
Exercise 1 *True or False? If False, you should come up with a counterexample. If True, can you give a proof?*

1. *If A is symmetric, then A has orthonormal columns.*

Multiple Choice:

- (i) *True*
- (ii) *False*

2. *The product of two orthogonal matrices is an orthogonal matrix.*

Multiple Choice:

- (i) *True*
- (ii) *False*

3. *The orthogonal complement of the row space of a matrix is the null space of that matrix.*

Multiple Choice:

- (i) *True*
- (ii) *False*

4. *For any proper subspace of $\mathbb{R}^n$, it is possible to produce an orthogonal basis.*

Multiple Choice:

- (i) *True*
- (ii) *False*