

Problem 16

Warning: Graphic Functions!

17 points

JAVA: program name must be prob16.class C /C++ program name must be: prob16.exe

Task Description

Often times seeing the graph of a function is the best way to understand its properties. Write a program to graph a function y = f(x) over a specified range.

Program Input

The program will read one or more lines typed from the console. Each line contains an algebraic expression of a single variable x. Valid operations include addition, subtraction, multiplication, division, exponentiation (where a^b is represented by a^b), parentheses, sine, cosine, and log10. The program must evaluate the expression using standard arithmetic precedence rules: first functions and parenthesis, then exponents, then multiplication and division, then addition and subtraction. Back-to-back exponents must be evaluated right-to-left, all other operations left-to-right. When correctly parsed, the input will not cause divide by zero conditions. Trigonometric functions should operate in radians, not degrees. The program must display a prompt to the console before each line with the string "f(x)=", and it must terminate when the input-line is the word END.

```
f(x)=7.2*cos((x + 3) / 4)

f(x)=log(x+21)*5.771

f(x)=3*x^2-4*x+1

f(x)=END
```

Program Output

The program must plot each function over the range -10 to 10 in a 21x21 integer grid. Output values should be truncated (always round down). Each function must be plotted in its own grid. The program must draw X and Y axes.

