**The Free 2007/2010 Microsoft Word Mathematics Add-In**

Gail Nord

Gonzaga University

Spokane, WA, 99258, USA

[nord@gonzaga.edu](mailto:nord@gonzaga.edu)

**Number Theory**

Example 1: Find the remainder when *21* is divided by *5.*

Example 2: Find the greatest common factor from a list of numbers.

Example 3: Convert the following number that is given in base *10* to a base of *3.*

*35*

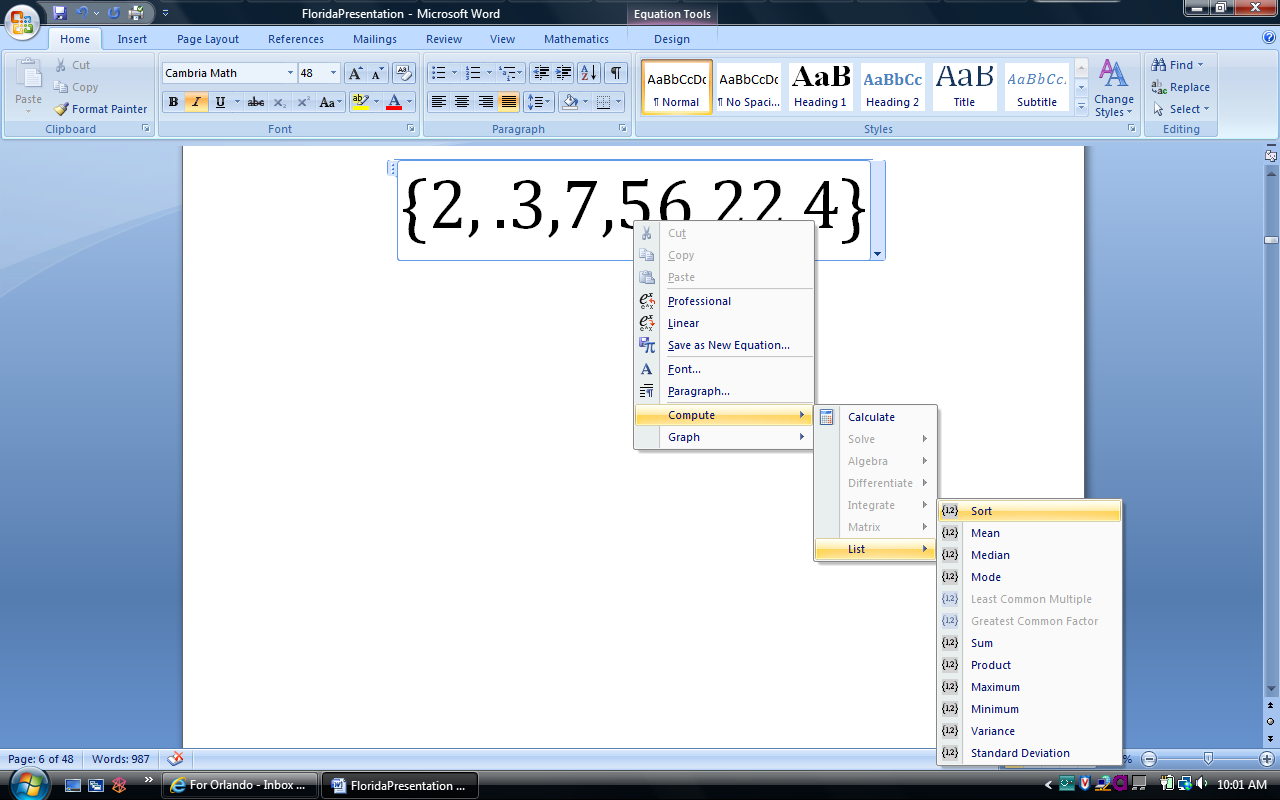
Our example will be:

The result is:

Example 4: Convert a number from another base to base ten.

The original base must be a number between *2* and *36*. Our example will be:

Example 5: From a list, find a maximum value.



Example 6: Given a number, find the closest prime to the right of it.

Example 7: Determine if a given number is a prime number.

The command is *IsPrime.* The input will be:

Example 8: Give the prime factorization for a given integer.

**Graphing**

**Graphing Commands**

Flexible input allows for alternative syntax.

