MAT-08B For-Loops 1 HW

Problems: 1,2,3,4

Do this assignment in one Script File. The first seven lines should

```
clc
clear
format compact
format short g %gives best default representation
disp ('First Name, Last Name')
disp ('ENG1181, Seat #')
disp ('Array Creation HW')
```

Then for each problem

```
disp ('Problem #')
```

Special Instructions:

Beginning with this assignment and for all subsequent assignments, you need to include units whenever you have them. If you do not understand the units used, ask. If you do not add units, points will be deducted.

Problem 1:
The circumference of an ellipse can be approximated by:

- \( C = \pi [3(a + b) - \sqrt{(3a + b)(a + 3b)}] \)

- Have the user input the \( a \) and \( b \) values to calculate the circumference of an ellipse. Have the user enter the following test cases:
  - Case 1: \( a= 16 \) in, \( b= 34 \) in
  - Case 2: \( a= 23 \) in, \( b= 11 \) in
  - Case 3: \( a= 56 \) in, \( b= 34 \) in

Use fprintf to display a descriptive message and the following information, the case number and circumference of the ellipse. Include comments in the code

Problem 2:
According to Zeno’s paradox any object in motion must arrive at the halfway point before it can arrive at its destination. Once arriving at the halfway point, the remaining distance is once again divided in half and so on to infinity. Since it is impossible to complete this process, Zeno concluded all motion must be an illusion. Letting the length by unity, Zeno’s paradox can be written in terms of the infinite sum \( \sum_{n=1}^{\infty} \frac{1}{2^n} = 1 \). To see how quickly this series converges to 1, use a for loop and ask the user to input the following \( n \) values to compare the sum:

- \( a) n = 5 \)
- \( b) n = 10 \)
- \( c) n = 40 \)

For each part create a vector \( n \) in which the first element is 1, the increment is 1, and the last term is 5,10,40. Then use element-by-element calculations to create a vector in which the elements are \( \frac{1}{2^n} \). Finally use the MATLAB built-in function \( \text{sum} \) to add the terms of the series. Compare the values obtained in parts (a),(b), and (c) with the value 1. Use \( \text{disp} \) to display a descriptive message, the number of terms (\( n \) value), the sum value, and the difference. Include comments in the code
Problem 3:
Ask user to input an integer, m. Then use a for-loop to create a column array that is twice as big as m, starting with 1 to 2*m. Use disp to display the resulting array. For m use 5. Include comments in the code

Problem 4:
Use a for loop to extract every 2^{nd} element from the array and then divide that number by 2. Store the results in a new array. Use disp to display the resulting array.

Submit printouts of both the Script File and the Command Window