The Jacobian Conjecture: Let $R = \mathbb{C}[x_1, \ldots, x_n]$ be a polynomial ring in n variables over the complex numbers. If $f_1, \ldots, f_n \in R$, then $P(x_i) = f_i$ defines a $\mathbb{C}$-endomorphism of R. Associated with P is the $n \times n$ matrix $J(P) = (\partial f_i / \partial x_j)$ with entries in R. If P is an automorphism of R, then the chain rule implies that $J(P)$ is an invertible matrix. The Jacobian Conjecture is that the converse holds: If $J(P)$ is an invertible matrix, then P is a automorphism of R. The Jacobian Conjecture is true for $n = 1$, but is open for $n \geq 2$. For $n \geq 3$, there is little evidence for either the truth or falsity of the conjecture, but it is generally believed to be true for $n = 2$. I will discuss what is known when $n = 2$.