Plotting functions (variation)

Given a function y=f(x) in RPN-notation plot it with stars (*) and then (!) its derivation with crosses (+) for 0 <= x <= 20 with $\Delta x = 1$ in a diagram with 21*21 points (0 <= x, y <= 20). Empty fields are marked with dots (.). For plotting the real number y should be rounded to integer (-0.5 -> -1, -0.4 -> 0, 0.4 -> 0, 0.5 -> 1). The function and its derivation are continuous between 0 and 20. The function definition uses only the following characters: $0123456789x.+-*/^{\wedge}$

'^' means 'power of'. Items are separated by space.

Input

In the first line the number N of functions, then N lines with one function.

Output

The plot of each function and its derivation in 21 lines.

Example

Input:
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x 1 -
Output:
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