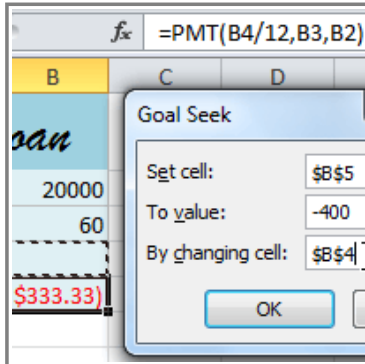**Excel 2010**
Using What-If Analysis
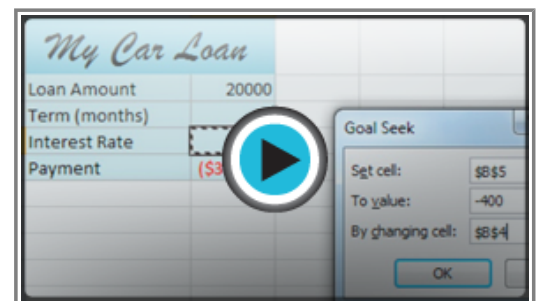
Using What-If Analysis

The real power in Excel comes in its ability to perform multiple mathematical calculations for you. One of the tools in Excel that you can use to perform these calculations is a **Data tool** called **What-If Analysis**. What-If analysis allows you to see the effect that different values have in formulas. Have you ever thought, "What interest rate do I need to qualify for to have a car payment of $400 on the car I want?" This question can be answered using What-If Analysis.

In this lesson, you will learn how to use a What-If Analysis tool called **Goal Seek**.

What-If Analysis

In many worksheets, there may be some cells whose values are **unknown**, or you may just want to **change** certain cells to see what the outcome is. **What-if analysis** is perfect for these situations. It allows you to **experiment** and **answer questions** with your data, even when the data is **incomplete**.

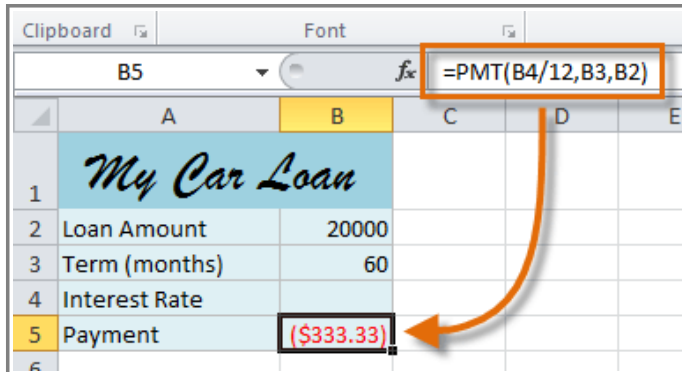>>> Watch the video to learn about using what-if analysis.

Watch the video (4:08). Need help?

Goal Seek

Goal Seek is a type of what-if analysis that is useful if you know the desired **result**, but need to find the **input value** that will give you that result. For example, suppose you need a **loan** to buy a new car. You already know that you want a **loan amount** of $20,000, a 60-month **term** (the length of time it takes to pay off the loan), and a **payment** of no more than $400 a month. However, you're not sure yet what the **interest rate** is going to be.

In the image below, you can see that **Interest Rate** is left blank, and **Payment** is $333.33. That's because the

payment is being calculated by a specialized function called the **PMT (Payment) function**, and $333.33 is what the monthly payment would be if there were **no interest** ($20,000 divided by 60 monthly payments).

Function calculating the monthly payment

If we typed different values into the empty **Interest Rate** cell, we could eventually find the value that causes **Payment** to be $400, and that would be the highest interest rate that we could afford. However, **Goal Seek** can do this automatically by starting with the **result** and **working backward**.

You'll need to understand how **functions** work before you use what-if analysis. If you want, you can review functions in our Working with Basic Functions lesson.

