Foundations and Pre-Calculus 10
Chapter 5: Relations and Functions

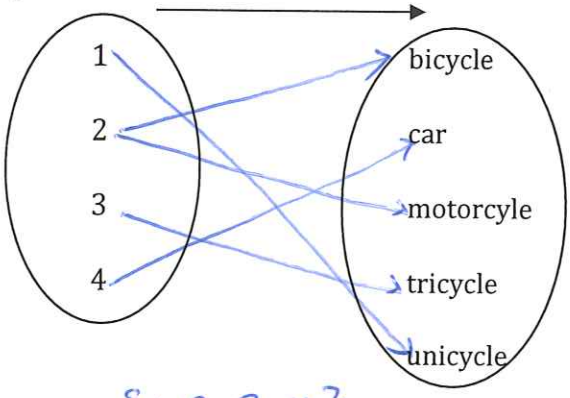
5.2 Properties of Functions

Identifying Functions

The set of first elements of a relation is called the **domain**. (Input or x-values)
The set of related second elements of a relation is called the **range**. (Output or y-values)
A **function** is a special type of relation where each element in the domain is associated with only one element in the range.

Example: List the domain and range for each relation. Is the relation a function?

a) is the number of wheels on a

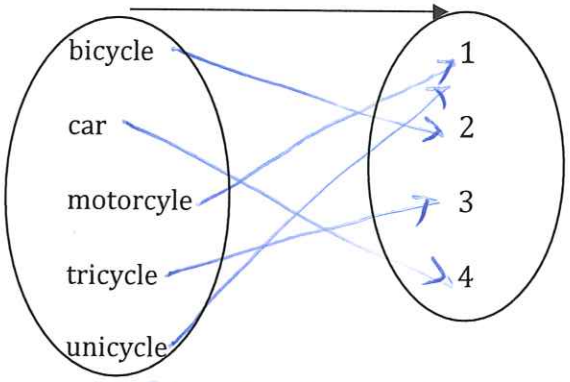


Domain: {1, 2, 3, 4}

Range: {bicycle, car, motorcycle, tricycle, unicycle}

Function? NO

b) has the number of wheels



Domain: {bicycle, car, motorcycle, tricycle, unicycle}

Range: {1, 2, 3, 4}

Function? YES

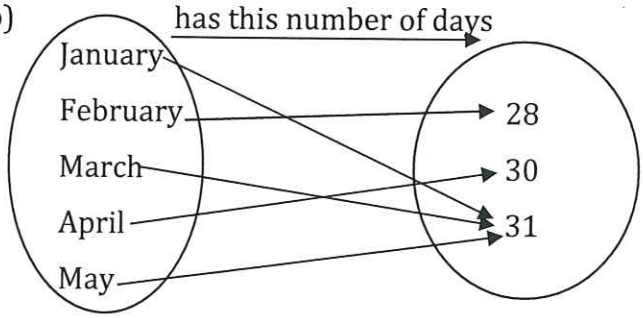
Ex. 1 For each relation below, identify the domain and range of each relation and determine whether the relation is a function.

a) A relation that associates a number with a prime factor of the number:
{(4,2), (6,2), (6,3), (8,2), (9,3)}

D: {4, 6, 8, 9}
R: {2, 3}

Not a function

b)



D: {Jan, Feb, Mar, Ap, May}
R {28, 30, 31}

Function

Describing Functions

Ex. 2 The table of values below shows the costs of student bus tickets, *C* dollars, for different number of tickets, *n*.

Number of tickets, *n*	Cost, *C* ($)
1	1.75
2	3.50
3	5.25
4	7.00
5	8.75

a) Explain why this relation is a function.

Each # of tickets has one specific cost associated with it.

b) Identify the independent and dependent variable.

n - ind

C - dep

Think: "Cost depends on number of tickets"

c) State the domain and range.

D: {1, 2, 3, 4, 5}

C: {1.75, 3.50, 5.25, 7.00, 8.75}

Using Function Notation to Determine Values

→ say "f" of "x"

Here are some examples of function notation: $f(x)$, $f(t)$, $f(a)$, $g(x)$, $h(x)$, $V(t)$

Any function that can be written in two variables can be written in function notation.

For example: $d = 4t + 9$ can be written as d(t)=4t+9, where *t* represents an element of the Domain, and $d(t)$ represents an element of the Range.

An equation such as $y = 3x - 5$ is usually written as $f(x) = 3x - 5$ in function notation.

y = f(x)

Ex. 3 The equation $C = 25n + 1000$ represents the cost, *C* dollars for renting a ballroom for the Grad dinner and dance, where *n* is the number of people attending.

a) Describe the function. Write the equation in function notation.

C(n) = 25n + 1000

The cost is an initial fee of $1000 and then $25 per person

b) Determine the value of C(100). What does this number represent?

C(100) = 25(100) + 1000

= $3500

↑ the cost for 100 people.

c) Determine the value of *n* when *C(n)* = 5000. What does this number represent?

C(n) = 25n + 1000

5000 = 25n + 1000

4000 = 25n

n = 160

160 people can attend when the cost is $5000

d) What values of *n* do not make sense as possible values of *n*?

n shouldn't be negative as it represents number of people.