4. Use substitution to find the running time of this function: T(n) = n2 + T(n/2)

T(n) = n2 + T(n/2)

= n2 + (n2/22) + T(n/22) [after step 1]

= n2 + (n2/22) + (n/22)2 + T(n/23) [after step 2]

= n2 +  n2/22 + n2/24 + T(n/23)

= n2(1 + 1/22 + 1/24 + … + 1/22(k-1)) + T(n/2k) [after step k]

= n2(1 + 1/22 + 1/24 + … + 1/22(k-1)) + T(n/2k)

= 2 \* n2 + c [Assuming, T(1) = c]

2 \* n2 + c < kn2 ,

1 + 1/22 + 1/24 + … + 1/22(k-1)

= 1 + 1/22 (1 + 1/22 + … + 1/2(k-1))

= 1 + 1/22 (1 + 1/22 + … + 1/2(k-1))

= 1 + 1/ (1 - 1/2)

= 1/2

T(1) = c

n = 2k

or, log2 n = k

5. Use substitution to find the running time of this function: T(n) *=* n*2* + 4T(n/2)*.*6. Use substitution to find the running time of this function: T (n) = n2 + 8T(n/2).