

# [Math problems](https://assignbuster.com/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".