Why

Often the edges of some graph are associated with a particular cost, perhaps the cost of traversing that edge.

Definition

Let (V, E) be an undirected graph. An *unordered weight function* $w : E \to \mathbf{R}$ is a function mapping undirected edges to real numbers. A *weighted undirected graph* is an ordered pair $((V, E), w)$ where (V, E) is an undirected graph and w is an unordered wieght function.

Let (V, F) be a directed graph. An *ordered weight function* or just *weight function* $\omega : F \to \mathbf{R}$ is a function mapping directed edges to real numbers. A *weighted directed graph* is an ordered pair $((V, F), \omega)$ where (V, E) is an undirected graph and ω is an ordered wieght function.

Weighted Graphs

Real Numbers   Directed Graphs

Rational Numbers   Undirected Graphs

Integer Arithmetic   Set Numbers

Natural Multiplicative Identity   Natural Additive Identity   Finite Sets

Arithmetic   Identity Elements

Integer Products   Natural Powers   Equivalent Sets

Integer Sums   Natural Products   Function Inverses

Integer Numbers   Natural Sums   Operations   Function Composites   Function Images

Recursion Theorem   Natural Order   Equivalence Relations   Functions

Peano Axioms   Relations

Natural Induction   Set Products

Natural Numbers   Set Powers   Ordered Pairs

Successor Sets   Unordered Triples   Intersection of Empty Set   Partitions

Set Symmetric Differences   Pair Unions   Set Intersections

Set Complements   Set Unions   Pair Intersections

Set Differences   Empty Set   Unordered Pairs

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities   Sets

Names

Letters   Objects

4