

平成31年度 神奈川県立横浜国際高等学校 指導計画 (予定)

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| 教科・科目 | 数学HL | 学年 | 2, 3 | 教科書 | Haese Mathematics SL Haese Mathematics HL etc. |
| | | 単位数 | 5, 5 | 副教材 | |

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| 学習目標 | Aims of Mathematics SL course are to: 1. enjoy mathematics, and develop an appreciation of the elegance and power of mathematics. 2. develop an understanding of the principles and nature of mathematics. 3. communicate clearly and confidently in a variety of contexts. 4. develop logical, critical and creative thinking, and patience and persistence in problem solving. 5. employ and refine their powers of abstraction and generalization. 6. apply and transfer skills to alternative situations, to other areas of knowledge and to future developments. 7. appreciate how developments in technology and mathematics have influenced each other. 8. appreciate the moral, social and ethical implications arising from the work of mathematicians and the applications of mathematics. 9. appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives. 10. appreciate the contribution of mathematics to other disciplines, and as a particular “area of knowledge” in the TOK course. |
| 学習方法 | The internally assessed exploration offers students the opportunity for developing independence in their mathematical learning. Students are encouraged to take a considered approach to various mathematical activities and to explore different mathematical ideas. The exploration also allows students to work without the time constraints of a written examination and to develop the skills they need for communicating mathematical ideas. |

| 内容のまとめり | 時数 | 単元(題材) | 評価方法 |
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| Unit 1: Functions and Equations | 40 | 1.1 Functions– Composite, identity, inverse, odd and even functions, Domain and Range. 1.2 Investigation of graphs 1.3 Transformations of graphs including $1/f(x)$ and modulus. 1.4. Rational, Exponential and Logarithmic Function 1.5 Polynomial functions 1.6 Quadratics and solving quadratics. Graphical solutions to variety of equations. 1.7 Inequalities | Problem solving and graphing of real world problems in the activities. Graphing vectors and identifying special properties through computation. |
| Unit 2: Algebra | 30 | 2.1 Counting principles – permutations and combinations. 2.2 The binomial theorem: expansion and calculation of binomial coefficients using Pascal’s Triangle 2.3 Proof by Mathematical Induction | |
| Unit 3: Logarithmic and Exponential Functions | 35 | 3.1 Arithmetic sequence and series; sum of finite arithmetic series; geometric sequences and series; sum of finite and infinite geometric series. Sigma notation. 3.2 Exponents and Logarithms. Review of laws and functions. Solving exponential and logarithmic equations. 3.3 Solutions of systems of linear equations | |
| Unit 4: Circular Functions and Trigonometry | 35 | 4.1 Unit circle 4.2 Trigonometry and the unit circle 4.3 Compound and double angle identities 4.4 Trigonometric functions and their graphs 4.5 Inverse trigonometric functions. 4.6 Solving trigonometric equations graphically and analytically 4.7 Trigonometry and triangles | |

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| Unit 5: Limits, Differentiation and Integration | 35 | 5.1 Limits and convergence 5.2 Derivatives 5.3 Max and min points, and graphing behaviours 5.4 Indefinite integration as anti-differentiation 5.5 Anti-differentiation with a boundary condition to determine the constant term Area under the curve and volume of revolution. 5.6 Kinematic problems involving displacement 5.7 Integration by substitution and Integration by parts | Problem solving and graphing of real world problems in the activities. Graphing vectors and identifying special properties through computation. |
| Unit 6: Complex Numbers | 25 | 6.1 Complex numbers in Cartesian form 6.2 Complex numbers in Polar form 6.3 de Moivre's theorem, n'th root 6.4 Conjugate roots | |
| Unit 7: Statistics and Probability – Core | 25 | 7.1 Concepts and presentation of data 7.2 Statistical measures and their interpretations. Venn diagrams. 7.3 Combined events. 7.4 Conditional probability. 7.5 Discrete and Continuous random variable 7.6 Binomial distribution, Poisson distribution 7.7 Normal distribution | |
| Unit 8: Statistics and Probability Options | 40 | 8.1 Cumulative distribution functions. Geometric, Negative binomial distributions. Probability Generating Functions. 8.2. Linear transformation of single random variable. Mean and Variance. Expectation of the product of independent variables. 8.3 Unbiased estimates and estimators. 8.4 A linear combination of independent normal random variables. The central limit theorem. 8.5 Confidence intervals. 8.6 Hypothesis testing for the mean. Type I and II errors. 8.7 Bivariate distributions. Covariance and correlation coefficient. | |
| Unit 9: Vectors | 30 | 9.1 Vector properties 9.2 Scalar product of vectors. Parallel and perpendicular vectors 9.3 Vector equations of lines in two and three dimensions. Angle between two lines. 9.4 Determining if two lines intersect and their point of intersection 9.5 Vector product 9.6 Vector and Cartesian equations of a plane. 9.7 Intersection of a line with a plane; two planes; three planes. | |
| Trial Examination | | | |