

---

## Table of Contents

.....	1
.....	1
INITIALIZATION .....	1
.....	2
CALCULATIONS .....	2
.....	2
FORMATTED TEXT DISPLAYS .....	2
.....	3
COMMAND WINDOW OUTPUTS .....	3
.....	3
ACADEMIC INTEGRITY STATEMENT --- .....	3

```
function [Counter, lnx_approx, Abs_Difference] =  
    PS10_taylor_ln_asartor_hkolagan(x, tolerance)  
  
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%  
% ENGR 132  
% Program Description  
% ... Computes the approxomation of a natural log of a given input  
% using  
% a taylor series  
%  
% Function Call  
% ...PS10_taylor_ln_asartor_hkolagan(x, tolerance)  
%  
% Input Arguments  
% 1. ...(x, tolerance)  
%  
% Output Arguments  
% 1. ...[Counter, lnx_approx, Abs_Differene]  
%  
% Assignment Information  
% Assignment: PS10, Problem 1  
% Author: Andrew Sartorio, asartor@purdue.edu  
% Team ID: 125-12  
% Paired Programmer: Harith Kolaganti, hkolagan@purdue.edu  
% Contributor: Name, login@purdue [repeat for each]  
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

---

## INITIALIZATION

```
%Sets accpectable bounds for x value to compute the natural log of and  
%tolerance  
if x>2 | x<=0
```

---

```

        disp('Error: Invalid X value')
        y=1;
    end
    if tolerance>1 | tolerance<0
        disp('Error: Invalid tolerance')
        y=1;
    end

    %Initializes variables within the loop
    Term_1= (((-1)^2)*(x-1)^1)/(1);
    lnx_approx = Term_1;
    Abs_nth_term = abs(Term_1);
    Counter=1;

```

---

## CALCULATIONS

```

    %Does not let the while loop run if there is an error, then computes
    the
    %approxomate natural log of "x" accroding to a taylor series
    if y ~= 1;

    while Abs_nth_term > tolerance

        Term_n = (((-1)^(Counter+1)*(x-1)^Counter)/Counter)
        lnx_approx = lnx_approx + Term_n
        Abs_nth_term = abs(Term_n);
        Counter = Counter + 1;
    end

    Abs_Difference = abs(lnx_approx - log(x));

```

---

## FORMATTED TEXT DISPLAYS

```

fprintf('The number of terms used is %d\n',Counter)
fprintf('The approximate natural log is %.2f\n', lnx_approx)
fprintf('The absolute difference between the real and approximated
values is %.2f', Abs_Difference)

end

Undefined function or variable 'y'.

Error in PS10_taylor_ln_asartor_hkolagan (line 51)
if y ~= 1;

```

---

## COMMAND WINDOW OUTPUTS

```
%Inputs:(.5, .05)
%The number of terms used is 4
%The approximate natural log is -1.17
%The absolute difference between the real and approximated values is
0.47
```

```
%Inputs:(3,.5)
%Error: Invalid X value
```

```
%Inputs:(2,3)
%Error: Invalid tolerance
```

---

## ACADEMIC INTEGRITY STATEMENT ---

I/We have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have I/we provided access to my/our code to another. The project I/we am/are submitting is my/our own original work.

*Published with MATLAB® R2016b*