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**SUBJECT:** Artifical Intelligence (LAB)

**Task No -1**

**Why this code was made:**

This program was created to be a **dynamic calculator**—more advanced than a normal calculator. The purpose is to let users:

* Type mathematical expressions naturally.
* Solve both simple arithmetic (like 2+3\*4) and advanced math (like sin(30), log(100), sqrt(25)).
* Use user-friendly symbols like ×, ÷, and ^ without worrying about the exact Python format.
* Get results that are either numeric or symbolic depending on the input.

**How this code works:**

The calculator is built as a class. It defines a dictionary of functions and constants (sin, cos, tan, log, ln, sqrt, pi, e) so the calculator knows what operations it can perform.

When the user types an expression, the program automatically fixes it:

* + Replaces × with \*, ÷ with /, ^ with \*\* .
  + Adds multiplication signs where necessary, like in 2(3+4) = 2\*(3+4) or (2+3)(4+5) = (2+3)\*(4+5).

After cleaning, the expression is converted into a symbolic math object using sympy. Then:

* + If it contains variables (like x+2), it returns a symbolic result.
  + If it’s only numbers, it calculates the numeric value.
  + The numeric result is returned as an integer if exact, or rounded to four decimal places if it’s a decimal.
  + If the input is invalid, it shows an error message.

The calculator keeps running, asking for new expressions. Typing exit closes the program.

