2.1. Basic of Functions and their graphs

Thursday, September 14, 2017 10:01 AM

Objective #1: Find the domain and the range of a relation.

Definition: A relation is a set of ordered pairs.

A set is a collection of objects.

E.g. Set of even numbers from 1 to 10.

$\{2, 4, 6, 8, 10\}$.

E.g. of a relation

$\{(4, 6), (6, 4), (12, 8), (0.5, 1.5), (3.14, 3.14), (\frac{1}{2}, \frac{3}{4}), (\sqrt{2}, \sqrt{5})\}$

The set of all the first components of the ordered pairs is called the domain of the relation.

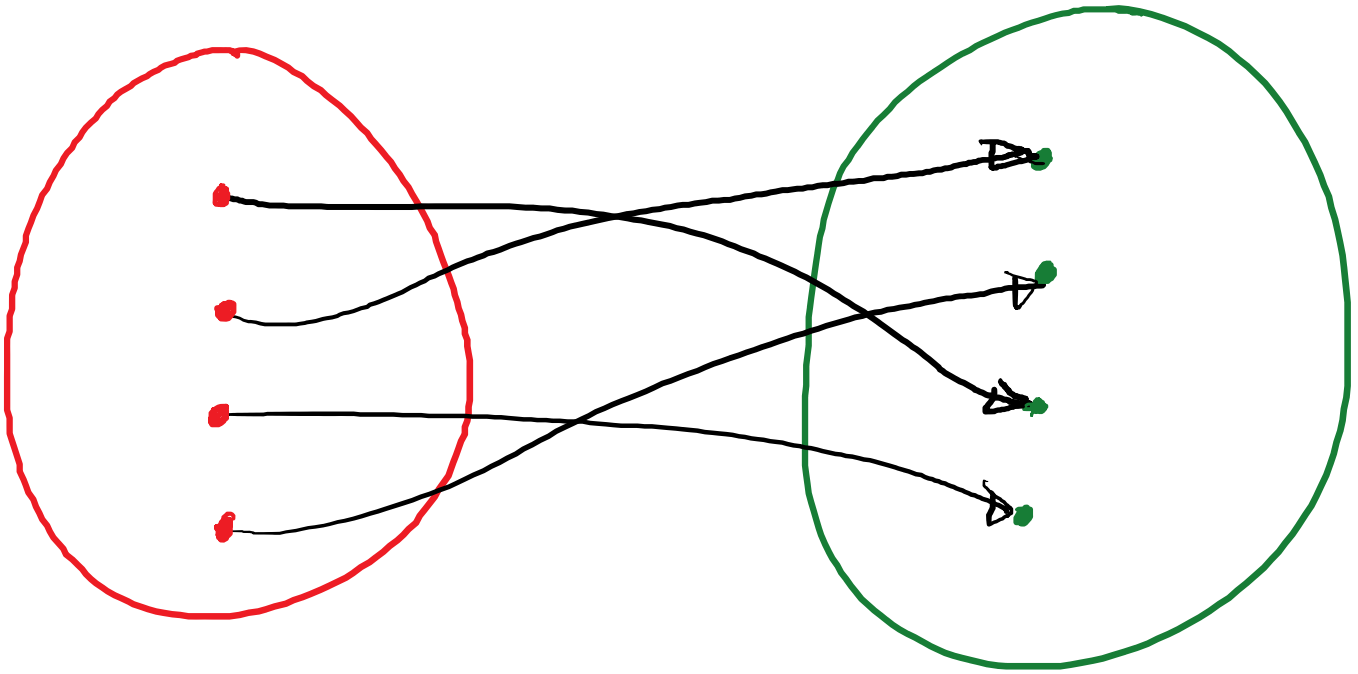
The set of all the second components is called the range of the relation.

