Answers to homework on antennas and wave propagation

1. A mobile station using GSM at 900 MHz has a distance of 20 km from the base station. It is a clear day. The antenna gain of the base station is 6 dB_i. The gain of the receiver is 0 dB_i. Assume a fading margin due to multipath reflection of 15 dB. What will be the received power in the mobile if the transmitted power from the base station is 40 W? Give the answer in dBm.
   Ans: A link budget using these values: P_t = 40W = 16dBW. G_t=6dB_i- L_s[dB] 117.5dB. G_r=0dBi. Fading margin 15dB gives P_r = -110.5dBW = - 80.5 dBm.

2. How much will the received power increase if the diameter of the parabolic antenna is doubled?
   Ans: If the diameter is doubled the area will increase four times. The antenna gain will increase four times, see Table 6.2.