**SYMBOLIC PROGRAMMING**

1. Solve the following using symbolic paradigm:

i. Calculate sqrt (2) with 100 decimals

**from sympy import \***

**expr = N(sqrt(2),100)**

**print(expr)**

ii. Calculate (1/2+1/3) in rational arithmetic.

**from sympy import \***

**a = Rational(1,2)**

**b = Rational(1,3)**

**print(a + b)**

iii. Calculate the expanded form of (x+y) ^ 6.

**import sympy as sym**

**x=sym.Symbol('x')**

**y=sym.Symbol('y')**

**exp=sym.expand((x+y)\*\*6)**

**print(exp).**

iv. Simplify the trigonometric expression sin (x) / cos (x)

**import sympy**

**from sympy import \***

**x=symbols('x')**

**expr=sin(x)/cos(x)**

**smpl=trigsimp(expr)**

**print(smpl)**

v. Calculate sin x -xx^3n

**from sympy import\***

**x=symbols('x')**

**expr=((sin(x)-x)/x\*\*3)**

**ans=expr.limit(x,0)**

**print("Limit x->0",expr,")=",ans)**

**2.** Develop a python code for to carryout the operations on the given algebraic manipulation for the given expression *a*2−*ab*+*ab*−*b*2=*a*2−*b*2  by using the symbolic programming paradigms principles.

**from sympy import \***

**a = symbols('a')**

**b = symbols('b')**

**expr = (a\*2 - a\*b + a\*b -b\*2)**

**smpl = simplify(expr)**

**print("eqn simplified: ",smpl)**

**3.** Give the Symbolic program for the expression given below:

1. ∬a2 da

**from sympy import \***

**x = a\*\*2**

**y = integrate(x, a)**

**print("result of Integrartion : ", y)**

1. 2x+y^2

**import sympy as sym**

**x=sym.Symbol('x')**

**y=sym.Symbol('y')**

**expr=solve(2\*x+(y\*\*2))**

**print(expr)**

1. 1/10 + 1/5

**from sympy import \***

**a = Rational(1,10)**

**b = Rational(1,5)**

**print(a + b)**

1. d/dx(sin(x))

**from sympy import \***

**x = symbols('x')**

**expr1 = diff(sin(x))**

**print(expr1)**