Example 1:

Consider the graphs of the roses generated by:

Example 2: Graphing in three dimensions:

Example 3:

Graph:



|  |  |  |
| --- | --- | --- |
| ***Command*** | ***Example*** | ***Input*** |
| *Plot2d* |  | *Input function, f(x).* |
| *plot3D* |  | *Input where, z=f(x, y).* |
| *plotCylR3D* |  | *Input z=f(r,* |
| *plotEq2d* |  | *Input f(x, y) = c.* |
| *plotEq3D* |  | *Input f(x, y, z)=c.* |
| *plotIneq2d* |  | *Input inequality in x and y.* |
| *plotParam2d* |  | *Input (f(t), g(t)) where x=f(t) and y=g(t).* |
| *plotParam3D* |  | *Input (f(t, s), g(t, s),*  *h(t, s)) where x=f(t, s) and*  *y=g(t, s) and z=h(t, s).* |

To execute these commands using the drop-down menu, apply *Calculate.*

Example 4: Use the *Show3D* command.

Example 4b:

Example 5: Use the *Show2D* command.

Example 6: Create a movie.

The two quadric surfaces that will alternatively appear will be a hyperbolic paraboloid and an elliptic paraboloid.

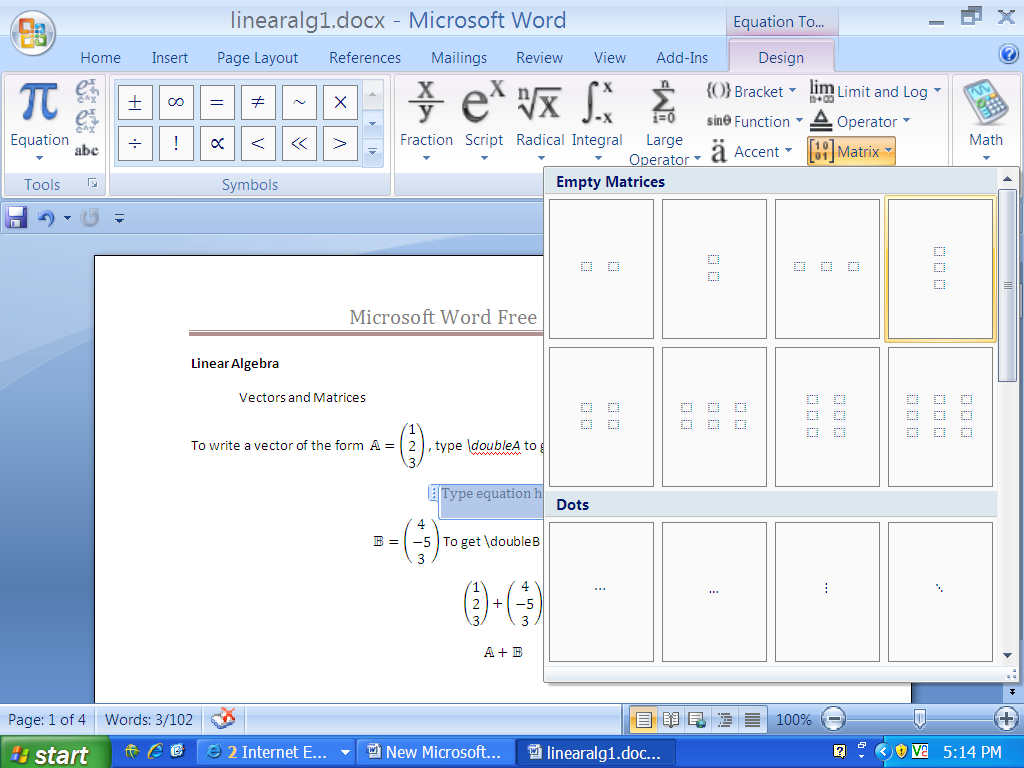
Example 7: Create an animated spring.

(Works in Mathematics 4.0—but not here)

**Linear Algebra**

**Vectors and Matrices**

Use the *Matrix* feature.



Example 1: Add two vectors.

*Calculate* gives the resultant vector,

Example 2: Find the magnitude of a vector.

