Just about any math equation !!!

For ADVANCED ALGETRA: sympy library in Jupyter Notebook allows you to:

- Series
- Limits
- Sum

In [1]:
```
from sympy import *
from __future__ import division
init_printing()
```

In [2]:
```
x, y, z = symbols("x, y, z")
```

In [3]:
```
a, b,c,d = symbols ('a b c d')
```

In [4]:
```
#  Simple Expansion  -- LaTeX printing
cos(x).series(n=10)
```

Out[4]: $1 - \frac{x^2}{2} + \frac{x^4}{24} - \frac{x^6}{720} + \frac{x^8}{40320} + \mathcal{O}(x^{10})$

In [5]:
```
#  Simple Expansion  -- LaTeX printing
sin(x).series(n=10)
```

Out[5]: $x - \frac{x^3}{6} + \frac{x^5}{120} - \frac{x^7}{5040} + \frac{x^9}{362880} + \mathcal{O}(x^{10})$

In [6]:
```
#  Simple Expansion  -- LaTeX printing
(sin(x)*cos(x)).series(n=10)
```

Out[6]: $x - \frac{2x^3}{3} + \frac{2x^5}{15} - \frac{4x^7}{315} + \frac{2x^9}{2835} + \mathcal{O}(x^{10})$

In [7]:
```
#  Simple Limit -- check syntax
Limit(sin(x)/x, x, 0)
```

Out[7]: $\lim_{x \to 0^+}\left(\frac{1}{x}\sin(x)\right)$

In [8]:
```
#  Simple Limit
limit(sin(x)/x, x, 0)
```

Out[8]: 1

In [9]:
```
#  Simple Limit to INFINITY
limit(1/x, x, oo)
```

Out[9]: 0

In [10]:
```
# Confirm Syntax of Infinite Series Limit
Sum(1/x**x, (x, 1, oo))
```

Out[10]: $\sum_{x=1}^{\infty} x^{-x}$

In [11]:
```
# Infinite Series Limit
Sum(1/x**x, (x, 1, oo)).evalf()
```

Out[11]: 1.29128599706266

In [18]:
```
# Infinite Series Limit
N(Sum(1/x**x, (x, 1, oo)))
```

Out[18]: 1.29128599706266

In [12]:
```
#Integral?
```

In [13]:
```
Integral(sin(x))
```

Out[13]: $\int \sin(x)\, dx$

In [14]:
```
integrate(sin(x))
```

Out[14]: $-\cos(x)$

In [15]:
```
Derivative(x**2)
```

Out[15]: $\frac{d}{dx} x^2$

In [16]:
```
diff(x**2)
```

Out[16]: $2x$

In [17]:
```
# Calculate Expression from Symbols
expr = sin(x)/x
f = lambdify(x, expr)
f(3.14)
```

Out[17]: 0.0005072143046136395