

9.10 An antenna with a radiation efficiency of 90% has a directivity of 7.0 dB. What is its gain in decibels?

Solution: $D = 7.0$ dB corresponds to $D = 5.0$.

$$G = \xi D = 0.9 \times 5.0 = 4.5 = 6.54 \text{ dB}.$$

Alternatively,

$$G \text{ (dB)} = \xi \text{ (dB)} + D \text{ (dB)} = 10 \log 0.9 + 7.0 = -0.46 + 7.0 = 6.54 \text{ dB}.$$