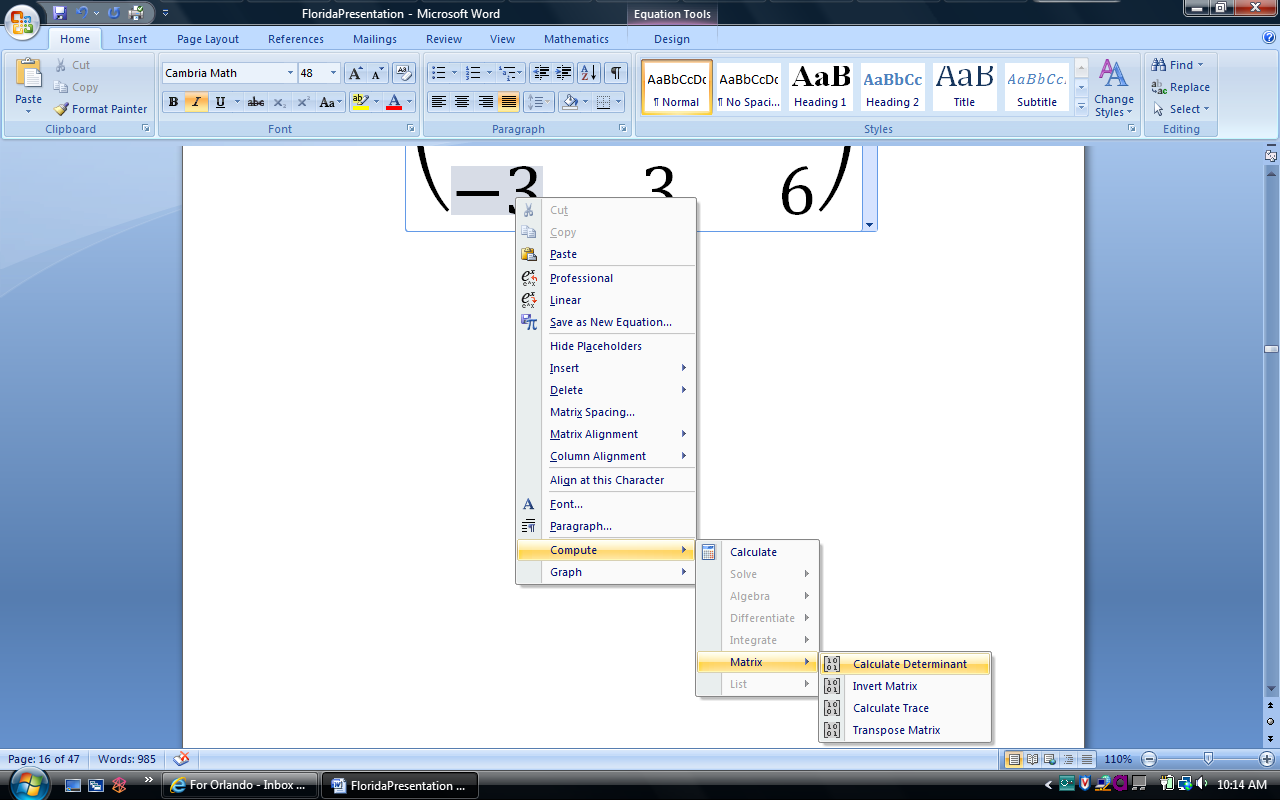
Use the command *Calculate* to find the answer:

Example 3: Find the inner product.

Example 4: Find the cross product where and

Example 5: Calculate the determinant of a

3 x 3 matrix.



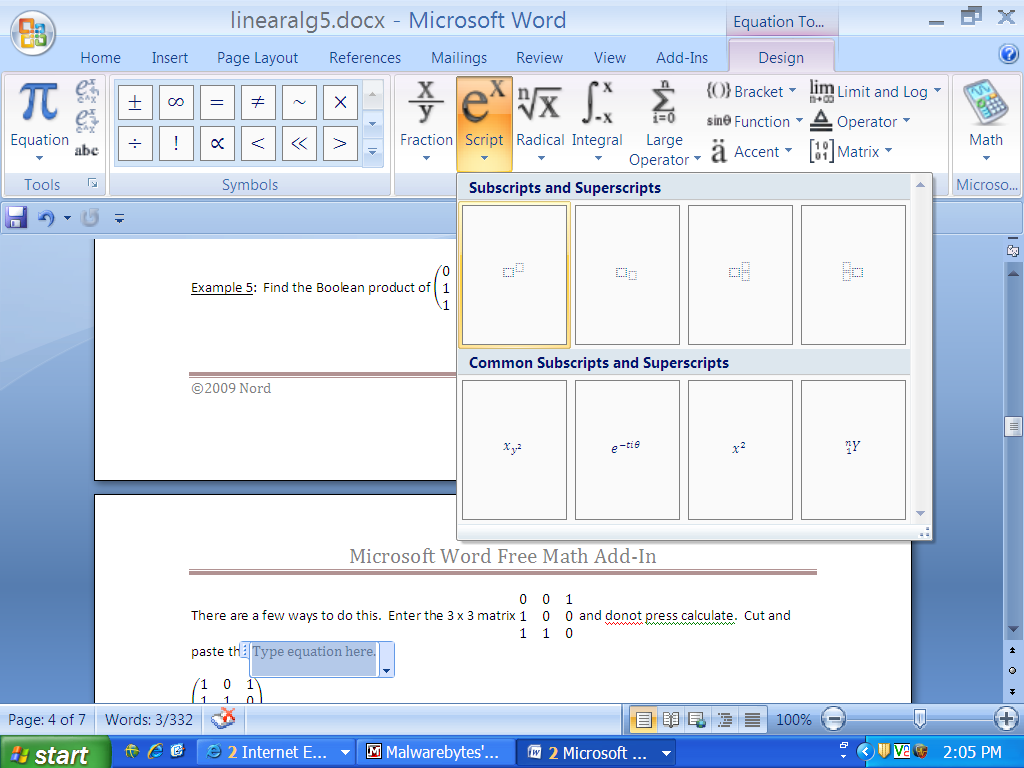
Using the other options, find the trace of the matrix is *5*, the inverse matrix is

