1. You are designing a line-of-sight communications system between two towns that are 40km apart. The receiving antenna is at a height of 150ft AGL (Above Ground Level). You can place the transmitting antenna on top of a building 50ft AGL.

   (a) Determine whether the antennas will have LOS. LOS? = Yes

   $R_{LOS,mi} = \sqrt{2(150)} + \sqrt{2(50)} = 27.32$ mi
   27.32 mi $\times$ 1.61 km/mi $= 43.99$ km
   43.99 km $\geqslant$ the 40 km between the towns: yes

   (b) Determine the max LOS range for this setup. R = 44.0 km

   The horizon distance found in (a):
   $R_{LOS} = 27.32 \times 1.61 = 43.99$ km ≈ 44.0 km

2. You are flying a drone at the maximum legal height of 400ft AGL. What will be your maximum LOS distance (in km), assuming you are standing at 0ft AGL?

   You are at 0 ft, so your term is zero: $R_{LOS,mi} = \sqrt{2(400)} + \sqrt{2(0)} = 28.284$ mi
   28.284 mi $\times$ 1.61 km/mi $= 45.54$ km ≈ 45.5 km

   R_{LOS} = 45.5 km

3. If your drone falls to 150ft AGL, what is the new maximum LOS distance (in km)?

   $R_{LOS,mi} = \sqrt{2(150)} + \sqrt{2(0)} = 17.32$ mi
   17.32 mi $\times$ 1.61 km/mi $= 27.89$ km ≈ 27.9 km

   R_{LOS} = 27.9 km