the window.**

Set cell: B7 (the location of the formula)

To value: 75 (the desired result)

By changing cell: B6 (the value you want to change or adjust)

	A	B	C
1	Quiz Grades		
2	Quiz 1	70	
3	Quiz 2	75	
4	Quiz 3	69	
5	Quiz 4	72	
6	Quiz 5		
7	Average	71.50	

Goal Seek ? X

Set cell:

To value:

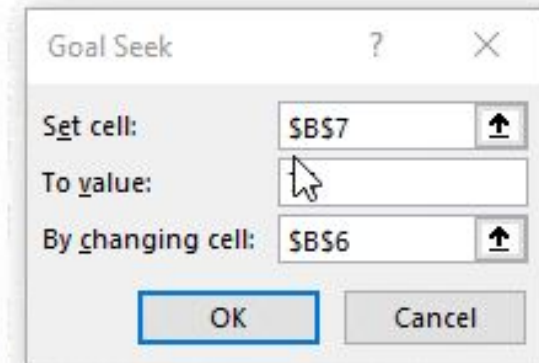
By changing cell:

OK Cancel

Goal Seek

- Then, **hit 'Enter'** and watch the magic of 'Goal Seek' unfold!
- The student needs to score at least 89 on the last quiz if he hopes to pass.

Quiz Grades	
Quiz 1	70
Quiz 2	75
Quiz 3	69
Quiz 4	72
Quiz 5	
Average	71.50

The image shows the 'Goal Seek' dialog box in Microsoft Excel. The title bar says 'Goal Seek'. There are three input fields: 'Set cell:' with the value '\$B\$7', 'To value:' which is currently empty and has a mouse cursor over it, and 'By changing cell:' with the value '\$B\$6'. Each input field has a small icon with an upward arrow to its right. At the bottom of the dialog are two buttons: 'OK' and 'Cancel'.

Goal Seek

Set cell:

To value:

By changing cell:

OK Cancel

Goal Seek

- 'Goal Seek' can also be used to calculate the number of votes needed to win.
- Let's say you're running for a local position where you need two-thirds (66.7%) of the majority to win. As of now, you have 256 voters out of 850 voters.
- How many votes do you need to win (get at least 66.7% votes out of the total votes)?

Election Results		
YES	256	30% =B2/B3
Total	850	100%

Goal Seek

□ Here's what you should enter on the 'Goal Seek' window:

- Set cell: C2 (the location of the formula)
- To value: 0.667 (the desired result)
- By changing cell: B2 (the value you want to change or adjust)

	A	B	C
1	Election Results		
2	YES	256	30%
3	Total	850	100%
4			
5			
6			

Set cell:	\$C\$2
To value:	0.667
By changing cell:	\$B\$2
OK Cancel	

Goal Seek

- Then, press 'Enter' to run the calculation.
- You need 567 votes to win.

<i>Election Results</i>		
YES	256	30%
Total	850	100%

Goal Seek

Set cell: SC\$2

To value: 0.667

By changing cell: SB\$2

OK Cancel

Goal Seek in Payments

- First off, there's actually a way you can calculate your **periodic loan payment** in Excel through the PMT function.
- But what if you're still evaluating how much you should loan or at what interest depending on your income?
- For example, you can only afford to pay \$5,000 annually for 5 years with an 8% interest. Now, you want to know how much money you can borrow from those conditions.

	A	B
1	Simple Loan Payment Calculator	
2	Annual Interest Rate	5%
3	Number of Payments	5
4	Loan Amount	
5	Annual Payment	\$0.00

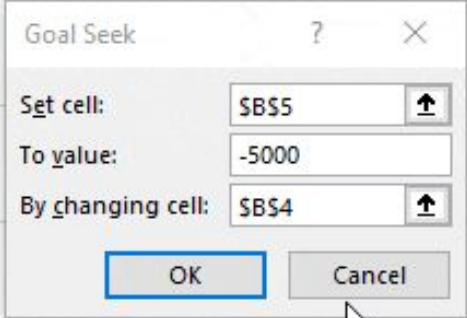
Goal Seek in Payments

- Here's what you should enter on the 'Goal Seek' window:
 - **Set cell: B5** (the location of the formula)
 - **To value: -5000** (the desired result)
 - **By changing cell: B4** (the value you want to change or adjust)
- B5 contains the PMT equation: **`=PMT(rate, nper, pv, [fv], [type])`**
- The value is negative to be in line with the cash flow model. The value is what you're supposed to 'pay' annually.

Goal Seek in Payments

- Hit Enter
- The maximum amount you can loan if you want to stay within the budget is \$21,647 (rounded to the nearest integer).

Simple Loan Payment Calculator	
Annual Interest Rate	5%
Number of Payments	5
Loan Amount	
Annual Payment	\$0.00

A screenshot of the Excel Goal Seek dialog box. The dialog box has a title bar with a question mark and a close button. It contains three input fields: 'Set cell:' with the value '\$B\$5', 'To value:' with the value '-5000', and 'By changing cell:' with the value '\$B\$4'. Each input field has a small icon to its right. At the bottom of the dialog box are two buttons: 'OK' and 'Cancel'.

