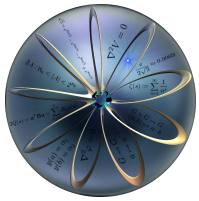

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distance (in a graph)

Canonical name	DistanceinAGraph
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Entry type	Definition
Classification	msc 05C12
Synonym	distance
Related topic	Graph
Related topic	Path
Related topic	Diameter3
Related topic	PathConnected
Defines	diameter (of a graph)
Defines	radius (of a graph)
Defines	central vertex

The *distance* $d(x, y)$ of two vertices x and y of a graph G is the length of the shortest path (or, equivalently, walk) from x to y. If there is no path from x to y (i.e. if they lie in different components of G), we set $d(x, y) := \infty$.

Two basic graph invariants involving distance are the *diameter* $\operatorname{diam} G := \max_{(x,y)\in V(G)^2} d(x, y)$ (the maximum distance between two vertices of G) and the *radius* $\operatorname{rad} G := \min_{x\in V(G)} \max_{y\in V(G)} d(x, y)$ (the maximum distance of a vertex from a *central* vertex of G, i.e. a vertex such that the maximum distance to another vertex is minimal).