

Answer Key

Names: _____

Date: _____

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      #print (output) each changed element of list1
18
19
20      #add each elemet of list1 to the sum
21
22
23
24
25 print s #outside the for loop, print out the final sum
26
```

Step 1 Python code ANSWER (missing code is provided) ↓

```
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 = len(list1) #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     list1[i] = 2*list1[i] #double each element of list1 and overwrite the
15     #old values of list1
16
17
18     print list1[i] #print (output) each changed element of list1
19
20
21     s += list1[i] #add each elemet of list1 to the sum
22
23
24
25 print s #outside the for loop, print out the final sum
26
```

Answer Key

Names: _____

Date: _____

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 standard 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, .0000001]
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
```

Step 2 Python code ANSWER (missing comments are provided) ↓

```
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 standard slope formula
3 # (y2 - y1)/(x2 - x1) or (f(t + h) - f(t))/(t + h - t)
4
5 import math #imports the math module
6
7 def f(x): # define the function
8     return x**2 # enter the equation of the function
9
10
11 inputs1 = [1, .1, .001, .0001, .00001, .0000001] # these are values of h
12
13 t = 8 # this is the input of the point of tangency
14
15 for h in inputs1:
16     print 1.0*(f(t + h) - f(t))/(t + h - t) #compute slopes from the right side
17
18 print "*****" #print a separator
19
20 for h in inputs1:
21     print 1.0*(f(t - h) - f(t))/(t - h - t) #compute slopes from the left side
22
```