and the transpose of the matrix is .

Example 6: Given a 3 x 3 matrix and its inverse, show the product gives the identity matrix.

Example 7: Find the Boolean product of.

There are a few ways to do this. For one approach, enter the 3 x 3 matrix and do not press *Calculate*. The insertion of a pasted object with spaces or parentheses often gives an error message. Without pressing *Calculate,* the matrix, will contain no parentheses. Cut and paste this matrix and place as the ‘base’. Insert the three as a superscript using this feature:



The command *Calculate* from the drop-down menu gives the desired result of:

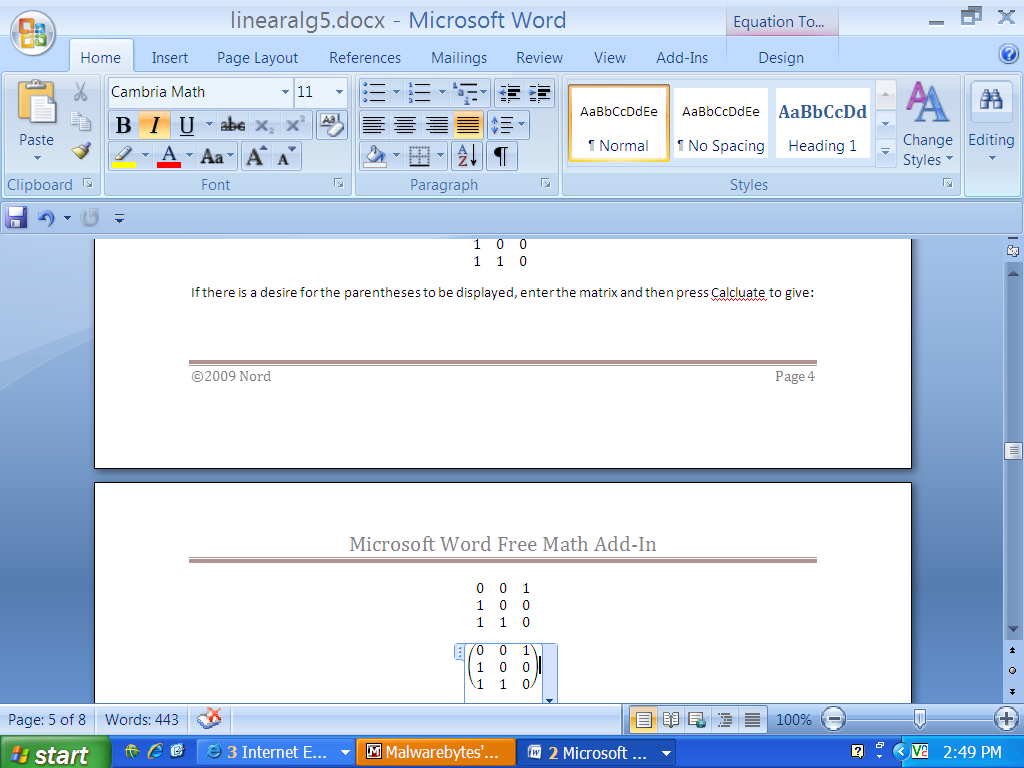
The superscript may be toggled to be 7, and the new Boolean product can be found to be:

=

Another approach is to enter the matrix and superscript directly without cutting and pasting to give:

If there is a desire for the parentheses to be displayed, enter the matrix and then press *Calculate* to give:

With the cursor inside the blue box, press *^3* followed by a space bar.



