



Ecole Internationale Provence-Alpes-Côte d'Azur



Forward Planning Long-Term Semester Planning

Academic Year: 2022-2023

Class: S7

Subject: Higher Level Mathematics

Teacher: Ms Rebeca Morones

No. Students: 5

Curriculum – Long-Term Planning 2022-2023

Date	Learning Objectives	Activities	Resources	Key Competences	Learning Outcomes / Assessment
September	Vector spaces	<ul style="list-style-type: none"> - review of vector spaces - review of matrix properties - Linear transformation defining the Kernel, range, nullity and rank. - Matrix transformation, effects on the image after several transformations. - Isomorphism 	<ul style="list-style-type: none"> - Geogebra - Worksheets - IB HL 		
October - November	Taylor and Maclaurin	<ul style="list-style-type: none"> - Calculating the n^{th} derivative - Expansion of order n of a function - Taylor and Maclaurin polynomials (apply T and M polynomials of order n with Lagrange remainder to a $(n+1)$-times differentiable function to give an approximate value of the functions) - Determine Maclaurin polynomials of order n of functions obtained by sum, difference, product and/or composition of the following functions: 	<ul style="list-style-type: none"> - Geogebra - Worksheets 	1, 2, 3, 5, 6	<ul style="list-style-type: none"> - Homework - Classwork - Test

		<ul style="list-style-type: none"> - $\frac{1}{1 \pm x}$, $\ln(1 \pm x)$, e^x, $\cos(x)$, $\sin(x)$ and $(1 \pm x)^n$ <i>with</i> $x \in \{\frac{1}{2}, 2, 3, 4, \dots\}$ 			
November - December	Trigonometric and hyperbolic functions	<ul style="list-style-type: none"> - Inverse trigonometric functions (arcsine, arccosine and arctangent) and hyperbolic functions (hyperbolic sine, hyperbolic cosine and hyperbolic tangent): definition, domain, limits, whether they are odd or even, domain for which they are differentiable, derivatives, where they are increasing/decreasing, graphs. - Families of functions involving trigonometric or hyperbolic functions. - Usual trigonometric and hyperbolic formulae and transformation: <ul style="list-style-type: none"> - For (hyperbolic) sine, cosine and tangent: square law formulae, sum/difference identities, double angle identities, product identities, sum to product identities, t-formula, ... - Linearize an expression involving trigonometric or hyperbolic functions. 	- FPP2 edexcel book.	1, 2, 3, 4, 5, 6	

		<p>Express:</p> <ul style="list-style-type: none"> - $\cos(nx)$ and $\sin(nx)$ as power of $\cos(x)$ and $\sin(x)$. - $\cos h(nx)$ and $\sinh(nx)$ as power of $\cos h(x)$ and $\sinh(x)$. - Equations solved by using these formulae or transformations. 			
January	Integration techniques	<ul style="list-style-type: none"> - Inverse functions based on primitives of arcsine, arccosine and arctangent functions. - Division of polynomials $\int \frac{P(x)}{Q(x)}$ where P and Q are polynomials functions including improper integrals. The polynomial Q has 1 or several single roots, has one unique multiple roots or is a quadratic function with a negative determinant. - Use of recursive formulae such as $\int_0^{\frac{\pi}{2}} x^n \sin(x) dx$ and $\int_0^{+\infty} x^n e^{-x} dx$ - 			

February	Differential equation	<ul style="list-style-type: none"> - Definition of differential equations, homogenous and non-homogeneous. - Solve a first order and a second order homogeneous linear differential equation with constant coefficients. 	<ul style="list-style-type: none"> - Worksheets - Geogebra 	1, 2, 3, 4, 5, 6, 7, 8	<ul style="list-style-type: none"> - Classwork - Homework
March	Partial differentiation	<ul style="list-style-type: none"> - Functions of two variables. - First order partial derivatives - Geometrical interpretations - Higher order derivatives - Euler's first theorem for homogeneous functions - Differentials - Differentiation of composite functions - Directional derivatives-maxima, minima, saddle points. 	<ul style="list-style-type: none"> - Worksheets - Geogebra 	1, 2, 3, 4, 5, 6, 7	<ul style="list-style-type: none"> - Homework - Classwork - Test
			<ul style="list-style-type: none"> - Geogebra - Worksheets 	1, 2, 3, 4, 5, 6, 7, 8	<ul style="list-style-type: none"> - Homework - Classwork



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March-April			- Worksheets. - Geogebra. - Bingo game.	1, 2, 3, 4, 5, 6	Homework/Classwork Test
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* Link to 8 key competences:

1. Literacy (reading and writing)
2. Multilingualism
3. Mathematics, Science, Technology and Engineering
4. Digital
5. Personal, Social and Learning to Learn
6. Citizenship
7. Entrepreneurship
8. Cultural Awareness and Expression