1. Trace the following program and show the separate stack frames (i.e. the values of the parameters and/or local variables in each stack frame). Show the final output in the rectangle provided as well.

```java
public class RecursionWorksheet1Ex1
{
    public static void main(String[] args)
    {
        int num = 10;
        System.out.println(mystery(num));
    }

    public static int mystery(int myNum)
    {
        if (myNum < 2)
            return 3;
        else
            return 2 + mystery(myNum - 2);
    }
}
```
Output:

2. What is the output of the program in Exercise #1 if the original value of the variable num is 1 instead of 10?

3. Trace the following program and show the separate stack frames (i.e. the values of the parameters and/or local variables in each stack frame). Show the final output in the rectangle provided as well.

```java
public class Ch17Worksheet1Ex3
{
    public static void main(String[] args)
    {
        int num = 13;
        System.out.println(mystery(num));
    }

    public static int mystery(int myNum)
    {
        if (myNum <= 0)
            return 0;
        else if (myNum % 2 == 0)
            return 2 + mystery(myNum - 1);
        else
            return 1 + mystery(myNum - 2);
    }
}
```

Output:

Java   Name –
Recursion Worksheet #3   Period –

1. Compute `mystery(20)` where `mystery` is the following recursive method. Show scratchwork for full credit.

```
public static int mystery(int num)
{
    if (num > 0)
        return (num + mystery(num - 1));

    return 0;
}
```

2. Rewrite `mystery` as an iterative function as simply and as efficiently as possible.

```
public static int mystery(int num)
{
```

Name: _____

AP Computer Science

Recursion Worksheet

1) What is the output?

```java
public class RecursionWorksheet {
    public static void main(String[] args) {
        blah(64);
    }//end main
    public static void blah(int n){
        if(n%2!=0)
            return;
        else{
            System.out.print(n+" ");
            blah(n/2);
        }
    }//end blah
}
```

2) Rewrite the function above to reverse the order of the numbers that are output.

3) What is the output of the following code?

```java
public class RecursivePractice {

    public static void main(String[] args) {
        System.out.print(function("hello"));
    }

    public static String function(String s) {

        if(s.length()==0){
            return "";
        }

        return( s.charAt(s.length()-1) +
                function(s.substring(0,s.length()-1)) );
    }
}
```

4) What is wrong with this code? What error could result?

```java
public static int badMethod(int n) {
    if(n==1)
        return 1;
    else
        return n * badMethod(n-2);
}
```

5) Complete the following recursive function:

```java
/*Preconditions: n is a nonnegative integer
 * Postconditions: returns 3^n
 */
public static int threeRaisedTo(int n){



}
```

6) Consider the following function:

```
public static int fun(int b, int e){
        if(e==0)
                return 1;
        else
                return b*fun(b, e-1);
}
```

What is the output of the following?
a) fun(2, 3):
b) fun(3, 3):
c) fun(2, 4):
d) fun(5, 2):

7) Write a recursive function that sums all the even numbers less that a given EVEN number n.

Java   Name -
Tracing Recursion Worksheet #1   Period -

1.
```java
public int sum(int n)
{
    if (n == 1)
        return 1;
    else
        return n + sum(n - 1);
}
```

What value is returned by the method call   sum(5) ?

2.
```java
public int result(int n)
{
    if (n == 1)
        return 2;
    else
        return 2 * result(n - 1);
}
```

What value is returned by the method call   result(5) ?

3.
```java
public int mystery(int n, int a, int d)
{
    if (n == 1)
        return a;
    else
        return d + mystery(n - 1, a, d);
}
```

What value is returned by the method call mystery(3, 2, 6) ?

4.
```java
public int f(int k, int n)
{
    if (n == k)
        return k;
    else
        if (n > k)
            return f(k, n - k);
        else
            return f(k - n, n);
}
```

What value is returned by the method call   f(6, 8) ?

1.
```java
public void strRecur(String s)
{
    if (s.length() < 6)
    {
        System.out.println(s);
        strRecur(s + "*");
    }
}
```

What is displayed by the method call   `strRecur("wyo")` ?

2.
```java
public void printString(String s)
{
    if (s.length() > 0)
    {
        printString(s.substring(1));
        System.out.print(s.substring(0, 1));
    }
}
```

What is displayed by the method call   `printString("wyo")` ?

3.
```java
public void doSomething(int n)
{
    if (n > 0)
    {
        doSomething(n - 1);
        System.out.print(n);
        doSomething(n - 1);

    }

}
```

What is displayed by the method call   `doSomething(3)` ?

4.
```java
public int mystery(int n)
{
    if (n < 0)
        return 2;
    else
        return mystery(n - 1) + mystery(n - 3);
}
```
What value is returned by the method call   `mystery(3)` ?

AP JAVA
Recursion Worksheet #1

1. For the following method, what would be displayed by the call `mystery1(5)`?
```java
public void mystery1(int nNum){
    if(nNum <= 0)
        return;
    else
    {
        System.out.println(nNum);
        mystery1(nNum - 1);
    }
}
```

2. For the following method, what would be displayed by the call `mystery2(5)`?
```java
public void mystery2(int nNum){
    if(nNum <= 0)
        return;
    System.out.println(nNum);
    mystery2(nNum - 1);
}
```

3. For the following method, what would be displayed by the call: `mystery3(4)`?
```java
public void mystery3(int nNum){
    if(nNum <= 0)
        return;
    for(int nI = 0; nI < nNum; nI++)
        System.out.print("-");
    for(int nI = 0; nI < nNum; nI++)
        System.out.print("+");
    System.out.println();//ends the line
    mystery3(nNum - 1);
}
```

4. For the following method, what value would be returned by the call: ans =`mystery4(4)`?
```java
public int mystery4(int nNum){

if (nNum>1)
        return nNum*mystery4(nNum-2);
else
        return 2;
}
```