This will move the three to the desired location and give:

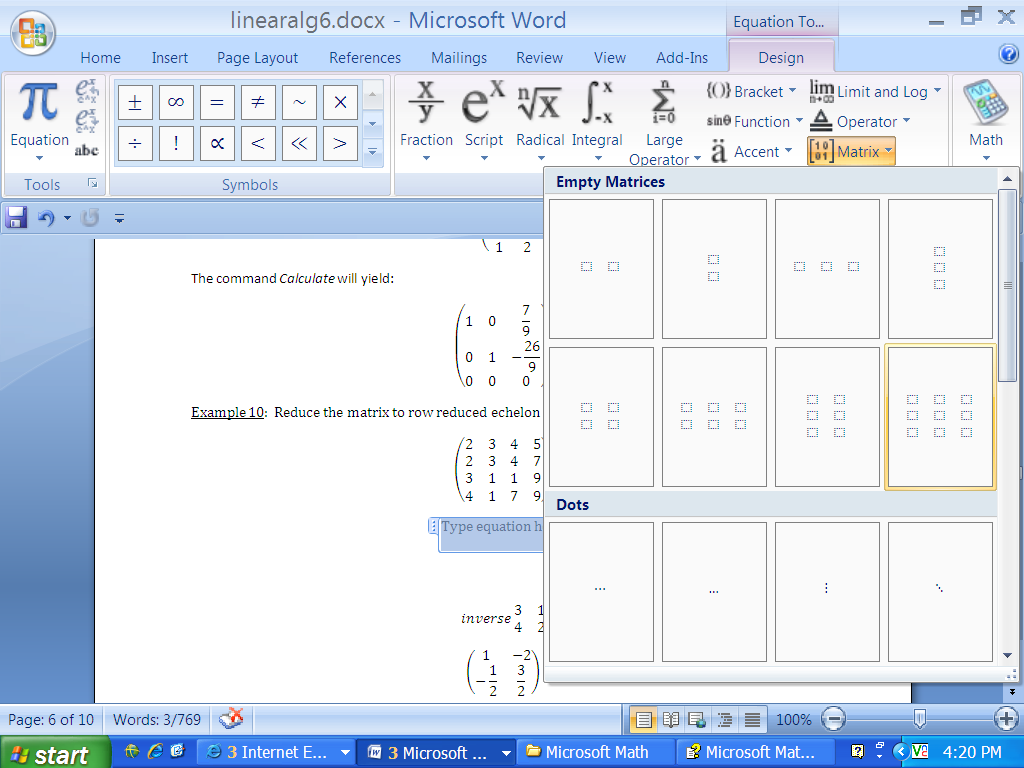
Press *Calculate* to simplify.

Example 8: Reduce a 3 x 3 matrix to row reduced echelon form.

Press *Calculate* to obtain the parentheses.

Example 9: Reduce the matrix to row reduced echelon form.

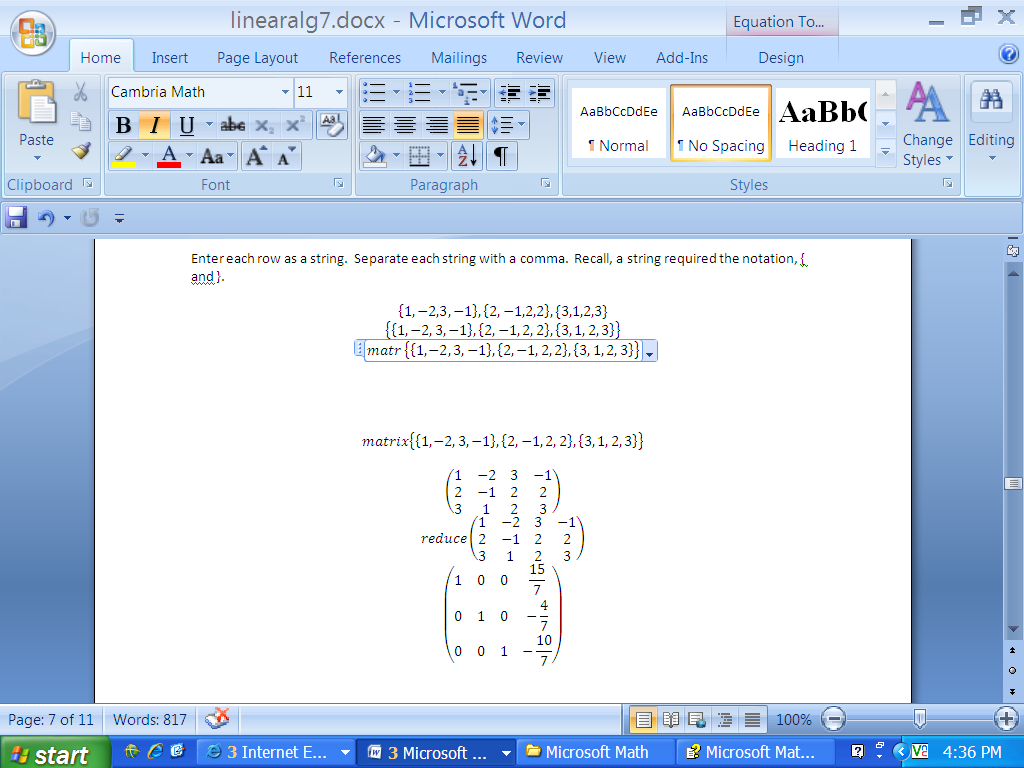
There is a problem entering this size of matrix from the menu since it is larger than a 3 x 3 matrix.



