Given a connected graph $G$ and an ordered subset $W$ of the vertex set of $G$, we define the locating code of a vertex $v$ of $G$ to be the vector representing the distances from $v$ to the vertices of $W$. The set $W$ is called a locating set if distinct vertices have distinct codes. The minimum cardinality for a locating set of $G$ is called the locating number of $G$, denoted $\text{loc}(G)$. Locating sets and locating numbers for general classes of graphs are discussed. Then locating sets and locating numbers for zero-divisor graphs of commutative rings are examined, with an eye towards identifying relationships between locating numbers and ring properties. Finally, these ideas are extended to other graphs on commutative rings. (Received January 04, 2014)