Graph isomorphisms

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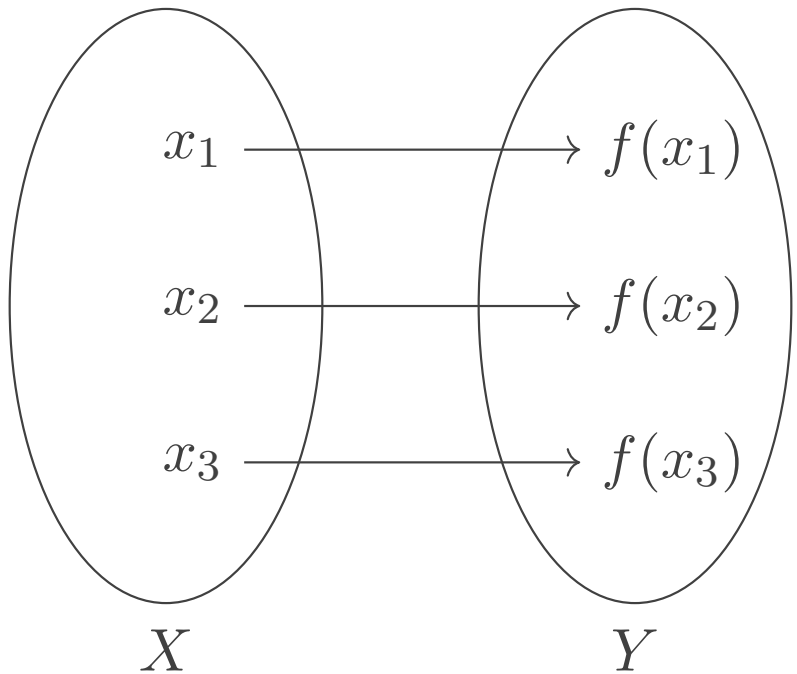
Bijections

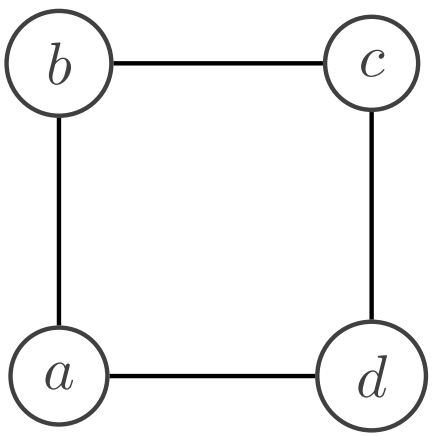
A bijection is map f from a set X to a set Y where both of the following are true:

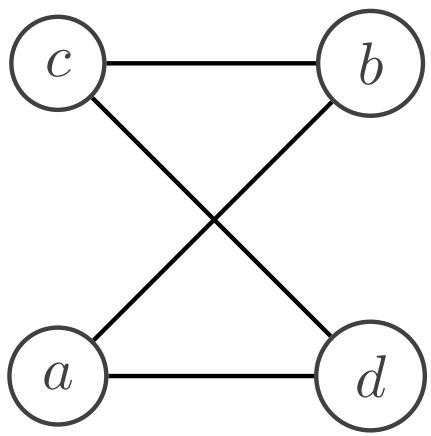
- every y in Y is a value $f(x)$ for at most one x in X.
- every y in Y is a value $f(x)$ for at least one x in X.

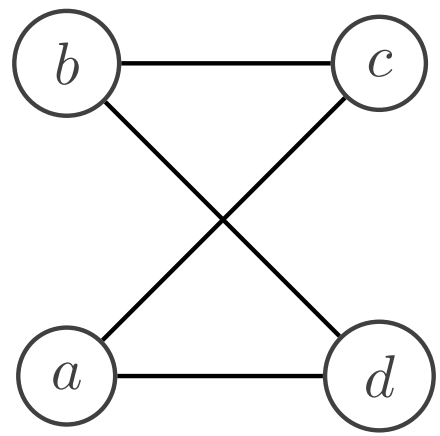


Isomorphisms

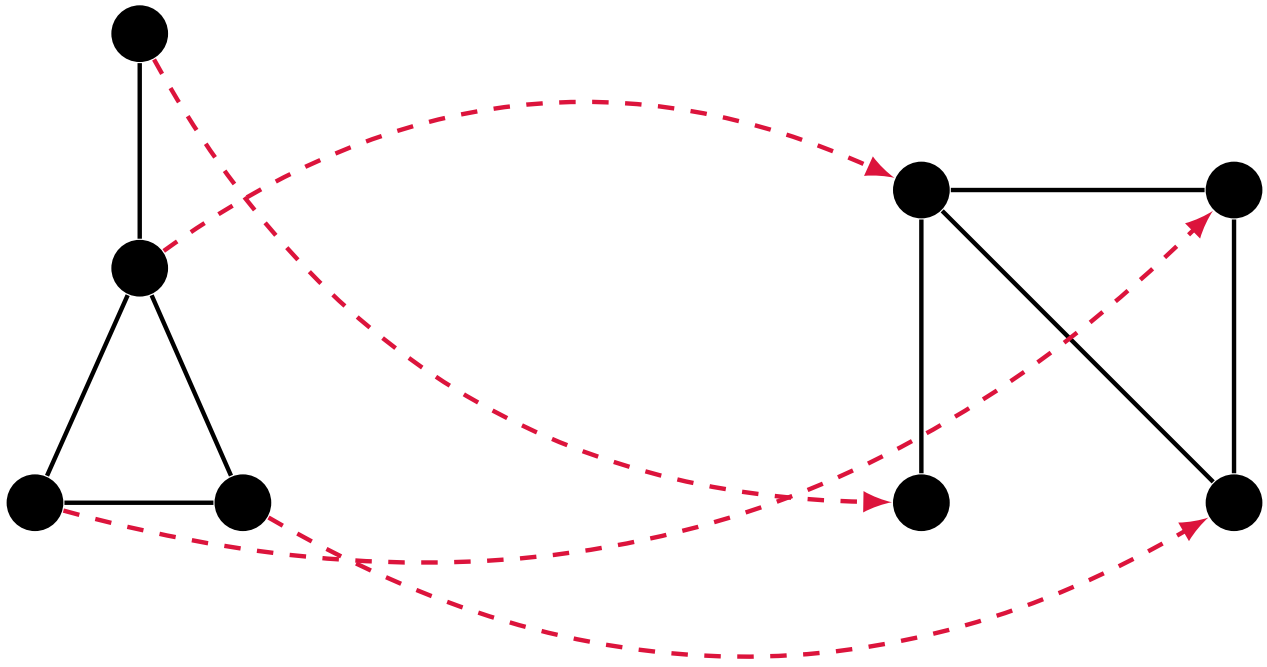
- Two graphs $G_1 = (V_1, E_1)$ and $G_2 = (V_2, E_2)$ are said to be isomorphic when there is a bijection f from V_1 to V_2 Bsuch that $\{f(x), f(y)\}$ is in E_2 if and only if (x, y) is in E_1.
- Then f is said to be an isomorphism.
- So, an isomorphism is a bijection between the vertex sets that preserves the edges.







Isomorphism example



$$G_1 \xrightarrow{\quad f \quad} G_2$$

Exercise

Determine if these two graphs are isomorphic.