1. Given a complex vector $\bar{\mathbf{x}} = [x_1 \quad x_2 \quad \dots \quad x_n]^T$. Then, $\bar{\mathbf{x}}^H = [x_1^* \quad x_2^* \quad \dots \quad x_n^*]$
   Ans d
2. Give a Gaussian random variable $\mathbf{X}$ with mean μ and variance σ^2. The random variable $\frac{X-\mu}{\sigma}$ is termed a Standard Normal random variable
   Ans d
3. Given the vectors $\bar{\mathbf{w}}_1 = [1 \quad 1 \quad 1]^T$ and $\bar{\mathbf{w}}_2 = [-2 \quad -2 \quad -2]^T$. These are Linearly dependent since $2\bar{\mathbf{w}}_1 + \bar{\mathbf{w}}_2 = 0$
   Ans c
4. It can be seen that $\bar{\mathbf{w}}_1 = [1 \quad 1 \quad 1]^T$ and $\bar{\mathbf{w}}_2 = [-1 \quad 2 \quad -1]^T$ satisfy $\bar{\mathbf{w}}_2^T \bar{\mathbf{w}}_1 = 0$. Hence they are orthogonal. This also implies that they are linearly independent
   Ans d
5. a_{ij} denotes the element in the ith row and jth column
   Ans b
6. Given the matrix $\mathbf{A} = \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$. One of its eigenvalues is $\sqrt{2}$
   Ans a
7. Given a Hermitian symmetric matrix $\mathbf{A}$, i.e., $\mathbf{A} = \mathbf{A}^H$. Hence, all of its eigenvalues are real
   Ans b
8. Given the vector $\bar{\mathbf{x}} = [1 \quad 1 \quad \dots \quad 1]^T$ of size $n \times 1$. The quantity $\|\bar{\mathbf{x}}\|_2$ equals
   $$\sqrt{1+1+\dots+1} = \sqrt{n}$$
   Ans c
9. It is always true that $\text{rank}(\mathbf{A}) \leq \min\{m, n\}$
   Ans a
10. Given the vector $\bar{\mathbf{x}} = [1 \quad 2 \quad \dots \quad n]^T$. The quantity $\|\mathbf{x}\|_2$ equals
    $$\sqrt{1+4+\dots+n^2} = \sqrt{\frac{n(n+1)(2n+1)}{6}}$$
    Ans c