# Program to calculate compound interest with monthly contribution at end of month

# First calculate the compound interest for principal using formula: A = P (1 + r/n)\*\*(nt)

# r = annual interest rate

# n = number of compounds per period (usually in months)

# t = time

principalinput = input("Enter principal: ")

annualrateinput = input("Enter annual rate: ")

numberoftimescompoundedinput = input("Enter number of times that the interest is compounded per year: ")

yearsinput = input("Time in years: ")

monthlycontributioninput = input("Enter monthly contribution amount: ")

# Convert entered input from strings into integers

principal = int(principalinput)

annualrate = (int(annualrateinput))/100

numberoftimescompounded = int(numberoftimescompoundedinput)

years = int(yearsinput)

monthlycontribution = int(monthlycontributioninput)

print ("The principal entered is: ", principal)

print ("The annual rate in decimal form is: ", annualrate)

print ("The number of times it will be compounded per year is: ", numberoftimescompounded)

print ("The number of years it will be compounded: ", years)

print ("The monthly contribution is: ", monthlycontribution)

# calculate compound interest plus the principal

preliminarynumber = (1 + (annualrate/numberoftimescompounded))

# print ("Preliminary number:", preliminarynumber)

raisedtopower = (numberoftimescompounded \* years)

# print ("Raised to power:", raisedtopower)

compoundinterestplusprincipal = principal \* (preliminarynumber\*\*raisedtopower)

print("The compound interest plus the principal is: ", compoundinterestplusprincipal)

# Now calculate the future value with deposits made at the end of the period

# Using formula: Monthly Payment × ( ( ( (1 + r/n)^(nt) ) - 1 ) / (r/n) )

# r = annual interest rate

# n = number of compounds per period (usually in months)

# t = time the money is invested (usually in years)

oneplus = (1+(annualrate/numberoftimescompounded))

raisedtopower2 = ((numberoftimescompounded\*years))

ratedividedbynumberoftimes = annualrate/numberoftimescompounded

halfdone = (((oneplus\*\*raisedtopower2)-1)/ratedividedbynumberoftimes)

futurevaluewithdeposits = monthlycontribution\*halfdone

print ("Future value with deposits: ",futurevaluewithdeposits)

totalamount = compoundinterestplusprincipal + futurevaluewithdeposits

print ("Total Amount:", totalamount)