Lesson	Learning Outcomes	The digital resources available on EKB	
		Student Book	Najwa Limited
Differentiation and its Applications			
Differentiation of trigo-nometric function	• To find derivatives of the inverse of trigonometric functions (secant – cosecant - cotan)	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit1_lesson1.pdf	https://lms.ekb.eg/repository/resource/80cb0859-7381-404b-998f-14be59bf7f26/en
Implicit and parametric differentiation	• To find derivatives of (explicit, implicit, parametric …..) functions	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit1_lesson2.pdf	https://lms.ekb.eg/repository/resource/f9cc1bbf-a102-45a3-8583-9f5086a1d4df
	• To solve problems on derivatives of (explicit, implicit, parametric …..) functions		https://lms.ekb.eg/repository/resource/f3c52386-c4fb-4b62-b6ff-1dd025c0711d/en
Higher derivatives of the function	• To solve problems on higher order (second – third) derivatives of different (explicit, implicit, parametric …..) functions	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit1_lesson3.pdf	https://lms.ekb.eg/repository/resource/1058084b-3d2b-4903-ab34-74ac477d86ef/en
Two equations of the tangent and normal to a curve	• To find the tangent and vertical line equations of a curve at a point thereon as an application on the differentiation of different (explicit, implicit, parametric …..) functions	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit1_lesson4.pdf	https://lms.ekb.eg/repository/resource/2fa15481-1087-4f34-b7ad-cec0db28ed73/en
Related time rates	• To find the correlated time rates of a relation between many variables.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit1_lesson5.pdf	https://lms.ekb.eg/repository/resource/f0cd98dc-1ba1-4523-b40b-f279faf4834b/en
	• To find the correlated time rates including the physical, geometric, and real-life applications.		
	• To model and solve mathematical, physical and real-life problems on the applications of tangent and vertical line equations and solve time rates problems.		

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The calculus of Exponential and Logarithmic functions			
The exponential function with the natural base and the natural logarithmic function	• To learn the concept of number e through limits, and to find some limits that lead to the number e and its multiples.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit2_lesson1.pdf	https://lms.ekb.eg/repository/resource/6f1b9bc6-2ad4-4a92-ada9-60ae74925918/en
	• To learn the principle of natural logarithm through the limit lim┬(x┬→) ┬┬a^(x\-)/x┬= log_e┬a, to know some properties of natural logarithms		
	• To solve problems on limits involving a logarithm of the base e or the base a.		
Derivatives of the exponential and log-arithmic functions	• To know and find the derivatives of the exponential and logarithmic functions of the base e.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit2_lesson2.pdf	https://lms.ekb.eg/repository/resource/0713a99d-0b3f-491e-b95c-5e1481ea9266/en
	• To know and find the derivatives of the exponential and logarithmic functions of the base a.		https://lms.ekb.eg/repository/resource/8c8a05bd-b518-4659-81f0-bce6e659061f/en
	• To solve geometric applications involving derivatives of the exponential and logarithmic functions.		https://lms.ekb.eg/repository/resource/aa151fec-e69f-4827-a522-e146eb374e0f/en
	• To solve mathematical and real-life problems involving logarithmic differentiation, tangent and vertical line functions, and time rates.		

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Integration of the exponential and logarithmic functions	• To know and find the indefinite integration of exponential functions.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit2_lesson3.pdf	https://lms.ekb.eg/repository/resource/579be2c3-12c7-4c72-87a5-8309dd154dbd/en
	• To know and find the indefinite integration of functions whose integration leads to logarithmic functions.		https://lms.ekb.eg/repository/resource/ad9e3259-9b9b-48bc-87f9-47be1a15ff3a/en
	• To solve real-life, physical and geometric problems on the integration of exponential functions and functions whose integration leads to logarithmic functions.		
Behaviors of the function and Curve sketching			
Increasing and decreasing of the functions	• To use the first derivative to determine the increasing and decreasing intervals of differentiable functions.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit3_lesson1.pdf	https://lms.ekb.eg/repository/resource/6dc0fb79-4f56-4fac-97a4-3ebfd04341af/en
Maximum and minimum values	• To know and find the critical points of a continuous function in the interval [a, b], and to determine its type in terms of being a local maxima or local minima.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit3_lesson2.pdf	https://lms.ekb.eg/repository/resource/d5b68f02-3767-4443-a355-b672e7f78f33/en
	• To find the local maxima and local minima of a differentiable function.		https://lms.ekb.eg/repository/resource/aa2bfeb3-8571-4be9-b6be-f32d1dda2e46/en
	• To know and find global maxima and global minima of a function in a closed interval.		

