

# 772. Basic Calculator III Premium

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Implement a basic calculator to evaluate a simple expression string.

The expression string contains only non-negative integers, '+', '-', '\*', '/' operators, and open '(' and closing parentheses ')'. The integer division should **truncate toward zero**.

You may assume that the given expression is always valid. All intermediate results will be in the range of  $[-2^{31}, 2^{31} - 1]$ .

**Note:** You are not allowed to use any built-in function which evaluates strings as mathematical expressions, such as `eval()`.

### Example 1:

**Input:** `s = "1+1"`  
**Output:** `2`

### Example 2:

**Input:** `s = "6-4/2"`  
**Output:** `4`

### Example 3:

**Input:** `s = "2*(5+5*2)/3+(6/2+8)"`  
**Output:** `21`

### Constraints:

- `1 <= s <= 104`
- `s` consists of digits, '+', '-', '\*', '/', '(', and ')'.  
• `s` is a **valid** expression.

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