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---------- QUESTION 1 ----------
Calculate the sum of an infinite series

Input a: 1

Input r, |r| < 1: .5

Number of terms (integer) in summation, k: 10
k, Sum in Theory, Actual Sum, %error

0	2.00000	1.00000	50.000000%
1	2.00000	1.50000	25.000000%
2	2.00000	1.75000	12.500000%
3	2.00000	1.87500	6.250000%
4	2.00000	1.93750	3.125000%
5	2.00000	1.96875	1.562500%
6	2.00000	1.98438	0.781250%
7	2.00000	1.99219	0.390625%
8	2.00000	1.99609	0.195312%
9	2.00000	1.99805	0.097656%
10	2.00000	1.99902	0.048828%

---------- QUESTION 2 ----------
This program calculates the monthly payment theoretically, and then verifies it.

Initial principal = 100

APR as a % = 5

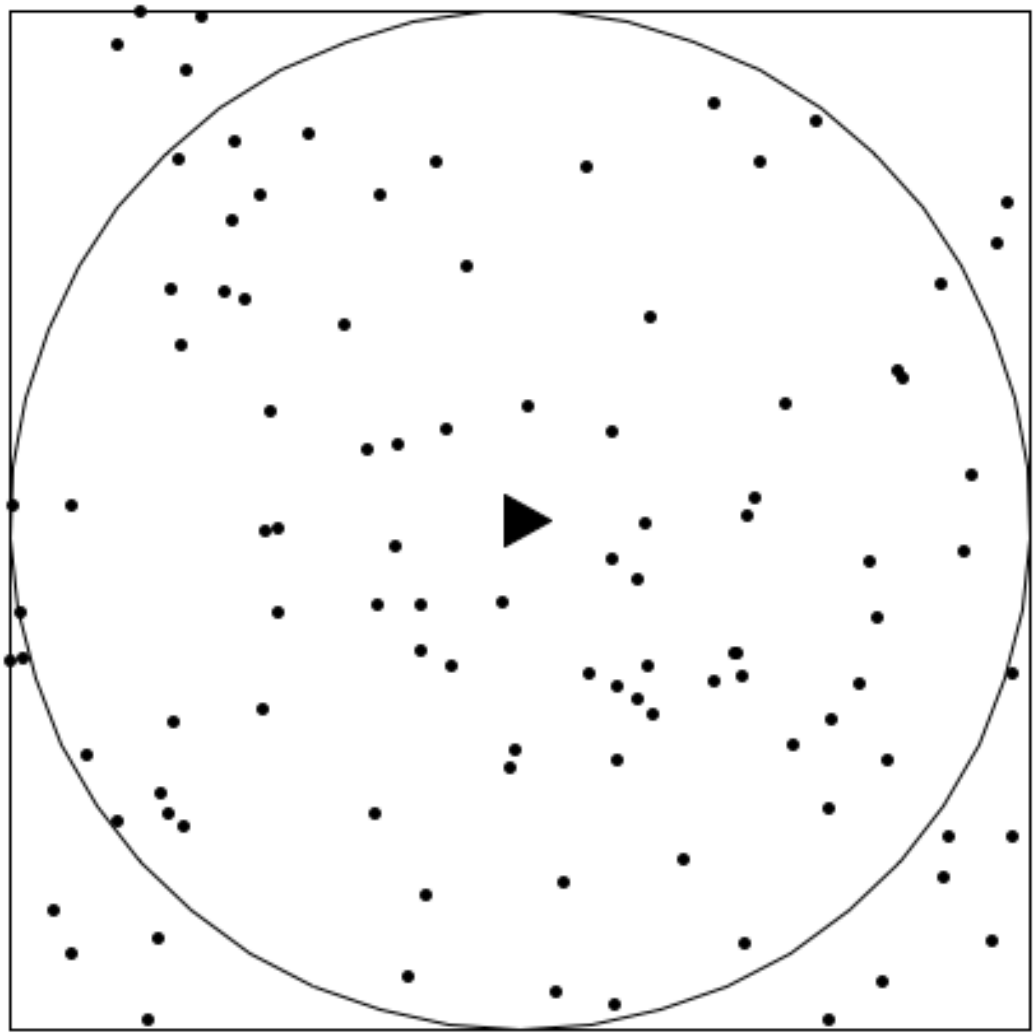
Duration of loan in number of months = 12

Monthly payment = $ 8.56

The month#, accumulated interest, and ending loan balance are:

0	0.00	100.00
1	0.38	91.86
2	0.73	83.68
3	1.05	75.47
4	1.33	67.22
5	1.57	58.94
6	1.78	50.62
7	1.96	42.27
8	2.10	33.89
9	2.21	25.47
10	2.28	17.02
11	2.31	8.53
12	2.31	0.00

---------- QUESTION 3 ----------
Number of "darts" in the circle: 81
The ratio of "darts" in the circle to total "darts thrown": 0.81000
The ratio, times 4: 3.24



CODE:

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### Question 1
print("---------- QUESTION 1 ----------")
print("Calculate the sum of an infinite series")

a = int(input("Input a: "))

r = float(input("Input r, |r| < 1: "))

while(abs(r) >= 1):
    r = float(input("Enter again  "))

k = int(input("Number of terms (integer) in summation, k: "))

s = a/(1-r)

print(" k, Sum in Theory, Actual Sum, %error")

for i in range(k+1):
    sum = 0
    for m in range(i+1):
        sum = sum + a*r**m

    print(format(i,'2.0f'), format(s, '.5f'), format(sum, '.5f'), format((s-sum)/s, '%'), sep='     ')


### Question 2
print("---------- QUESTION 2 ----------")
print("This program calculates the monthly payment theoretically, and then verifies it.")


P = int(input("Initial principal = "))
i = float(input("APR as a % = "))
n = int(input("Duration of loan in number of months = "))
i = i/100/n
I = float(P*i)/(1-(1+i)**(-n))
accumulatedInterest = 0

print('\n')

print("Monthly payment = $", format(I, '.2f'))

print('\n')

print("The month#, accumulated interest, and ending loan balance are:")

for j in range(n+1):
    balance = float((((1+i)**j)*P)-(I*(1-(1+i)**j))/(-i))
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    if(j!=0):
        accumulatedInterest = accumulatedInterest + balance*i
    print(format(j,'6.0f'), format(accumulatedInterest, '.2f'), format(balance, '.2f'), sep='            ')


### Question 3
print("---------- QUESTION 3 ----------")
import turtle
import random

g = turtle.Turtle()
g.shape("triangle")

r = 200
numDarts = 100
dartsInCircle = 0

g.up()
g.goto(-200,-200)
g.down()

for i in range(4):
    g.forward(r*2)
    g.left(90)

g.up()
g.forward(r)
g.down()

g.circle(r)

g.up()

for i in range(numDarts):
    x=200-400*random.random()
    y=200-400*random.random()
    if(x**2+y**2<r**2):
        dartsInCircle = dartsInCircle + 1

    g.speed(100)
    g.goto(x,y)
    g.dot()
    g.goto(0,0)


print("""Number of "darts" in the circle:""", dartsInCircle)
print("""The ratio of "darts" in the circle to total "darts thrown":""", format(dartsInCircle/numDarts,
‘.5f'))
print("The ratio, times 4: ", dartsInCircle*4/numDarts)
```