# Python Calculus Activity Handout

**Step 1 Python code:**

```
1 #This program will double all of the elements of a given
2 #list and then sum all the resulting values
3
4 import math
5
6 list1 = [23,1,5,9,2,4,5,6,2,18] #list1: a given list of numbers
7
8 s = 0 #initialize the sum to zero
9
10 length = [          ]   #store the length of list1 as a variable named 'length'
11
12 for i in range(0,length): #a for loop will iterate though the elements of list1
13
14     [                    ] #double each element of list1 and overwrite the
15                            #old values of list1
16
17
18     [                ]  #print (output) each changed element of list1
19
20
21     [              ] #add each elemet of list1 to the sum
22
23
24
25 print s #outside the for loop, print out the final sum
26
```

**Step 2 Python code:**

```
1   # This program will approximate the slope of a tangent line
2   # to a function f(x) at a value of x, where x = t, using the satndard slope formula
3   # (y2 - y1)/(x2 - x1) or (f(t + h) - f(t))/(t + h - t)
4
5   import math
6
7 - def f(x):
8       return x**2
9
10
11  inputs1 = [1,.1,.001,.0001,.00001, .00000001]
12
13  t = 8
14
15 - for h in inputs1:
16       print 1.0*(f(t + h) - f(t))/(t + h - t)
17
18  print "#########################"
19  |
20 - for h in inputs1:
21       print 1.0*(f(t - h) - f(t))/(t - h - t)
22
```