1. Determine the height of the Antenna for TV stations that must be able to reach customers 80Kms away. Use Okumura-Hatta Model for rural environment with fc=75Mhz and Hr=1.5m. Transmitter power 150Kw and received power must be greater than 10^-13 W

Lru = 20 log(4πd/ λ)

Lru = 20 log(4π \* 80000 / 4) [λ = c/f => 3\*108/75\*106 => (4)]

Lru = 108 dBW  
  
Lru = Lu  - 4.78(log f)2 – 18.33 log f – 40.94  
Lu = Lru + 4.78(log f)2 + 18.33 log f + 40.94  
 = 330.932665797 dBW  
According to Okumura Hata Model,  
Lu = 69.55 + 26.16 logf – 13.82log hb – A(hm) + (44.9 – 6.55 log hb) log d

A(hm) = (1.1 log f -0.7)hm – (1.56 log f – 0.8)  
 A(hm) = 0.4587555137

= 330.932665797 = 69.55 + 26.16 logf – 13.82log hb – 0. 4587555137 + (44.9 – 6.55 log hb) log d

= 330.932662665797 = 275.102847137 – 13.82log hb + (44.9 – 6.55 log hb) log d  
= -164.318924887 = – 13.82log hb - 6.55 log hb \* log d  
= 164.318924887 = (13.82+ 32.1152394148) log hb  
= 3.5771866432 = log hb  
Hb=3777 m