**Short Answer [5 min]**

1. How do you know you should use a for loop versus a while loop?

When you know the range

1. In longest digit run we kept track of four things as variables. What were they?

Longestdigit, currentdigit, longest count, current count

1. What happens when the bounds of a for loop look like this: “for i in range(5,3)”?

Returns nothing

**Reasoning Over Code**  **[12 min]**

Find arguments for the following functions that make them return True.  You only need one set of arguments for each function, even if there are multiple correct answers.

def f(x, y):

assert((type(x) == int) and (type(y) == int) and (100 > x > y > 0))

z = 0 if (x+y==50) else 123

while (x//10 != y//10):

x -= 10

z += 1

return (x == z == 4)

x=44,y=6

def g(z):

assert((type(z) == int) and (100 > z > 0))

step = total = 0

while (total < 25):

step += 1

for y in range(1,6,step):

total += y

return (step == z)

step 1 total 15

step 2 total 24

step 3 total 29

z=3

2.    **Code Tracing [12 min]**

Indicate what each will print:

def f(x,y):

    m = 0

    for z in range(x,y,2):

        if (z%x == m):

            print(z, end = “”)

            m += 1

        elif (z%x == m+3):

            print(".", end=””)

        if (z%5 == 1):

            print("\*", end = “”)

f(5, 12)

5 11 None

def g(z):

    for x in range(1,z,3):

       print("#", x, ":", end = “”)

       for y in range(z, x, -2):

           print (x,y),

       print()

g(6)

#1: 1,6 1,4 1,2

#4: 4,6

None

**Free Response [20 min, 10 min each]**

**nthSumProduct**

A sum - product number is a number that is equal to the sum of its digits times the product of its digits. So 144 is a sum-product because 1 + 4 + 4 = 9, and 1 × 4 × 4 = 16, and 9 × 16 = 144.

**isOddish**

We will say that a value is *oddish* if it is a positive integer where the sum of its odd digits is greater than the sum of its even digits.  With this in mind, write the function isOddish that takes any value (including non-integers) and returns True if it is oddish.