Square Roots of $2 \times 2$ Matrices.

The square root of a $2 \times 2$ matrix $A$ is a matrix $B$ such that $B^2 = A$. We show how the diagonalization method and the Cayley-Hamilton Theorem can be used to find the square root of a $2 \times 2$ matrix. Along the way, we can determine what matrices have square roots and how to count them. (Received September 25, 2017)