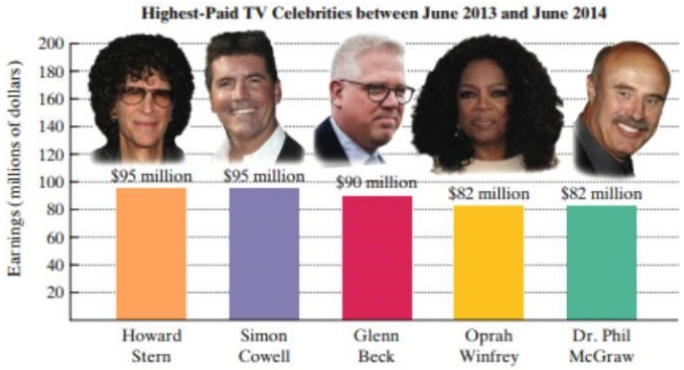
2.1. Basics of Functions and their graphs (Part I)

Thursday, September 5, 2019 9:35 AM

Objective 1: Definition of a Relation and find the domain and the range of a relation

Definition of a relation:

A **Relation** is a set of ordered pairs.



{(Stern, 95); (Cowell, 95), (Beck, 90); (Winfrey, 82); (McGraw, 82)} → This is an example of a relation

{(95, Stern); (95, Cowell); (90, Beck); (82, Winfrey); (82, McGraw)} → This is another relation.

The **Domain** of a relation is the set of all the first components of the ordered pairs in the relation

The **Range** of a relation is the set of all the second components of the ordered pairs in the relation

For the first relation:

Domain = { Stern, Cowell, Beck, Winfrey, McGraw }

Range = { 95, 90, 82 }

For the second relation:

Domain = { 95, 90, 82 }

Range = { Stern, Cowell, Beck, Winfrey, McGraw }

Second Example:

Event : a ticket cost you $5, you also have to pay a flat rate of $2 (regardless of the # of tickets you buy)

# of tickets	cost
1	$7
2	$12
3	$17
4	$22
5	$27

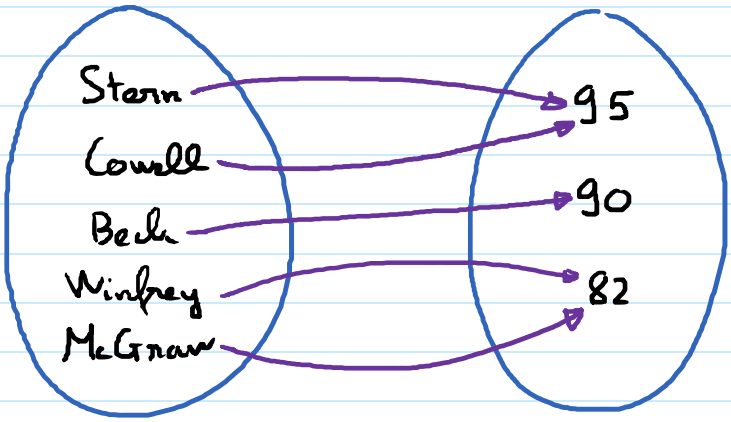
Relation : { (1,7) ; (2,12) ; (3,17) ; (4,22) ; (5,27) }

Domain = { 1, 2, 3, 4, 5 }

Range = { 7, 12, 17, 22, 27 }

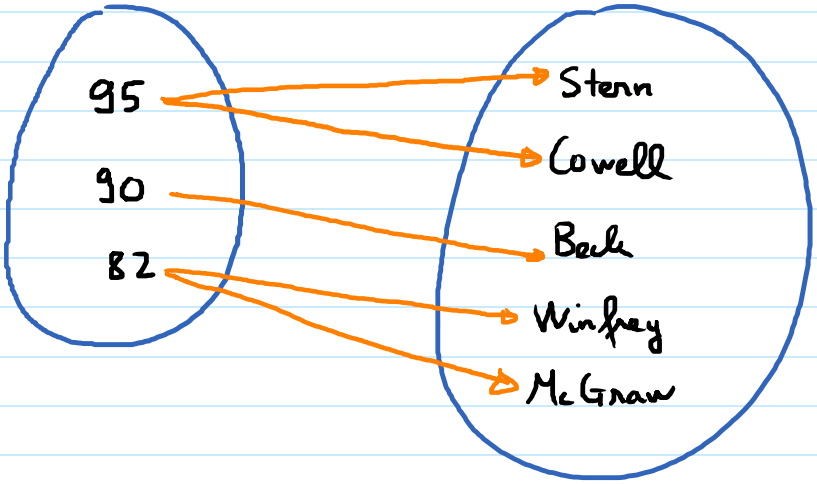
Obj 2: Functions and Determine whether a relation is a function.

Mapping Diagrams.



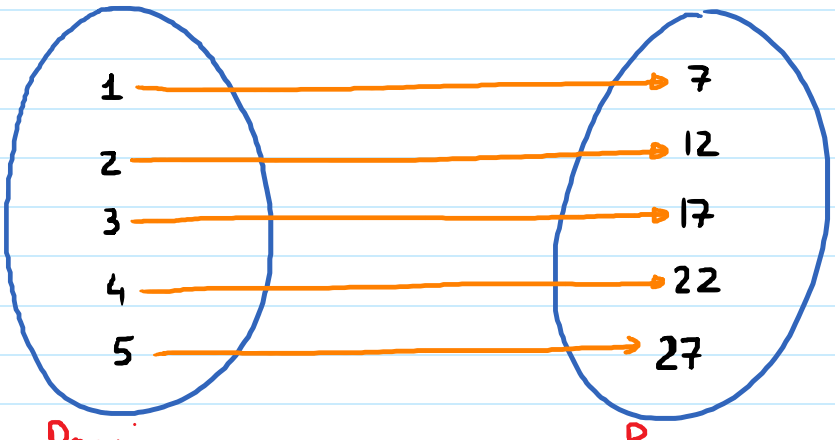
This is A FUNCTION

Domain Range



This is NOT a function

Domain Range



This is a FUNCTION

Domain Range

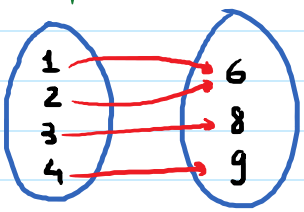
Definition of a function:

A function is a relation in which no two ordered pairs have the same first component and different second components.

More intuitively, 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.

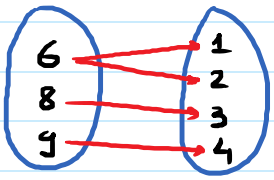
E.g. Determine whether a relation is a function.

(a) $\{(1,6);(2,6);(3,8);(4,9)\}$



This is a function

(b) $\{(6,1);(6,2);(8,3);(9,4)\}$



This is NOT a function

6 in the domain corresponds to 2 different elements in the range

Functions as Equations