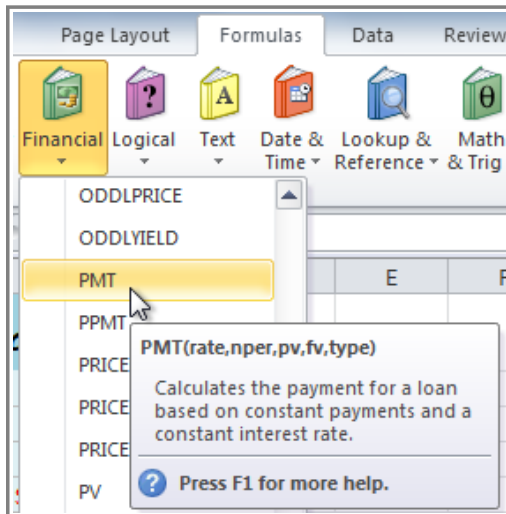## To Insert the Payment Function:

1. Select the cell where you want the function to be.
2. From the **Formula** tab, select the **Financial** command.
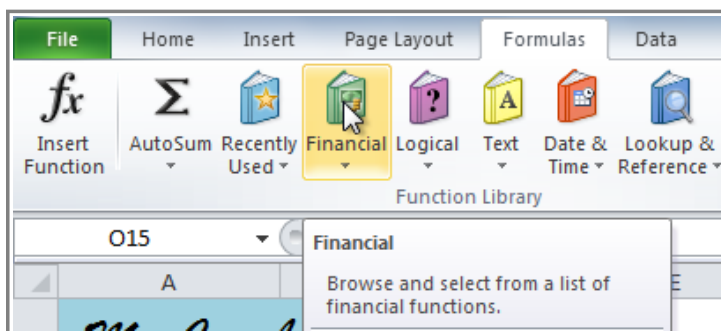
The Financial command

3. A drop-down menu will appear showing all finance-related functions. Scroll down and select the **PMT** function.

Selecting the PMT function

4. A dialog box will appear.
5. Enter the desired **values** and/or **cell references** into the different fields. In this example, we're only using **Rate**, **Nper** (the number of payments), and **Pv** (the loan amount).
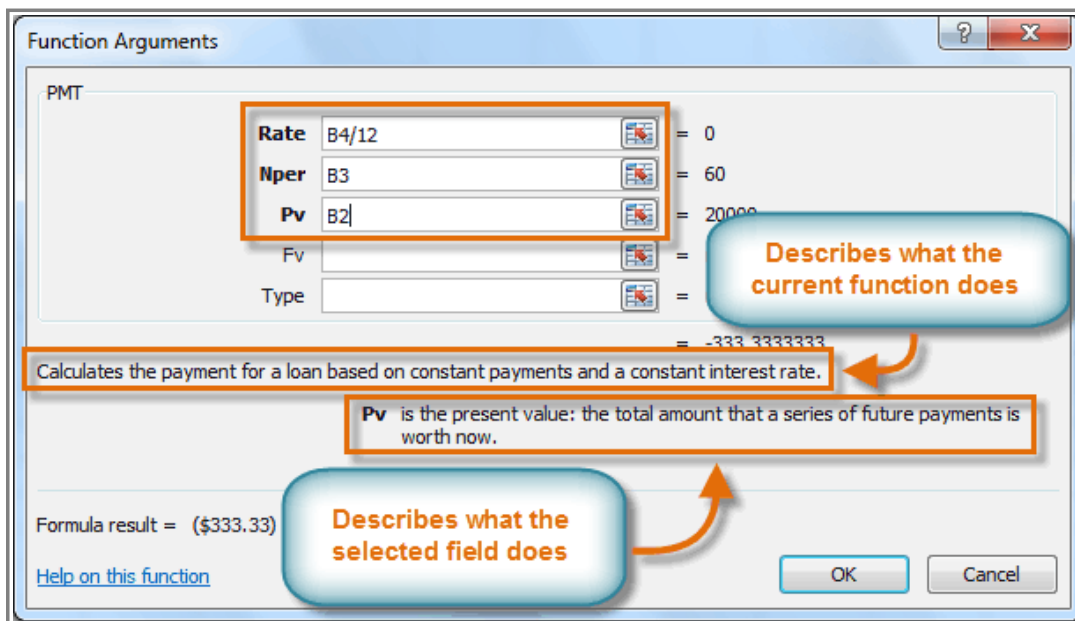
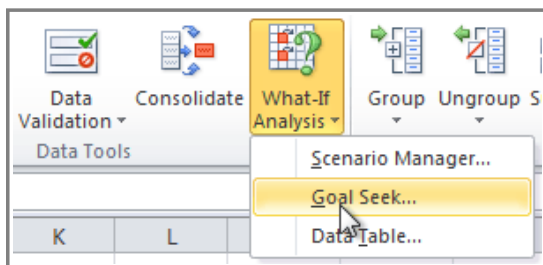*Entering values into the necessary fields*