Goal Seek in Payments

- *But what if it's about the interest rate? Like you have already decided to loan \$20,000 payable in 10 years and you would like to pay \$3,000 yearly.*
- *You now like to know the annual interest rate to make this arrangement possible.*
- *(Don't worry about the current 'Annual Payment'. It's automatically calculated based on the values above it.)*

Goal Seek in Payments

	A	B
1	<i>Simple Loan Payment Calculator</i>	
2	Annual Interest Rate	0%
3	Number of Payments	10
4	Loan Amount	\$ 20,000.00
5	Annual Payment	-\$2,000.00

Goal Seek in Payments

Here's what you should enter on the 'Goal Seek' window:

- **Set cell: B5** (the location of the formula)
- **To value: -3000** (the desired result)
- **By changing cell: B2** (the value you want to change or adjust)

Simple Loan Payment Calculator

Annual Interest Rate	0%
Number of Payments	10
Loan Amount	\$ 20,000.00
Annual Payment	-\$2,000.00

Goal Seek

Set cell:

To value:

By changing cell:

OK Cancel

Goal Seek in Payments

□ Hit Enter

□ The answer is 8%

Simple Loan Payment Calculator

Annual Interest Rate	0%
Number of Payments	10
Loan Amount	\$ 20,000.00
Annual Payment	-\$2,000.00

Goal Seek

Set cell:

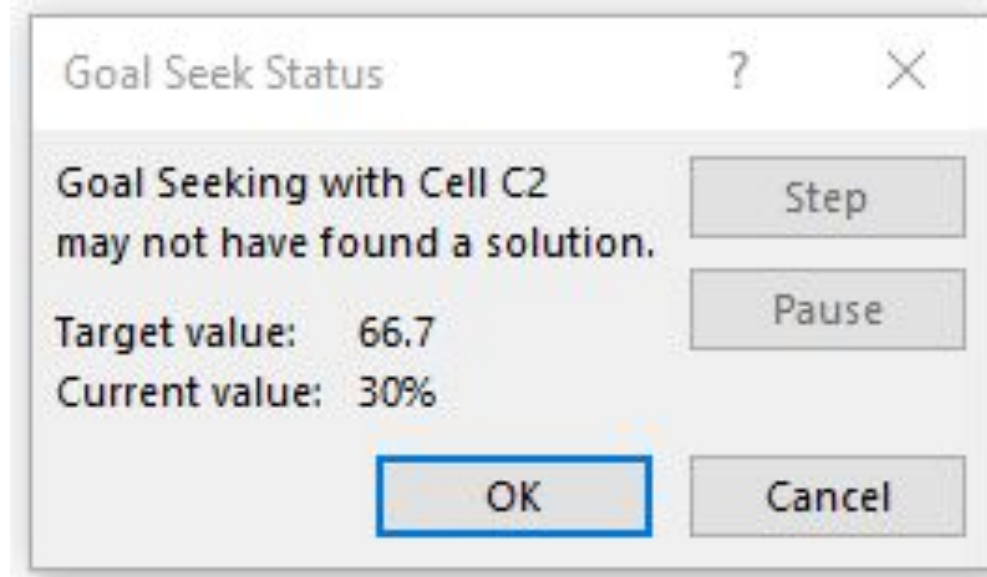
To value:

By changing cell:

OK Cancel

Error

- *As with any other functions or tools in Excel, it's possible that something could go wrong.*
- *There are times when 'Goal Seek' returns a 'not have found a solution'. This could be due to the fact that a solution doesn't really exist.*
- *However, if you're sure that a solution does exist, there are a few things you can check:*



Error

1. Check the parameters and values

Every time your handling a function and a tool that includes references, make sure your reference is accurate. If not, whatever adjustment you make, you'll always get the wrong answer.

Error

2. Change iterative calculation

There's a setting in Excel where you can adjust the number of possible solutions Excel will calculate as well as its accuracy.

To change them,

- i. Click '**File**' from the tab list.*
- ii. Then go to '**Excel Options**' window,*
- iii. Click '**Formulas**' at the left-hand sidebar of the window.*

There are 2 settings you can tweak to adjust the iterative calculation:

- **Maximum Iterations** (the number of possible solutions; the higher the number the more iterations)*
- **Maximum Change** (accuracy; the lower the number the higher the accuracy)*

Error

Excel Options

Change options related to formula calculation, performance, and error handling.

Calculation options

Workbook Calculation ⓘ

☒ Automatic
☐ Automatic except for data tables
☐ Manual

☒ Recalculate workbook before saving

☐ Enable iterative calculation

Maximum Iterations: 100
Maximum Change: 0.001

Working with formulas

☐ R1C1 reference style ⓘ
☒ Formula AutoComplete ⓘ
☒ Use table names in formulas
☒ Use GetPivotData functions for PivotTable references

Error Checking

☒ Enable background error checking

Indicate errors using this color: 

Reset Ignored Errors

Error checking rules

☒ Cells containing formulas that result in an error ⓘ	☒ Formulas which omit cells in a region ⓘ
☒ Inconsistent calculated column formula in tables ⓘ	☒ Unlocked cells containing formulas ⓘ
☒ Cells containing years represented as 2 digits ⓘ	☐ Formulas referring to empty cells ⓘ
☒ Numbers formatted as text or preceded by an apostrophe ⓘ	☒ Data entered in a table is invalid ⓘ
☒ Formulas inconsistent with other formulas in the region ⓘ	☒ Misleading number formats ⓘ

OK Cancel

Error

3. No circular reference

A circular reference occurs when a formula refers back to its own cell directly or indirectly. 'Goal Seek' doesn't work when there are co-dependent formulas involved.

Conclusion

What-If Analysis tools like 'Goal Seek' is one of the most useful features in Excel yet also one of the least used and unpopular.