**SYMBOLIC PARADIGM**

**ANNOTATION**

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| **PYTHON CODE** | **MATH EXPRESSION** | **PYTHON OUTPUT** |
| #Using Math Library  import math  print(math.sqrt(8)) | √8 | 2.8284271247461903 |
| #using Sympy Library  import sympy  print(sympy.sqrt(8)) | √8 = 2\*2\*2 = 2 \* √2 | 2\*sqrt(2) |
| #using symbols  from sympy import symbols  x=symbols('x')  y=symbols('y')  print(x+y+x-y)  print((x+y)\*(x+y)) | 2X  (X+Y)(X+Y) = (X+Y)2 | 2\*x  (x + y)\*\*2 |
| #using expand  from sympy import expand  exp = expand((x+y)\*\*3)  print(exp) | (x+y)3 = x3+3x2y+3xy2+y3 | x\*\*3 + 3\*x\*\*2\*y + 3\*x\*y\*\*2 + y\*\*3 |
| #using factor  from sympy import factor  exp = expand((x+y)\*\*3)  print(factor(exp)) | Factor(x3+3x2y+3xy2+y3)  = (x+y)3 | (x + y)\*\*3 |
| #using simplify  from sympy import simplify  print(simplify((x+x\*y)/x)) | = y+1 | y + 1 |
| #using limit and sine  from sympy import limit,sin  print(limit(sin(x)/x,x,0)) |  | 1 |
| #using infinity  from sympy import oo  print(limit(x,x,oo)) |  | 00 |
| #using diff  from sympy import diff,tan  print(diff(sin(x),x))  print(diff(sin(2\*x),x))  print(diff(tan(x),x))  print(diff(sin(2\*x),x,1)) |  | cos(x)  2\*cos(2\*x)  tan(x)\*\*2 + 1  2\*cos(2\*x) |
| #using series  from sympy import series,cos  print(series(cos(x),x)) |  | 1 - x\*\*2/2 + x\*\*4/24 + O(x\*\*6) |
| #using integration  from sympy import integrate  print(integrate(6\*x \*\*5,x))  print(integrate(sin(x),x))  print(integrate(x\*\*3, (x,-1,1))) |  | x\*\*6  -cos(x)  0 |
| #equation solving  from sympy import solve  print(solve((x+5\*y-2,-3\*x+6\*y-15),(x,y))) | X + 5y – 2  -3x+6y-15 | {x: -3, y: 1} |
| #matrix  from sympy import Matrix  x=Matrix([[1,2],[3,4]])  y=Matrix([[1,3],[5,6]])  print(x+y)  print(x-y)  print(x\*y) | =  =  = |  |
| #using Rational  import sympy  a = sympy.Rational(1, 2)  print(a) |  | 1/2 |
| #using pi  import sympy  print(sympy.pi)  print(sympy.pi\*\*2)  print(sympy.pi.evalf())  print((sympy.pi+sympy.exp(1)).evalf()) |  | pi  pi\*\*2  3.14159265358979  5.85987448204884 |
| #using solveset  from sympy import solveset  print(solveset(x\*\*2 + 1, x))  print(solveset(x \*\* 4 - 1, x)) | =>  => |  |