

1. Write a Python program that:
starts with the expression $f(x, y) = x^2 + y^2 - 2xy + x + y$.
Substitutes $y = 2xy$ into the expression. Then, substitute $x = 3x$ into the resulting expression and evaluate the result.
Your program should show the expression after each substitution and print the final evaluated result.
2. Write a Python program to simulate a vending machine using a dictionary to store the products and their types. The dictionary should have the product categories as keys (e.g., "Chocolate", "Juices", "Biscuits", "Lays", "Cool Drinks"), and the values should be a list of specific product types (e.g., "5 Star", "Dairy Milk" for chocolates).

The program should:

1. Display the available product categories and their types.
2. Allow the user to select a product category and then a specific product from that category.
3. Prompt the user to add money to the vending machine.
4. Track the user's balance and deduct the product's price.
5. Display the balance after purchase or inform the user if they don't have enough money.
6. Provide an option to add more money or exit the vending machine after each transaction.
7. Provide a way to end the session and return any remaining balance.

Make sure the program handles invalid inputs and maintains a clear flow for selecting products and managing balance.