Math problems

Find the least integer n for which pn(2) approximates f(2) with three decimal place accuracy From f(a+h) approximately f(a)+h f(a)

When h is small enough in terms of value of f(a) and f(a)

it is possible to approximate the value of

f (a+h)

For this case

let approximate the value

Of 2. 1

Therefore 2. 1 can be expressed as

2. 1 = 2+ h where

h = 0. 1

Assuming f(x) = x

Then f1(x) = 1/2x

Therefore , by linear approximation formula

x+h= x +h/2x

And then

2. 1= 2+0. 1/22=

2. 1= 2+0. 035

= 1. 4495

Use Tylor polynomials to estimate the following to within 0. 01

e0. 8

ex = 1 + x + x2 + x3 +..+ xn

2 3 n

e0. 8 = 1 + 0. 8 + 0. 82 + 0. 83 + . + 0. 8n

2 3 n

= 1 + 0. 8 + 0. 82 + 0. 83

2 3

= 1 + 0. 8 + 0. 64 + 0. 212

2 6

= 1 + 0. 8 + 0. 32 + 0. 0353

= 2. 1553

Expand as indicated

Ln (x2)

Let x2 be (x-1)2

Where 2 is constant

= then

Ln (x-1)2= 2{(x-1)2/(x+1)2} +1/3{(x-1)3 /(x+2)3} + 1/5{(x-5)5/(x+5)5}

For x > 0

For

(a+b) n = an + n/1! a n-1b + n(n-1)/2!* an -2 b2.

For this case, let 1 be a and 2x be b

Therefore,

(1-2x)-3

= 1-3+3/11*1-3 2* + -3(-4)/2! * 1-5 +4x2 + ..

=-1+ {(-3/1!*1-4*(_2x)} +

(-3(-4)/2*1-5*4x2) +.

= -1+6x +24x2 +2

= 24x2+6x-1+2

Find interval of convergence

(-1) k (2/3) k (x+1) k

Lim (-1) k+1 (2/3) k+1 (x+1) k+1

(-1) k (2/3) k (x+1) k

Lim (-1) (2/3) (x+1)

1

= -2/3 (x+1)

=-(x+1) lim 2/3

= -x-1 lim 2/3

= -2/3 x+1 Therefore interval

-2/3 x+1 < 1 Convergence.

2 1/k k

(x-2) k

K (k+1) (k+2)

Lim 2 1/r k

(x-2) k 1/k

K (k+1) (k+2) (k+1)

Lim 2 1/k k (x-2) k+1

0

k (k+1)2 (k+2)

= x-2 2 1/k k (x-2) k+1

k (k+1)2 (k+2)

= 0

Therefore, f = 0 < 1

Evaluation of the given limits

Lim ex - 1 - x

x tan -1 c

Using hospital rule,

Lim ex - 1 - x

x tan -1 c = Lim ex - 1

Tan -1c

As the ex - 1 and tan -1c tends to zero, then

Lim ex

tan -1c

= 1=+

o

Estimate within 0. 01

1

e-3x dx

0

= [e-3x] 1

0

= [e-1 - e0]

= [0. 368 -1]

= -0. 632

Reference

Karner. G and Kuich. W, (1997). " Characterizations of Abstract Families of Algebraic Power Series".