Introduction to Maths II

* Chapter 1: "Functions"

$\therefore F(1) = 4$
$, F(2) = 5$
$, F(3) = 4$

الأصل
domain

الصورة
Co-domain

$\therefore x$ is Function in Y " $Y = F(x)$ "

* x is function in Y if each element in x has one and only one image in Y.
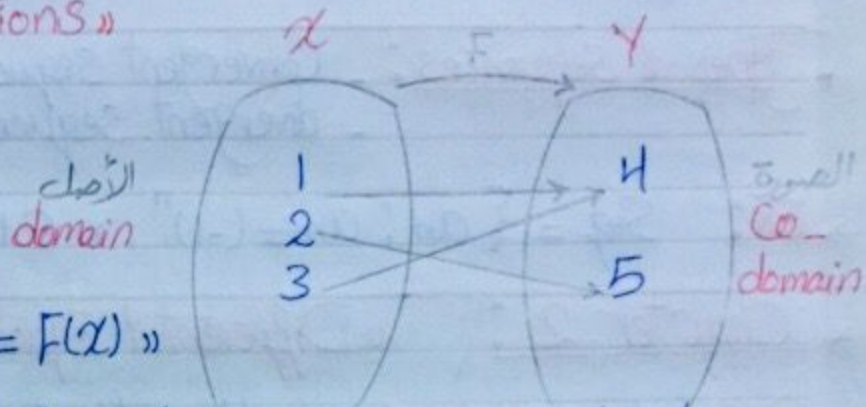
$$F(n) = a_n = \frac{1}{n}$$

$\longrightarrow F(1) = a_1 = 1$
$\quad\; F(2) = a_2 = \frac{1}{2}$
$\quad\; F(3) = a_3 = \frac{1}{3}$

$$y = F(x)$$

variable
x يعتمد على dependent

Variable
Independent

* Value of y depends on value of x.

- <u>Sequence</u> is a set of terms have special pattern.

$\longrightarrow$ <u>EX:</u> $\left\{ a_n : a_n = \frac{1}{n} , n \in N \right\}$

$N \longrightarrow$ set of natural numbers.

- domain of Sequence $\longrightarrow$ N «natural numbers»
- domain of Functions $\longrightarrow$ R «real numbers»

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* <u>Types of Sequences</u>: - Convergent sequence   لـ قيمة محددة
                       - divergent sequence   ليس لها نهاية

$\rightarrow$<u>EX</u>: Seq. $= \{ a_n : a_n = (-1)^n, n \in N \} \longrightarrow$ Divergent

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* <u>Chapter 2</u>: «Differential Equation»

- <u>Differential Equation</u>: Equation that Contains differentiation. «y'»
$\rightarrow$<u>EX</u>: $y' + 5x - 2 = 0$

- <u>order of the equation</u>: Number of y' in the equation.
- <u>degree of the equation</u>: Greatest power in the equation.

$$y'' + y = 0$$

$\longrightarrow$ if $y = \sin x$
$\therefore y' = \cos x$
$\therefore y'' = -\sin x$

$\quad\quad \therefore y'' + y = -\sin x + \sin x = 0$
$\quad\quad \therefore y = \sin x$ is a Solution.

الحل هو ال بيبقى المعادلة. *

$\longrightarrow$ if $y = \sin x + 5$
$\quad y' = \cos x$
$\quad y'' = -\sin x$

$\quad\quad \therefore y'' + y = -\sin x + \sin x + 5 = 5 \neq 0$
$\quad\quad \therefore y = \sin x + 5$ is not a Solution.

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* $e^x \longrightarrow$ exponential function.

Chapter 3: «Linear Algebra»

- Vectors are ordered pairs.

* Sum of 2 vectors is a vector.
* Sum of ordered pairs is an ordered pair.

Ex: $(1, 2) + (3, 5) = (4, 7)$

* $(-1, -2)$ is the additive inverse of $(1, 2)$.
* $(0, 0)$ is the additive identity.

* Scalar x vector = vector.
EX: $5 \times (1, 2) = (5, 10)$