E.g. $\{(3,4),(3,5),(4,4),(4,5)\}$

Domain of this relation: $\{3,4\}$

Range of this relation: $\{4,5\}$

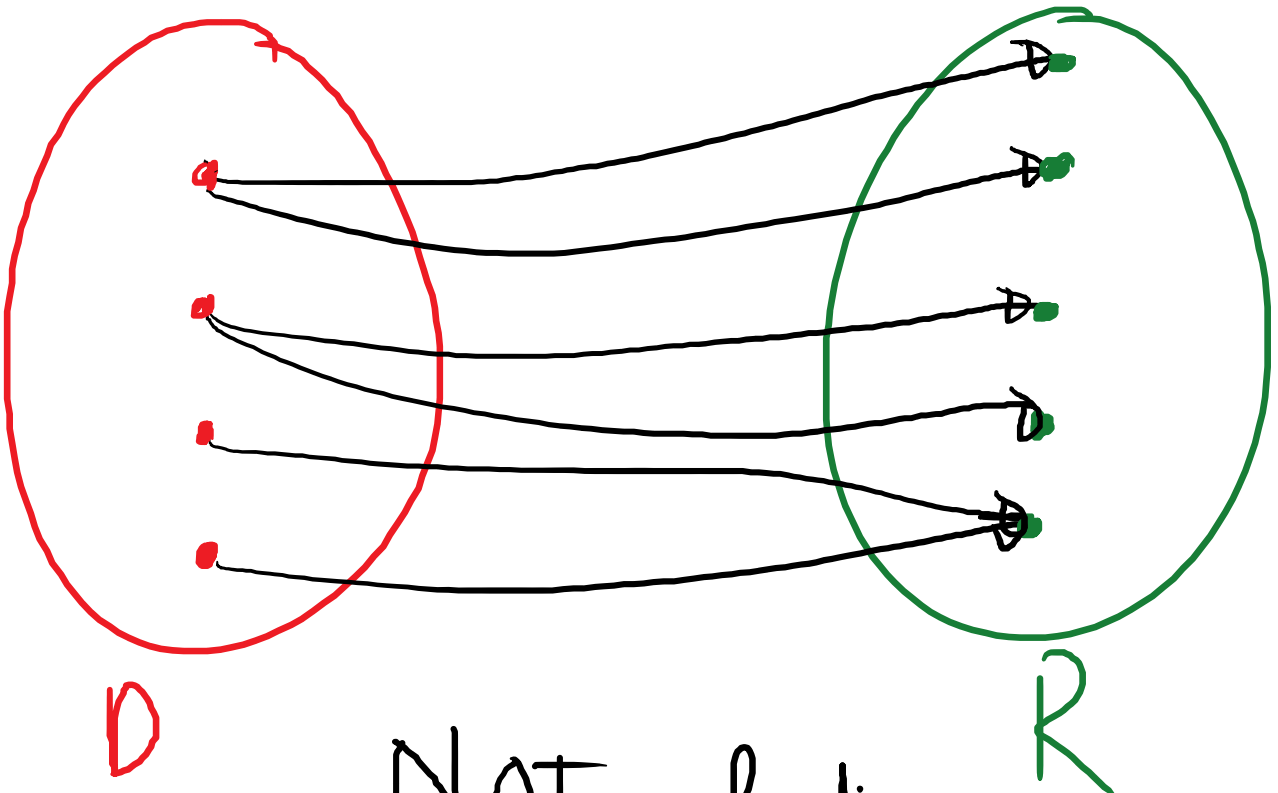
A function is a correspondence from a first set called the domain to a second set called the range such that each element in the domain corresponds to exactly one element in the range.



Domain

Range

Function



D

R

NOT a function

Objective #2: Determine whether a relation is a function.

E.g. Given the relation

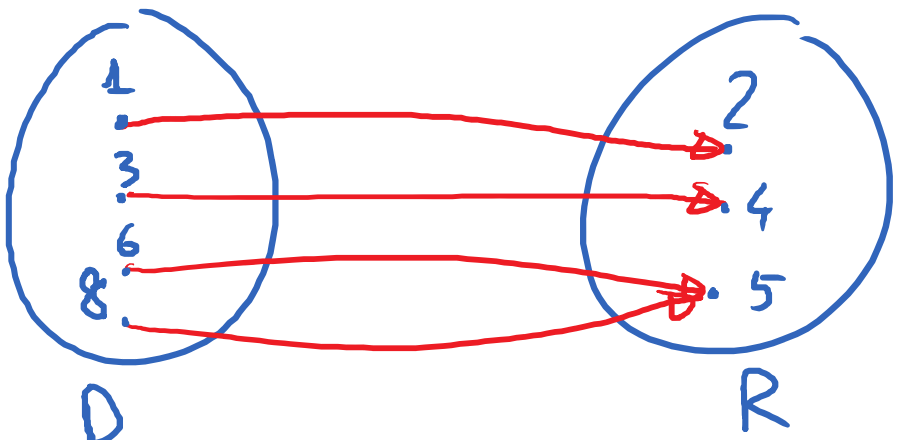
$\{(1,2), (3,4), (5,6), (5,8)\}$

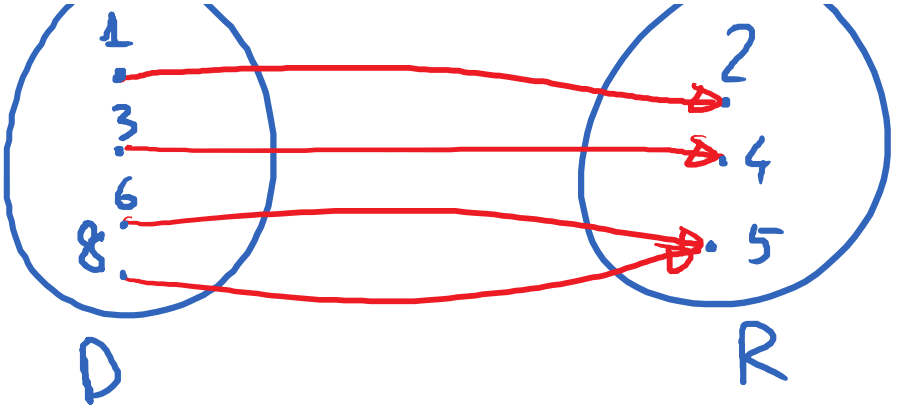
Q: Is this relation a function?

This Relation is not a function because the element 5 in the domain corresponds to 2 elements, namely, 6 and 8 in the range

E.g. $\{(1,2), (3,4), (6,5), (8,5)\}$

Is this relation a function? Yes




1
3
6
8
2
4
5
D
R

Objective #3: Determine whether an equation represents a function.

Key: If an equation is solved for y and more than one value of y can be obtained for a given value of x, then the equation does not represent a function.

E.g. $x = y^2$. Solve for y in terms of x

$$y = \pm\sqrt{x}$$

This equation does not define y as a function of x.

E.g. $x^2 + y^2 = 8$. Solve for y in terms of x.

$$y^2 = 8 - x^2$$

$$y = \pm\sqrt{8 - x^2}$$

$$y = \pm\sqrt{8 - x^2}$$