Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_

AP Computer Science “A”

Recursion Quiz

**PLEASE SHOW ALL WORK!**

1. int mist(int n){

if ( n == 1){

return 3;

}else{

return 3 \* mist(n-1);

}

}

What value does mist(5) return?

2. void misty(int n){

if(n > 4){

misty(n%4);

}

System.out.print(n/4 + “ “);

}

What sequence of numbers will the call to misty(38) yield?

3. int mistier(int n){

if ( n == 0){

return 1;

}else{

return 4 \* mistier(n-1) + 2;

}

}

What value does mistier(3) return?

4. int mistiest(int n){

if ( n == 6){

return 6;

}else{

return 2 \* mistiest(n+1);

}

}

What value does mistiest(2) return?5. int whoKnows(int n){

if ( n <= 1){

return n;

}else{

return n + whoKnows(n-1);

}

}

What value does whoKnows(5) return?

1. int weird(int p, int q){

if ( p == 1){

return p +1;

}else if(q == 0){

return weird(p-1, q);

} else{

return weird(p-1, weird(p, q-1));

}

}

What does weird(2,2) return?

1. int weirder(int r, int s){

if ( r == 0 || r == s){

return 1;

}else{

return weirder(r-1, s) + weirder(r-1, s-1);

}

}

What is the return value of weirder(3,2)?

8. void weirdest(int x){

if ( x > 1){

weirdest(x/2);

}else{

System.out.print(x + " ");

}

}

What is the output of the call weirdest(40)?

1. void weirdo(int x){

if( x > 1 ){

weirdo(x/2);

}

System.out.print(x + “ “);

}

What is the output of the call weirdo(40)?

10. void weirdom(int x){

System.out.print(x + " ");

if( x > 1 ){

weirdom(x/2);

}

}

What is the output of the call weirdom(40)?

**BONUS QUESTIONS**

1. The Monkey and the Coconut (5 points)

Ten people land on a deserted island. There they find lots of coconuts and a monkey. During their first day they gather coconuts and put them all in a community pile. After working all day they decide to sleep and divide them into ten equal piles the next morning.

That night one castaway wakes up hungry and decides to take his share early. After dividing up the coconuts he finds he is one coconut short of ten equal piles. He also notices the monkey holding one more coconut. So he tries to take the monkey's coconut to have a total evenly divisible by 10. However when he tries to take it the monkey conks him on the head with it and kills him.

Later another castaway wakes up hungry and decides to take his share early. On the way to the coconuts he finds the body of the first castaway, which pleases him because he will now be entitled to 1/9 of the total pile. After dividing them up into nine piles he is again one coconut short and tries to take the monkey's slightly bloodied coconut. The monkey conks the second man on the head and kills him.

One by one each of the remaining castaways goes through the same process, until the 10th person to wake up gets the entire pile for himself. What is the smallest number of possible coconuts in the pile, not counting the monkeys?

2. The Pigeon (2 points)

Two friends decide to get together; so they start riding bikes towards each other. They plan to meet halfway. Each is riding at 6 MPH. They live 36 miles apart. One of them has a pet carrier pigeon and it starts flying the instant the friends start traveling. The pigeon flies back and forth at 18 MPH between the 2 friends until the friends meet. How many miles does the pigeon travel?

1. Answer: 2519

The solution for the answer is the LCM (Lowest Common Multiple) of 10,9,8,7,6,5,4,3,2,1 -1. LCM would give the least number which is divisible by all of these number and subtracting one would give us the number of coconuts which were initially there.

2. Answer: 54.

It takes 3 hours for the friends to meet; so the pigeon flies for 3 hours at 18 MPH = 54 miles.