

APM 153 Assignment Five – Calculating Compound Interest, Plotting in Matlab

bank.m

(1) Write a function named **bank.m** that calculates **the daily balance** in a bank account for a given number of years with interest compounded any one of three ways: annually, monthly, or daily.

(2) The input arguments for the function will be,...

- A. the starting balance
- B. the interest rate
- C. the number of years to calculate the balance
- D. whether to compound interest once a year, once a month, or once a day.

(3) The output of the function will be,...

- A. the final balance at the end of the calculation
- B. the daily balance regardless of what type of interest is earned.

(4) When you run your bank.m function you will type in something like the following,...

```
>> bank(1000, 0.05, 10, 'a');      (You must use the semicolon when you call the  
                                function to suppress unwanted output)
```

(5) The first line of code in our function should look like the following.

```
function output = bank(balance, interest, years, method)
```

(6) The word “output” is the output argument. It is a vector that holds the daily balance.

(7) When you call your function from the Matlab Command Window, your output should look like the following.

```
>> bank(1000, 0.05, 10, 'a');
```

```
Starting Balance : $1000.00  
Interest Rate   : 5.00 percent  
Compounded     : annually  
Ending Balance  : $1628.89
```

(8) You will need to use the `fprintf` command to get your output to look right. Being able to make your output conform to the style above demonstrates that you can control output.

(9) Once your program writes out the correct output, turn on a diary file and run your program using the following input: \$1000 starting balance, 5% annual interest, compounded annually, monthly and daily for 10 and 30 years each. (six runs total)

Plotting in Matlab

(10) As you perform the six calculations above, you can also plot the results in Matlab. To plot your results when you call your function, type in the following.

```
>> plot ( bank (1000, 0.05, 10, 'a')
```

(11) After plotting the annual interest for 10 years, type in **hold**

(12) Then plot the monthly interest and daily interest for ten years on the same plot.

(13) Save your plot as **bank10.bmp** - you will need to **save as** and choose **bitmap**.

(14) Make a second plot named **bank30.bmp** for 30 years with annual, monthly, and daily interest.

(15) Assignment Five will be due in lab on March 3rd, 2006. You will turn in a single MS Word document with **page numbers** that contains **all** of the following.

Part One – Your algorithm for `bank.m` written as pseudocode and as a flowchart

Part Two – A copy of your `bank.m` mfile with all proper documentation and a help file.

Part Three – A copy of your diary file showing the Command Window output for all six runs.

Part Four – A copy of the two figures showing the 10-year and 30-year plots.

Each plot should have a title and a legend and axis labels.

Use your textbook to find out how to add these to your plots.