6. Click **OK**. The result will appear in the selected cell. Note that this is not our **final** result, as we still don't know what the interest rate will be.

*The monthly payment, not including interest*

To Use Goal Seek to Find the Interest Rate:

1. From the **Data** tab, click the **What-If Analysis** command.

2. Select **Goal Seek**.

Selecting Goal Seek

3. A dialog box will appear containing three fields:

   ❍ **Set cell:** This is the cell that will contain the **desired result** (in this case, the monthly payment). In this example, we will set it to **B5** (it doesn't matter whether it's an **absolute** or **relative** reference).

   ❍ **To value:** This is the desired result. We'll set it to **-400**. Since we're making a payment that will be **subtracted** from our loan amount, we have to enter the payment as a **negative number**.

   ❍ **By changing cell:** This is the cell where Goal Seek will place its answer (in this case, the interest rate). We'll set it to **B4**.
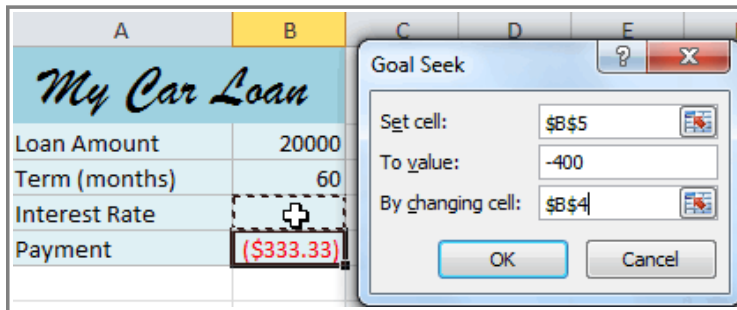
Entering values into the Goal Seek fields

4. When you're done, click **OK**. The dialog box will tell you whether or not Goal Seek was able to find a solution. In this example, the solution is **7.42%**, and it has been placed in cell **B4**. This tells us that a 7.42% interest rate will give us a $400-a-month payment on a $20,000 loan that is paid off over 5 years, or 60 months.
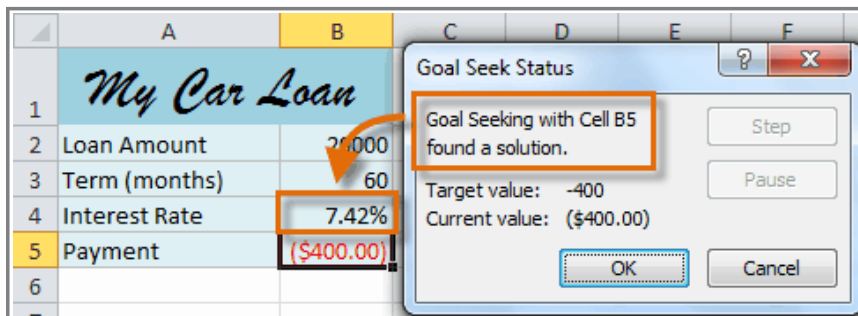

Solution found by Goal Seek

Other Types of What-If Analysis

For more advanced projects, you may want to look at the other two types of what-if analysis: **scenarios** and **data tables**. Rather than starting from the desired result and working backward, like Goal Seek, these options allow you to test multiple values and see how the result changes.

