



King Abdul-Aziz University
Department of Mathematics

Academic year 1437-1438
2016-2017

Math 110 (S & E) Syllabus / Term (1)

Book: Calculus Early Transcendentals by James Stewart 7th edition

		Lectures			
Chapter Title	Section	Theoretical (Definitions & Theorem)	Examples	Exercises	HW
Appendix	Appendix A Numbers, Inequalities and Absolute Values	- Intervals (Table) - Inequalities - Absolute value Properties (1-6)	4,7 Read 1,2,3,6,8		
	Appendix B Coordinate Geometry and lines	- Slope of line - Point-slope form of the equation of a line.	4 Read 7,8	35	
	Appendix D Trigonometry	- Angles (convert formula) - Trigonometric functions - Trigonometric identities,6-11,15. - Graphs of the trigonometric functions (sin,cos,tan only) (domain & range of all).	1,4	4, 33	1-12 (odd) 29- 34 (odd)

Ch1: Functions and Models

1.1 Four ways to represent a function	- Definition: Function, Domain and Range of a (polynomial, absolute, rational, radical of first and second degree) Functions- - Graphs of Functions and vertical line test. - Piecewise defined functions. - Symmetry (Odd & even) functions. - Increasing and Decreasing Functions	2,6,7,8,11 Read 1	9,31,33,34,76,38,42,45. Prove that the function $y = \sqrt[3]{\frac{x+2}{2}}$ is 1-1 by def.	7-10,32-34,43,47,73-78
1.2 Mathematical Models: A Catalog of essential functions	Essential functions (Polynomials, power, rational, algebraic, trigonometric, exponential and logarithmic)	5	2	1
1.3 New functions from old functions	- Transformation of functions. i) Vertical and horizontal shifts. ii) Vertical and horizontal reflecting. - Combination of functions ($f \pm g$, $f \cdot g$, f/g, Composite Functions) and their domain.	1,2,3(b), 6-9	1(a-f) *Solve it for $y=e^x$ (or $y=x^2$) *Sketch the graph of $y = \cos x $ $y = \cos x + 3$ $y = \cos\left(x - \frac{\pi}{2}\right)$ Then find the domain and range	29-37 (odd), 39, 45 *try to sketch $y = \cos x - 3$ $y = 2 + \cos x$ $y = \sin x $ $y = \sin x + 3$ Then find the domain and range
1.5 Exponential Functions	- Laws of Exponents - The Number e.	1	2,13,14,19,20	1,3,17
1.6 Inverse Functions and Logarithms	- Definition1: (1-1) & horizontal line test. - Definition 2: Inverse Functions. - How to find the inverse function. - Logarithmic functions - Natural logarithm. - Graphs and growth of natural logarithm - Inverse of Trigonometric Functions	1,2 4-13 Read 3,6	22,23,37(b),40,48(a),51(a,b),53(a),57, 64,68.	21-26 (odd) 35-41 (add) 52

Ch2: Limits and derivatives	2.2 The Limits of a Functions	• Definition1-6 • Fig17 • One-sided limits • Infinite limits (vertical asymptote)+ limit of trigonometric function(by theorem)* •	1,7-10	9,12 35,38	4,7,8,11
	2.3 Calculating Limits Using the Limits Laws	• The Limits Laws • Theorem1,2 • The squeezed theorem. • P.192 relation 2, p.193 relation 3	2(a)-9,11 p. 196 5,6	15,23,28, 29,57 40,46 42, 45 ,47, 48	12, 19, 20,22,25, 27, 31, 32,35-37, 39
	2.5 Continuity	• Definition1: Continuity at A number. • Definition2: Continuity from the right and from the left • Definition3: Continuity on an interval. • Theorem4-10	2(a-c),6,8,9, 10 Read5,7	3,45	17,20,21,25 , 38, 41,45
	2.6Limits at infinity	• Definition1-3 • Infinite limits at infinity • Theorem • $\lim_{x \rightarrow \infty} (ax^n)$ if n odd or even	1-11	34,43	19,26,33, 35 , 43, 44
	2.7 Derivatives and rates of change	• Tangents • Definition1-2 • Derivatives • Definition 4	1,4,5		
Ch3: Differentiation Rules	2.8 The Derivatives as a Function	• Formulas 1,2 • Definition 3,Theorem 4 • Higher Derivatives	3,5,7		29,49
	3.1 The Derivative of polynomials and exponential function	• Constant functions • Power functions • Definition of normal line p.176 • New derivatives from old • Exponential functions	1-6,8	23	3-35(odd)
	3.2 The product and quotientrules	• The product rule • Quotient rule	1-5		3-33(odd)

	3.3 Derivatives of Trigonometric Functions	Derivative of Sine Function, Derivative of Cosine Function, Derivative of other Basic Trigonometric Function.	1,2(diff.only), 4-6	21, 40,46 42, ,45 ,47, 48	1-7(odd), 39,49
	3.4 The Chain Rule and Parametric Equations	The Chain Rule.	1-9	33,53	1- 15(odd),44, 47,48
	3.5 Implicit Differentiation	Implicit Differentiation, Derivatives of Higher Order, Derivatives of Inverse Trigonometric Functions.	1-2(a,b)-5,	12,26	5- 11(odd),25, 35,37,49,55
	3.6 Derivatives of Logarithmic Functions	Derivatives of Logarithmic Functions	1-8	19,52	3- 17(odd),31, 43-47
Ch4: Applications of Differentiation	4.1 Maximum and Minimum Values	- Definition1,2,6 - Extreme Value Theorem, Critical Number.	4,7,8 Read2,3	4	5,29,47,53
	4.3 How derivatives affect the shape of a graph	- Increasing /decreasing test - Monotonic Function and Concavity, First and second derivative Test - Test for Concavity. - Definition: inflection point	1,2,6 Read7	12 (read 1)	9,19

Note: see the workshop at mnorwali.kau.edu.sa

Marks distribution :-First Exam (120 min; 30 marks); Second Exam (120 min; 30 marks); Final Exam (120 min; 40 marks);

Note

Appendices A&B are not included in the exams.

Exam1 from Appendix D, sec.1.1-end of sec.1.5. (to be arrange later)

Exam2 from sec.1.6-end of sec.2.8.+P192,193,198 (to be arrange later)

Final exam: All chapters