

Derive™ Tutorial One

Introduction

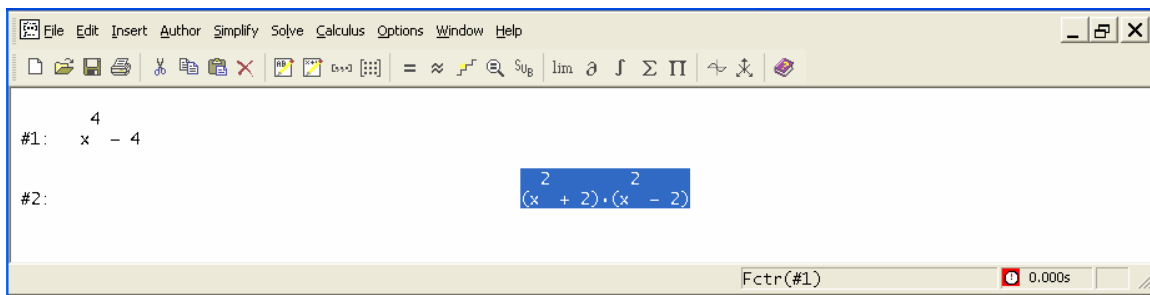
This set of activities is intended to illustrate the use of Derive™ 6, a powerful and easy to use Computer Algebra System (CAS). The initial activities assume that the reader is unfamiliar with CASs but is familiar with the use of a mouse and pop-down menus. As the activities progress, the amount of detail on how to use the Derive 6 interface decreases although more complicated commands are brought into play.

We wish you well in becoming a competent user of mathematical tools Derive makes so easy to work with.

Factoring and Expanding

In this activity, you will factor polynomials in several ways. In addition, you will expand binomials in one and two variables. These activities may refresh your memory about factoring polynomials and multiplying polynomials together..

You begin by authoring $x^4 - 4$. To author an expression, move the cursor to the Entry line at the bottom of the screen, type $x^4 - 4$ and press **Enter** on the keyboard. You will author many expressions and equations in these activities. Now find and click on **Simplify** on the Main Algebra Window's menu, and select **Factor** (in the future, this type of action will be described as “use the **Simplify>Factor** command). In the **Factor** dialog box, notice that the **Rational polynomial factoring** button is selected. Now click on the **Factor** button. The rational factors of your expression are displayed in the worksheet.



With this factored form of the expression highlighted, use the **Simplify > Factor** command, and then choose the **Radical polynomial** button by clicking on the appropriate button to the right of the screen. Now click the **Factor** button at the bottom of this dialog box. The *radical* factors of your expression are then displayed in the worksheet.

With this new factored form of the expression highlighted, use the **Simplify > Factor** command, and then click on the **Complex polynomial** button. Finally, click on **Factor** at the bottom of this dialog box. The *complex* factors of your original expression are displayed. The History window of the worksheet should look like this.

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#1: $x^4 - 4$

#2: $(x^2 + 2) \cdot (x^2 - 2)$

#3: $(x + \sqrt{2}) \cdot (x - \sqrt{2}) \cdot (x^2 + 2)$

#4: $(x + \sqrt{2}) \cdot (x - \sqrt{2}) \cdot (x + \sqrt{2} \cdot i) \cdot (x - \sqrt{2} \cdot i)$

screenshot2.1

You can expand a variety of expressions with Derive. The expression $x^4 - 4$ should be highlighted on the Entry line. Author the expression $(x+y)^2$ (type $(x+y)^2$, and press **Enter**). Use the **Simplify > Expand** command, and notice that the **Rational polynomial** button on the right is selected. Now click on **Expand** at the bottom of the dialog box. Your History window worksheet should look something like this.

#3: $(x + y)^2$

#4: $x^2 + 2 \cdot x \cdot y + y^2$

Expd(#3) 0.000s

Notice that this expression (#6) has three terms. You can also expand $(x + y)^3$. One way to do this is to edit the expression on the Entry line using the **Backspace**, **Del** and other standard editing keys. Once you have edited the expression, press **Enter**. Using the commands given above, **Author** and **Expand** $(x+y)^3$. Your History window worksheet should look something like this.

#5: $(x + y)^3$

#6: $x^3 + 3 \cdot x^2 \cdot y + 3 \cdot x \cdot y^2 + y^3$

Expd(#5) 0.000s

You might like to try expanding $(x + y)^n$ for larger values of n .

Summary

You should have learned how to author expressions.

You can edit expressions on the Entry line using standard editing keys such as the **Delete**, **Backspace**, and arrow keys.

You can find menu items on the Main Algebra Window's menu bar and on submenus. Also, when you point the mouse cursor (without clicking) on the Main Algebra Window's Icon menu toolbar at the top of the screen, a description of what each icon does is displayed near the cursor. Try this for one or more icons.