1. A squadron of planes is approaching a RADAR installation. The squadron has the following characteristics:

   $\sigma = 8\text{m}^2$
   $\text{G}_\text{R} = 3.2$
   $\text{P}_{\text{r,min, RWR}} = 400\text{nW}$
   altitude = 3500ft, AGL

   The RADAR installation has the following characteristics:

   $f = 900\text{MHz}$
   $\text{G}_\text{T} = 250$
   $\text{P}_\text{T} = 9\text{kW}$
   $\text{P}_{\text{r,min,RADAR}} = 15\text{fW}$
   altitude = 175ft, AGL

   (a) For the conditions specified, what will be the maximum line of sight distance between the RADAR and the lead aircraft? $\text{R}_\text{LOS} =$ ____

   (b) What is the maximum distance from which the lead aircraft's RWR will detect the RADAR? $\text{R}_\text{RWR} =$ ____

(c) What is the maximum distance from which the RADAR will detect the planes? $R_{RADAR} =$ [ ]

(d) Who will see who first, and at what range? Answer = [ ]

2. For the data given in Problem 1, what would be the planes' new altitude so that the line-of-sight distance matches the RWR detection distance?

Altitude = $\square$

3. For the data given in Problem 1, what is the minimum RCS value (σ) required for the RADAR to be able to detect the plane at the original LOS distance?

σ = $\square$

4. The RCS of a fighter is approximately 20 square meters. The RCS of a missile is approximately 0.2 square meters. How many times farther away can the fighter be detected than the missile?

σ = $\square$

5. During an exercise, a UAS is used to gather information on the red forces. The red team has deployed a mobile RADAR unit, with the following parameters:

RADAR unit	UAS
Frequency = 450 MHz	RCS = 0.4 m^2
Transmit Power = 1.5kW	Receive antenna gain = 3
Antenna gain = 200	Minimum power received = 1.25 μW
Minimum power received = 1 fW	

(a) If the RADAR signal takes 133.3 us to return, how far away is the UAS? R_{LOS} =

(b) How much power is received by the RADAR if the UAS is 30 km from the RADAR? R_{RWR} =

(c) For the conditions specified, what will be the maximum line of sight distance between the RADAR and the UAS? R_{LOS} =

(d) What is the maximum distance from which the UAS RWR will detect the RADAR? $R_{RWR} =$ [ ]

(e) What is the maximum distance from which the RADAR will detect the UAS? $R_{RADAR} =$ [ ]

(f) Who will see who first, and at what range? Answer = [ ]