Tutorials in Mathematics – CLEF

Course contents

1. Set of Natural (N), Integer (Z), Rational (Q), Real (R) numbers. Complex (C) numbers.
2. Basic operations and order of operations. Factorisation of an algebraic expression. Product of a sum and a difference. Square of a binomial. Cube of a binomial.
3. Exponential, logarithmic, radical expressions.
4. Polynomials. Algebraic fractions.
5. Linear and quadratic equations. Quadratic formula and other methods to solve a quadratic equation. Geometric interpretation. Higher order equations, absolute value, and radical equations.
6. Linear and quadratic inequalities. Systems of inequalities. Radical, absolute value and rational inequalities.
7. Intervals of real numbers. Functions of a real variable: domain, codomain, symmetries, monotonicity, convexity. Inverse functions.
8. Elementary functions: power, radical, exponential, and logarithmic functions. Graphs of elementary functions.
9. Graphs of functions of a real variable.
10. Trigonometry. Trigonometric functions and trigonometric identities.
11. Notions of Euclidean geometry. Cartesian coordinates. Fundamental formulas in geometry. Lines. Conic sections: circle, ellipse, parabola, hyperbola.
12. Elementary set theory.

Readings/Bibliography

- Any book of Precalculus, for instance:
    - "Essential of Precalculus" by Richard N. Aufmann and Richard D. Nation, 1st Edition, Cengage Learning, 2005.
    - "Essential Mathematics for Economic Analysis" by Knut Sydsaeter, Peter Hammond and Arne Strom, 4th Edition, Pearson 2012
- Precalculus lectures at iLectureOnline (Precalculus)
- Notes on Precalculus (batmath.it)

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