RAFAY AAMIR GULL

BSEE19047

Numerical Analysis A1

Q1 (A):

## Python Code

## Rafay Aamir

## BSEE19047

epsilon =1

while True:

if epsilon+1 <= 1:

break

epsilon=epsilon/2

epsilon=epsilon\*2

print("Epsilon of my Laptop is = ",epsilon)

# Output

# Epsilon of my Laptop is = 2.220446049250313e-16

Maltab Code

Graphical user interface, text, application

Description automatically generated

Output

Text, letter

Description automatically generated

Q1 (B):

Matlab code

Text

Description automatically generated with medium confidence

Output

Text

Description automatically generated

Q2:

## Python Code

## Rafay Aamir

## BSEE19047

import math as m

n=10000

limit=((m.pi)\*\*4)/90

approx\_value=0

true\_value=((m.pi)\*\*4)/90

print("True Value = ",true\_value)

for i in range(n):

if i!=0:

if approx\_value>limit:

print("Limit reached/ f converged to (pi^4)/90 at n = ",i," and approximated value of f = ",approx\_value)

break

if approx\_value<=limit:

approx\_value=approx\_value + 1/(i\*4)

approx\_value=approx\_value - 1/(i\*4)

print("Approximated\_Value", approx\_value)

error=(true\_value-approx\_value)

print("The true reletive error is ",error)

## Output

## True Value = 1.082323233711138

## Limit reached/ f converged to (pi^4)/90 at n = 44 and approximated value of f = 1.0874996551504568

## Approximated\_Value 1.0818178369686386

## The true reletive error is 0.0005053967424992756

Matlab code

Graphical user interface, text, application

Description automatically generated

Output

Text, letter

Description automatically generated

Q3:

## Python Code

## Rafay Aamir

## BSEE19047

import math as mt

def factorial(number):

fact=1

for i in range(number+1):

if i!=0:

fact=fact\*i

return fact

def approach1(Tn, n):

i=1

sum=1

for i in range(Tn):

if i !=0:

if (i%2==0):

sum=sum+((n\*\*i)/factorial(i))

else:

sum=sum-((n\*\*i)/factorial(i))

return (sum)

def approach2(Tn,n):

i=1

sum=0

for i in range(Tn):

if i !=0:

sum=sum+((n\*\*i)/factorial(i))

return (1/sum)

true\_value=0.006737947

Tn=20

n=5

print("True Value = ",true\_value)

print("Approximated Value from Approach 1 = ",approach1(Tn,n))

print("Approximated Value from Approach 2 = ",approach2(Tn,n))

## Output

## True Value = 0.006737947

## Approximated Value from Approach 1 = 0.006745540097711817

## Approximated Value from Approach 2 = 0.006783655460139556

Matlab Code

Graphical user interface, text, application

Description automatically generated

Output

Text

Description automatically generated

Q4:

Maltab Code

Text

Description automatically generated

Output

Graphical user interface

Description automatically generated with medium confidence