Problem 1:

1. Write a function that takes an interval and returns the two points on the x axis used in one iteration of a golden section search

**function** **[**outLower**,**outUpper**]** **=** GoldenRatio**(**inLower**,**inUpper**)**

%function [outLower,outUpper] = GoldenRatio(inLower,inUpper)

% Golden Ratio is a function which returns the two inner values which

% are needed for Golden ration given two intial lower and upper

% bounds

% Inputs: inLower, the lower bound for "x"

% inUpper, the upper bound for "x"

% Outputs:outLower, the lower GR value

% outUpper, the upper GR value

%Follow the formula used in class

dist **=** **(**inUpper **-** inLower**)** **/** 1.618**;**

outLower **=** inUpper **-** dist**;**

outUpper **=** inLower **+** dist**;**

**end**

1. Write a script that calls the function from 2(a) three times, starting with the interval [5,7]. Discard the left-most, right-most, and left-most sections during the three iterations, in order.

%Code for Problem 1

xLower **=** 5**;**

xUpper **=** 7**;**

%Run the first time

**[**outLower**,** outUpper**]** **=** GoldenRatio**(**xLower**,** xUpper**);**

%Throw out the leftmost

xLower **=** outLower**;**

fprintf**(**"First Run: xLower is %.4f and xUpper is %.4f\n"**,**...

xLower**,** xUpper**);**

%Run a second time

**[**outLower**,** outUpper**]** **=** GoldenRatio**(**xLower**,** xUpper**);**

%Throw out the rightmost

xUpper **=** outUpper**;**

fprintf**(**"Second Run: xLower is %.4f and xUpper is %.4f\n"**,**...

xLower**,** xUpper**);**

%Run a third tim

**[**outLower**,** outUpper**]** **=** GoldenRatio**(**xLower**,** xUpper**);**

%Throw out the leftmost

xLower **=** outLower**;**

fprintf**(**"Third Run: xLower is %.4f and xUpper is %.4f\n"**,**...

xLower**,** xUpper**);**

|  |  |  |  |
| --- | --- | --- | --- |
|  | First Run | Second Run | Third Run |
| Lower | 5.7639 | 6.2360 | 6.0557 |
| Upper | 6.2361 | 6.5279 | 6.2361 |

The final bounds are [6.0557, 6.5279].

Problem 2:

1. =