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Curve sketching	• To know the definition of convex curve, determine the intervals of convex upward curve and convex downward curve, and to determine the inflection points "if any".	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit3_lesson3.pdf	https://lms.ekb.eg/repository/resource/8e4a01a1-14ac-430e-8bd6-ecfb22db8c1f/en
	• To solve problems on critical points, convex upward curve, convex downward curve, and inflection points of a function curve.		https://lms.ekb.eg/repository/resource/ac6e9e66-f547-4ed2-ac4c-699f211d9913/en
	• To study a function behavior in terms of uniformity, maxima and minima through first derivative.		https://lms.ekb.eg/repository/resource/ffde37f4-7a6e-43b0-b86b-3d7ebb4ad004/en
	• To solve problems on drawn curves of polynomial functions only till the third degree ones.		
Applications on maximum and minimum values	• To use the second-derivative test to find the local maxima and local minima.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit3_lesson4.pdf	https://lms.ekb.eg/repository/resource/680d774e-cc25-43f2-9f3d-a61e65b85d0c/en
	• To infer and determine the general shape of a continuous function curve having some properties of this curve given.		https://lms.ekb.eg/repository/resource/f6a98742-5a9a-49a3-a8ce-a677c22fcb76/en
	• To model and solve mathematical and real-life applications on the maxima and minima		

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The Definite integral and its applications			
Methods of integration	• To know and find the differentiation of a given function.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit4_lesson1.pdf	https://lms.ekb.eg/repository/resource/b5e7321e-d10b-446a-bfb8-c2fc854a6d50/en
	• To find the original function of a given function having its first derivative known.		
	• To know some integration methods such as: non-trigonometric substitution, and to find the integration using it.		https://lms.ekb.eg/repository/resource/fedd2135-2375-4ec0-8e1f-0077fa53512b/en
	• To know some integration methods such as: integration by parts, and to find the integration using it.		https://lms.ekb.eg/repository/resource/d3dd0f29-c698-4fa1-b570-82c4a00b7210/en
Integration of trigonometric functions	• To know and solve problems using integration rules of trigonometric functions and table of basic integrals	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit4_lesson2.pdf	https://lms.ekb.eg/repository/resource/8e66c757-de35-48ef-9930-c714ba2336bb/en
Definite integration	• To know the concept of definite integration and use the fundamental theorem of differentiation to find the definite integration .	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit4_lesson3.pdf	https://lms.ekb.eg/repository/resource/c13ce3ba-064f-48fe-a3bd-6fdf52f8f37d/en
	• To know and use some properties of definite integration to find the value of definite integration of a continuous function.		
	• To know and use some properties of definite integration to find the value of definite integration of odd and even functions.		https://lms.ekb.eg/repository/resource/99868623-60c0-4780-b56c-a4bb248bdffc/en

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Areas in the plane	• To find the area defined by a function curve and X-axis on a closed interval.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit4_lesson4.pdf	https://lms.ekb.eg/repository/resource/2803d121-a6e5-47de-8b2d-e32402f9b550/en
	• To find the plane area confined between two curves.		https://lms.ekb.eg/repository/resource/237caad1-a868-4e4f-83a7-0f8159982700/en
	• To use the definite integration to solve applications involving finding an area.		https://lms.ekb.eg/repository/resource/c1d4ec81-d3ae-46c1-844e-016b42dabac6/en
Volumes of solids of revolution	• To recognize volume as a definite integration and find the particle volume produced by the rotation of a plane area around one of the coordinates axes.	https://d3sk34bfh9epsl.cloudfront.net/mathematics/differential-integral-calculus/g12/english/unit4_lesson5.pdf	https://lms.ekb.eg/repository/resource/16ec33b9-b0a2-49d0-a2ab-fe84f8b977e5/en
	• To find the particle volume produced by the rotation of an area confined between two curves around one of the coordinates axes.		
	• To use the definite integration to solve problems involving finding the volume of a surface of revolution around one of the coordinates axes.		