In-class problems

Consider a 20-element standard linear array. Can you predict how the MVDR beampattern will differ from the conventional beampattern in the following cases?

1. The noise field consists of spatially white noise plus one discrete interferer at $u_I = 0.15$ with INR=40 dB.
2. The noise field consists of spatially white noise plus two discrete interferers at $u_I = \pm 0.1$ with INR’s of 20 dB.
3. The noise field consists of spatially white noise plus a discrete interferer at $u_I = -0.25$ with INR=20 dB and a discrete interferer at $u_I = .05$ with INR=0 dB.
In-class problems

4. Suppose that you have a 30-element linear array. What is the maximum possible value for the white noise gain for this array? What beamformer is guaranteed to achieve this white noise gain?

5. Suppose that you use two conventional beamformers to process data. The data contains the desired planewave signal plus spatially white noise. Beamformer #1 has a white noise gain of 10 dB and Beamformer #2 has a white noise gain of 20 dB. How do you expect the two outputs to differ? How do you build conventional beamformers with different white noise gains?