*Calculate* will place { } around the input.

With the cursor in the blue box, type *matrix*

Type in here *matrix.*



Example 10: Find the inverse of a matrix.

If the matrix is a *2 x 2* or *3 x 3* matrix, the pull-down menu will contain the option, *Invert Matrix.*

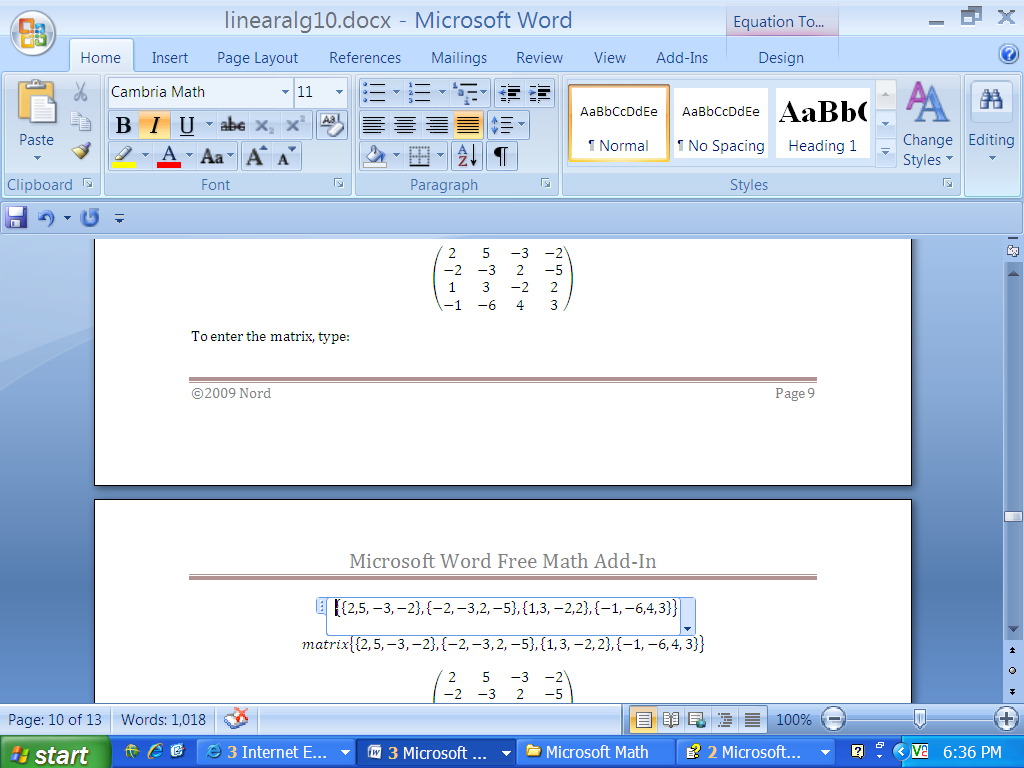
However, for larger matrices the option will appear with the command, *matrix,* in the *Insert New Equation*  line.

Enter each row of the matrix as a string using { and }. Separate the elements with a comma.

Consider the matrix

To enter the matrix, type:

Place the cursor in the blue box and in front of the desired matrix.