Below is an introduction to some of the things you can do with **scenarios** and **data tables**.

*   **Scenarios** let you substitute values for **multiple cells** (up to 32) at the same time. It is especially well-suited to showing **best-case** and **worst-case** scenarios. You can create **as many scenarios as you want**, and then compare them without having to manually change all of the values. In the example below, each scenario contains a **term** and an **interest rate**. When each scenario is selected, it will replace the values in the spreadsheet with its own values, and the **result** will be recalculated.
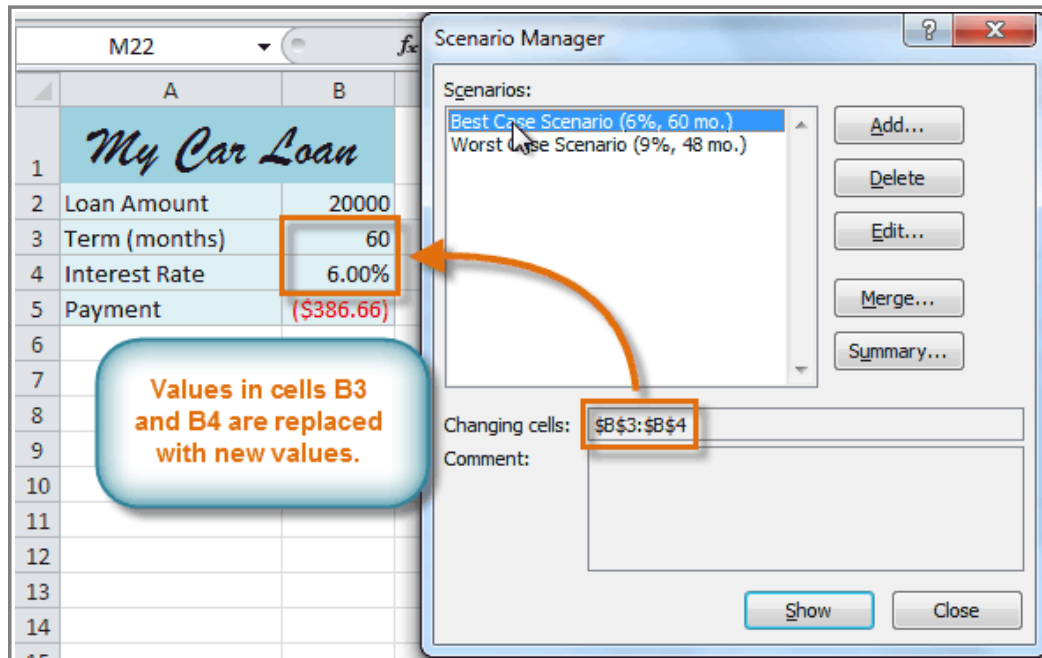
Selecting a scenario

▶▶ For more information about scenarios, check out this article on the Microsoft site.

❖ **Data Tables** allow you to take one or two variables in a formula and replace them with **as many different values as you want**, and then view the results in a table. This option is especially powerful because it shows **multiple results** at the same time, unlike Scenarios or Goal Seek. In the example below, **24 possible results** are shown in the table; doing the same task with **Scenarios** would take much longer.

Using a data table to compare different terms and interest rates

▶▶ For more information about data tables, check out this article on the Microsoft site.

Challenge!

1. Open an **existing Excel workbook**. If you want, you can use this [example](#).

2. Insert the **PMT** function into the worksheet. If you are using the example, insert the function into cell **B5**.

3. Use **Goal Seek** to find the **interest rate** you will need in order to have a monthly payment of **$400**. What **interest rate** would you need if you could only afford a **$380** monthly payment?