

CS200 Induction Worksheet

Prove the following statements using induction

a) Sum of odds:

$$1 + 3 + 5 \dots + (2n-1) = n^2$$

b) Exponential vs polynomial:

$$2^n > n^2 \text{ for } n > 5$$

c) Sum of squares:

$$1 + 4 + 9 \dots + n^2 = n(n+1)(n+2)/6$$

d) Given:

```
public class Multi {  
  
    private int recMul(int m, int n){  
        // pre: m>0 && n>0  
        if(m==1)  
            return n;  
        else  
            return n + recMul(m-1,n);  
    }  
  
    public static void main(String[] args){  
        Multi m = new Multi();  
        System.out.println("7*5= " +m.recMul(7,5));  
        System.out.println("8*11 = " +m.recMul(8,11));  
    }  
}
```

Proof that recMul computes $m*n$ for all $m>0, n>0$