



## SYMMETRIC MATRICES

### Why

Matrices that have reflected values across their diagonals arise often.<sup>1</sup>

### Definition

A square matrix is *symmetric* (we call it a *symmetric matrix*) if its values do not depend on the order of the indices. In other words, a matrix is symmetric if the value above and below the diagonal are a mirror image.

### Notation

Let  $S$  be a nonempty set and  $A \in S^{n \times n}$ . Then  $A$  is symmetric if  $A_{ij} = A_{ji}$ . We denote the set of real-valued  $n$  by  $n$  symmetric matrices by  $\mathbf{S}^n$ . A symmetric matrix is the same as its tranpose. In other words, if  $A$  is symmetric,  $A = A^\top$ .

---

<sup>1</sup>Future editions will clarify.



