1086-05-142 **Bryan Ek***, School of Mathematical Sciences, Rochester Institute of Technology, Rochester, NY 14623-5604, and **Caitlin VerSchneider**, Department of Mathematics, Nazareth College, Rochester, NY 14618. *Efficiency of the Atlanta subway network and functional connectivity of the human brain.*

In 2001, Latora and Marchiori introduced the measure of efficiency between vertices in a graph. The efficiency between two vertices $i$ and $j$ is defined as the inverse of the corresponding distance. The global efficiency of a graph is the average of the efficiencies over all pairs of distinct vertices. We investigate the global efficiency of star-like networks, and show that networks of this type are very efficient. In particular we analyze the Metropolitan Atlanta Rapid Transit Authority (MARTA) Subway system, and show this network is 82 percent as efficient as a network where there is a direct line between every pair of stations. We determine global efficiencies for many families of graphs. We also consider two other measures of efficiency and connectivity. Given a graph $G$, let $G_i$ denote the subgraph induced by the neighbors of vertex $v_i$. Then the local efficiency of $G$ is the average of the global efficiencies of the subgraphs $G_i$. Also the clustering coefficient is the average number of edges in the subgraphs $C_i$. We present familes of graphs where these two quantities are the same and others where they are very different. Finally we show how efficiency can be used to analyze functional connectivity of the human brain. (Received July 27, 2012)