Chapter 5 – Part I – Relations and Functions

1. **Different ways to describe relations**
A relation between two sets can be described with words, tables, arrow diagrams, set of ordered pairs, graphs etc.…

Examples 1 – 3 p 259

🡪 Hwk: p 262 # 3, 4, 7 – 10, 12 - 14
2. **Dependent and independent variables**
In a relation, the second set of elements depends on the first set.

- Example 1 p 267 : dependant variable : the mass of the balls
 independent variable : the number of balls

- $A=πr^{2} $: dependant variable : A (area of a circle)
 independent variable : r (radius of a circle)

When describing a relation, you have to decide what you want to put as the dependent and the independent variable to know in what order you need to present your sets. In general, one order will make more sense than another…

Examples : a) if you go to the cinema and you want to describe the relation between the price paid and the number of tickets bought, in what order is it more logical to present the variables?

 b) which of the two is more logical?


Note : when the variable have no name, it is common to call the dependant variable *y* and the independent variable *x*.

🡪 Hwk : worksheet
3. **Domain and Range**The Domain of a relation is the set of all the possible values of the independent variable.
The Range is the set of all the possible values of the dependant variable.

Examples : a)
 
 Domain : $\left\{Hay River;Iqaluit;Nanisivik;Old Crow;Whitehorse;Yellowknife\right\}$
 Range : $\left\{Nunavut;NWT;Yukon\right\}$

 b) Consider the set of ordered pairs : $\left\{\left(-3;9\right);\left(-1;1\right);\left(0;0\right);\left(1;1\right);(3;9)\right\}$

 Domain: $\left\{-3; -1;0;1;3\right\}$
 Range: $\left\{0;1;9\right\}$

 c) Jean invited 10 friends to the cinema for his birthday.
 He does not know if everyone will come. Each seat costs $6.
 Study the relation between the price paid and the number of seats bought.

 🡪 D = R =

 d) The following table represents the price paid by 5 different families for their last vacations.

|  |  |
| --- | --- |
| Family | Price ($) |
| Ramirez | 2500 |
| Johnson | 1700 |
| Brown | 550 |
| Daniels | 750 |
| Theriault | 2000 |

 🡪 D = R =

Note : We will see further in the chapter how to determine Domain and Range from a graph…

Hwk: worksheet

1. **What is a function?**A relation is called a function when each element of the domain is associated with exactly 1 element of the range.

Examples : a)
  This is not a function !
 b)
 This is a function !

Note : Look at the 1er set of elements only…

 c) $\left\{\left(3;4\right);\left(4;7\right);\left(5;9\right);(6;7)\right\}$
 This relation is a function !

 d) $\left\{\left(3;4\right);\left(4;7\right);\left(3;9\right);(1;2)\right\}$
 This relation is not a function !

🡪 Hwk : p 270 # 4, 5, 8 – 13

**Function Notation**

The function notation indicates the variable that the dependent variable depends on…

ex : $A=πr^{2}$ $\leftrightarrow $ $A\left(r\right)=πr^{2}$
 equation functional notation
 Note: you should read: “A of r”

 $V=\frac{4}{3}πr^{3}$ $V(r)=\frac{4}{3}πr^{3}$

This notation is very useful when you want to evaluate a function to a specific value of the independent variable, and show it properly…

ex : in the first example : $A\left(3\right)=9π$ shows that the area *A* is $9π$ when *r* = 3.

Note : when the variables are *x* et *y*, we use *f* (or *g* or *h*) to represent the function…
 $y=2x-5$ becomes $f\left(x\right)=2x-5$

 *f*(*x*) and *y* represent the same thing…

Application :
Carmen works for a survey company in a commercial center. She is paid $30 to come work and after, she gets $5 for each survey that is completed.
a) Write her salary with an equation.

b) Write the equation is functional notation.

c) Determine P(8). What does the result represent ?

d) Determine n when P(n)=90. What does the result represent ?

Example 3 p 269

🡪 Hwk : p 272 # 14 – 23 + verify your comprehension 3 p 269.