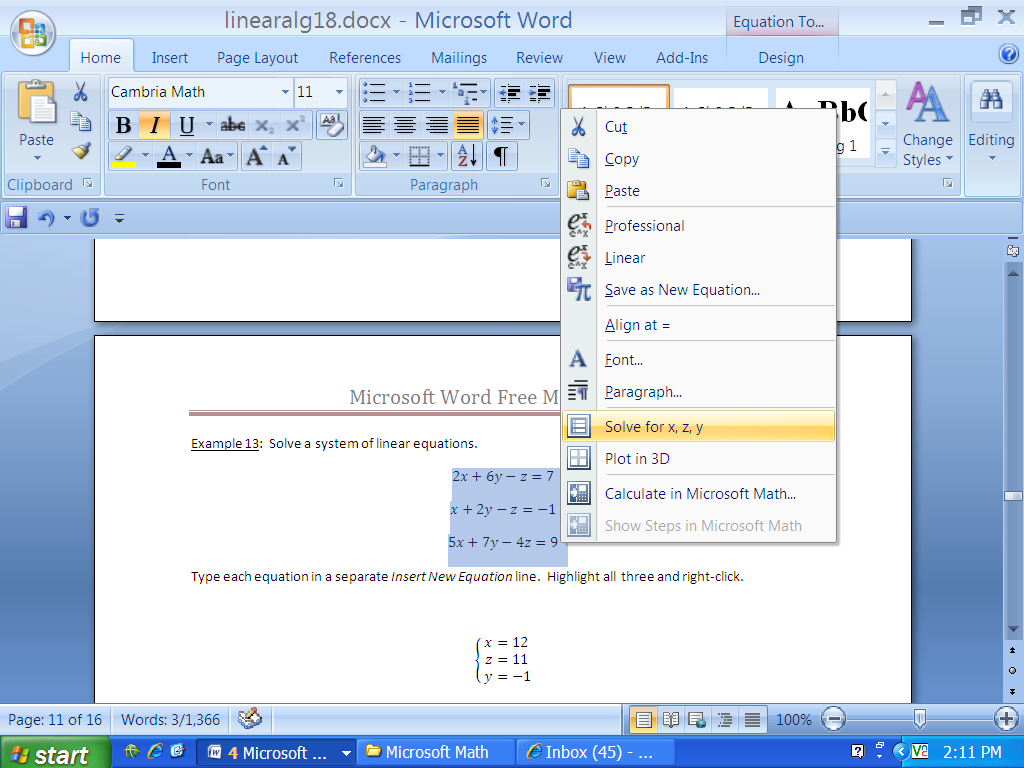
Type *matrix.*

With the insertion of *matrix*, the pop-up box changes and the desired option of *Invert Matrix* appears*.*

The answer is:

Example 12: Solve a system of linear equations.

Type each equation in a separate *Insert New Equation* line. If the last equation had no term of *7y,* then a place-holder of *0y* would have been needed. Now, highlight all three and right-click. The menu is:



The answer is:

As a matrix the answer is:

