

Project / Draft # 4

[3 periods of 40' / 2h / week]

Requirement : willingness to improve your understanding and knowledge of both Maths and English.
with applications in use of computer software.

<p>Week 1 Sept. 14 - 19</p>	<p>1) Review of elementary functions (Part 1) : Examples - Equations - Graphs - Exercises Use of Mathematical software.</p> <p>a) Linear functions vs Affine functions $y = ax$ vs $y = ax + b$</p> <p>b) Graphing inequalities : $ax + by \leq c$</p> <p>c) Graphing linear systems of inequalities $\begin{cases} ax + by \leq c \\ a'x + b'y \leq c' \end{cases}$</p> <p>d) Word problems (Kinematics / Economics)</p>
<p>Week 2 Sept. 21 - 30</p>	<p>2) Review of elementary functions (Part 1) : Examples - Equations - Graphs - Exercises Use of Mathematical software.</p> <p>a) Second degree Equations and functions [.ppt] $y = ax^2$; $y = a(x - L)^2 + H$; $y = ax^2 + bx + c$</p> <p>b) Interception of a line and a parabola</p> <p>c) Word problems (Kinematics g / Optical - lenses)</p>
<p>Oct. 1 - 8</p>	<p>National Holyday of the 60th anniversary of the People's Republic of China</p>
<p>Week 3 Oct. 9 - 10</p>	<p>3) Review of elementary functions (Part 3) : Examples - Equations - Graphs - Exercises Use of Mathematical software.</p> <p>a) Homographic functions [.ppt] $f : x \mapsto y = \frac{A}{x}$; $f : x \mapsto y = \frac{A}{x - L} + H$; $f : x \mapsto y = \frac{ax + b}{cx + d}$</p> <p>b) Interception of Hyperbola and parabola</p> <p>c) Word problems (Physics / Optics)</p>

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Week 4 Oct. 12 - 17	<p>4) Associated functions / geometric transformations Examples - Equations - Graphs - Exercises Use of Mathematical software.</p> <p>a) $g(x) = -f(x)$ / Ox Symmetry b) $g(x) = f(-x)$ / Oy Symmetry c) $g(x) = -f(-x)$ / Central Symmetry d) $g(x) = f(x - L) + H$ / Translation</p> <p>Exercises on graphs of such functions.</p>
Week 5 Oct. 19 - 24	<p>5) Function associated to the Absolute value function : Examples - Equations - Graphs - Exercises Use of Mathematical software.</p> <p>a) $g(x) = f(x)$ b) $g(x) = f(x)$.</p>
Week 6 Oct. 26 - 31	<p>6) Review of elementary functions (Part 4): Examples - Equations - Graphs - Exercises Use of Mathematical software.</p> <p>a) Exponential functions b) Logarithm functions</p>
Week 7 Nov. 2 - 7	<p>7) Sequences and Series Examples - Equations - Graphs - Exercises Use of Excel.</p> <p>a) Arithmetic Sequences. b) Geometric Sequences c) Geometric Series.</p>
Week 8 Nov. 9 - 14	<p>8) Limits of series and sequences : Examples - Equations - Graphs - Exercises Use of Excel.</p> <p>a) Arithmetic and geometric Sequences and series. b) Operations on sequences and limits</p>

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<p>Week 9 Nov. 16 - 21</p>	<p>9) Sequences defined recursively by a function : Examples - Equations - Graphs - Exercises Use of Excel. a) Illustration / graph b) Problems with limits.</p>
<p>Week 10 Nov. 23 - 28</p>	<p>10) General Theorems on sequences : Examples - Equations - Graphs - Exercises Use of Excel. a) Variations b) Monotonous bound sequences. c) Adjacent sequences</p>
<p>Week 11 Nov. 30 - Dec. 5</p>	<p>11) Introduction to Computer programming : a) Basic Components of a computer b) Binary system and operations c) The ASCII system d) Basic Logic connectors : AND - OR - NOT e) Composite connectors : IF ... THEN</p>
<p>Week 12 Dec. 7 - 12</p>	<p>12) Programming with Scheme [1] a) Compiled vs interpreted Programming (Lisp vs Pascal) b) Algorithm vs Program c) Read vs Write d) Type of Variables : Integers, Real, Strings, Character, Boolean Functions vs Procedures</p>

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Week 13 Dec. 7 - 12	13) Programming with Scheme [2] a) The Scheme environment b) Edition vs Execution of a Program c) Simple Programs of calculations Definition of Recursive Functions
Week 14 Dec.14 - 19	14) Programming with Scheme [3] a) Application to sequences b) Application to series
Week 15 Dec.21 - 26	15) Programming with Scheme [4] a) Definition of lists b) Basic functions on lists
Week 16 Dec.28 - 30	16) Programming with Scheme [5] a) Basic Graphic functions b) Graphing regular polygones