CsMath 371 Ernst/Wang **Simple Task 1** **Spring 2016**

Due: Monday Feb 1 at the beginning of class

Basic algebra/numeric/plotting computation with *Mathematica*:
The objective of this Simple Task is for you to work some basic tasks with *Mathematica.* Please do not use copy/paste but retype the expressions so that you learn how to type formulas into the computer on your own. Careful with sin and cos! Look up ("Help" within *Mathematica*) how to type this if you don't know.

Turn in a print out of the following. Your print out must show the statement(s) you used and the result *Mathematica* generates when the statement is executed.

1. Simplify: (*i*) $\frac{\frac{1}{a^2}-\frac{1}{b^2}}{\frac{1}{a^6}-\frac{1}{b^6}}$ (ii) $\frac{1-x^6}{1+x+x^2+x^3+x^4+x^5}$ (iii) $\frac{1-x^6}{1-x+x^2-x^3+x^4-x^5}$ (iv) $\frac{\cos^2(\theta)}{\cos^4(\theta)+\cos^2(\theta)\sin^2(\theta)}$

2. Foil: $(-1+x)\left(1+x+x^2\right)\left(1+x+x^2+x^3+x^4\right)\left(1+x^3+x^6\right)$
$\left(1-x+x^3-x^4+x^5-x^7+x^8\right)\left(1-x^3+x^9-x^{12}+x^{15}-x^{21}+x^{24}\right)$

3. Plot the functions $y = \sin(x)$, $y = \cos(x)$ and $y = \tan(x)$ over the interval $[-2\pi, 2\pi]$. The tangent function should be ***thick*** and both the sine and cosine function should be **dashed**. The y-axis should have a scale from −3
to 3.

4. Find the alteranting sum of the first 1000 fourth powers, that is $1 - 16 + 81 - 256 + \ldots \ldots - 1000^4$ (in *Mathematica* there's no need to use a loop for this)

Note: We expect you to enter the input into *Mathematica* to show the fractions as shown in problem 1 and to use θ as shown in problem 1. The file is posted as a pdf so you cannot just copy and paste - you must retype the expressions.
For information about how to do that see *Virtual Book -> Introducation -> Working with the Notebook Interface -> Entering Input in Notebooks.*