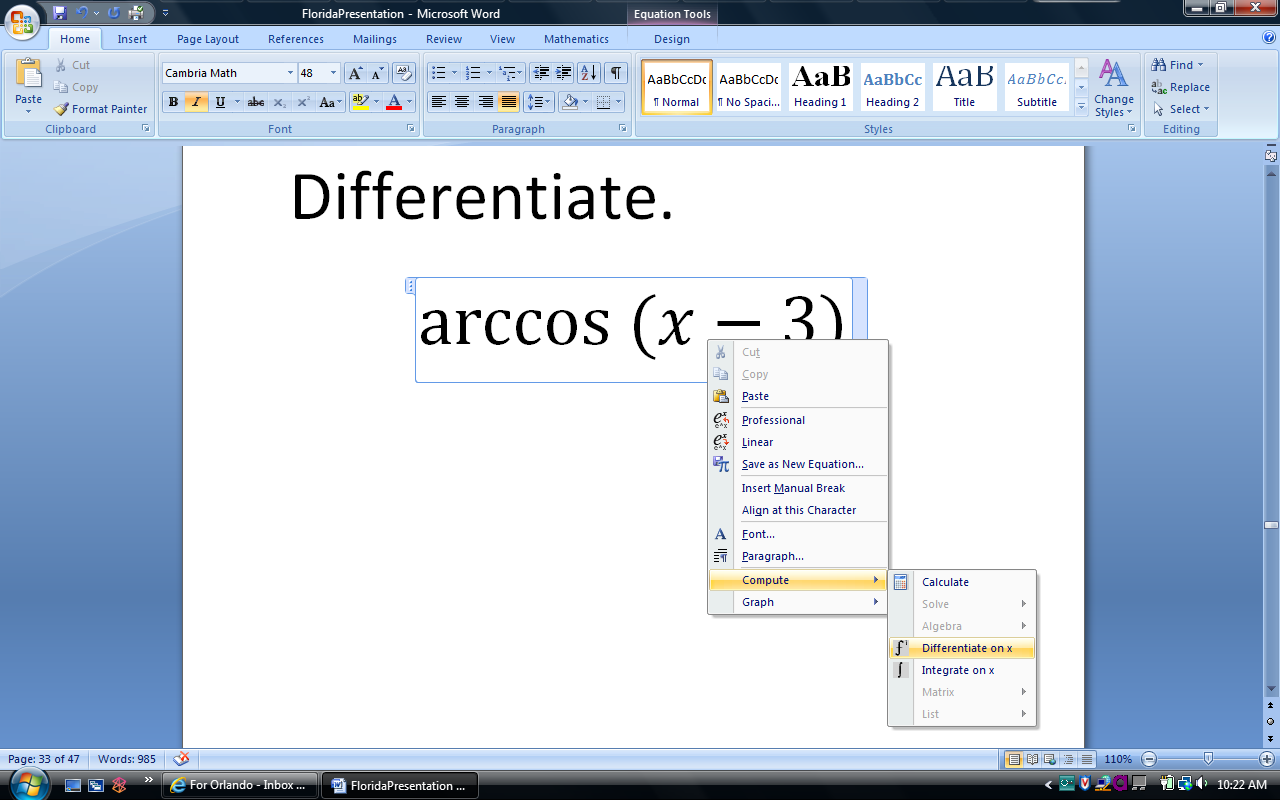
**Calculus**

Example 1: Given a polynomial, find the 3rd derivative with respect to *x*.

Consider the input:

The same output can be obtained with an initial input of an expression:

Example 2: Differentiate.

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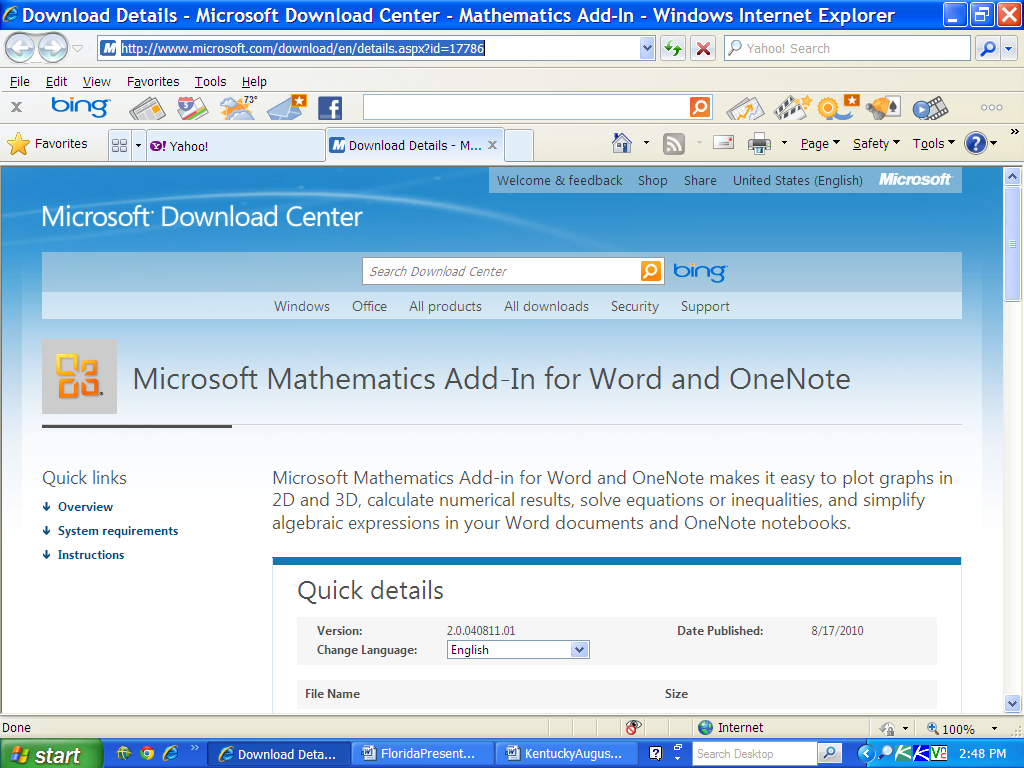
Example 3: Integrate.

Example 4: Evaluate the integral.

Select *Calculate* to give:

**More Information**

Microsoft Corporation, Microsoft Mathematics Add-In for *Word* and *OneNote* (2010): <http://www.microsoft.com/downloads/en/details.aspx?FamilyID=CA620C50-1A56-49D2-90BD-B2E505B3BF09>



Reference

Gail Nord’s Website:

<http://web02.gonzaga.edu/faculty/nord/>