المملكة العربيّة السّعوديّة
وزارة التّعليم

MINISTRY OF EDUCATION

هام

لكل المهتمين و المهتمات
بدروس و مراجع الجامعية

مدونة المناهج السعودية eduschool40.blog

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Department of Mathematics

**Academic year 1439-1440
2018-2019**

Math 110 "Students Syllabus"

Book: Calculus Metric Version Early Transcendentals by James Stewart 8th edition   **(No Calculator)**

Chapter Title	Section	Theoretical (Definitions & Theorem)	Examples	Exercises	HW
		Lectures			
Appendixes	Appendix A Numbers, Inequalities and Absolute Values	• Intervals (Table). • Inequalities • Absolute value. • Properties (1-6).	1,2,3,4,6,7,8		
	Appendix B Coordinate Geometry and lines	• Slope of line. • Point-slope form of the equation of a line. • Slope-Intercept form of the equation of a line. • Parallel and perpendicular lines.	4,7,8		
	Appendix D Trigonometry	• Angles (convert formula). • The Trigonometric functions. • Trigonometric identities, 6-11, 15. • **Graphs** of the trigonometric functions **(sin, cos, tan only) (domain, period of all) (range of sin, cos, tan only).**	1,4	4,33	1-11(odd) 29-33(odd)
Ch1: Functions and Models	1.1 Four ways to represent a function	• Definitions: Function, Domain and Range. • Vertical line test. • Piecewise defined functions. • Symmetry (odd & even) functions. ** • Increasing and Decreasing Functions _(open or closed intervals are correct)_	2,6,7,8,11 **Read 1**	9, 31, 33, 34, 38, 40, 49, 76.	7-10, 32-34, 41, 46, 73-78
	1.2 Mathematical Models: A Catalog of essential functions	• Essential functions: Polynomials, power, rational, algebraic, trigonometric, exponential and logarithmic ($\ln x$). • Graphs of functions *.	**6**	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±g, f.g, f/g, Composite Functions) and their domain. **Remark:** **Don't simplify the function f/g before calculating the domain.**	**1 (without** $y=2\sqrt{x}$**), 2, 3(b) add to example (3) Sketch the graph of** (c) $y = |\cos x|$ (d) $y = |\cos x| + 3$ (e) $y = \cos\left(x - \frac{\pi}{2}\right)$ **Then find the domain and range, 6-9**	1(a-f) Add to exercise (1) and solve it for $y = 2^x$ and $y = x^2$ 32	29-39(odd) ,41 ,47 *try to sketch $y = \cos x - 3$ $y = 2 + \cos x$ $y = |\sin x|$ $y = |\sin x| + 3$ Then find the domain and range
	1.4 Exponential Functions	• Laws of Exponents. • The Number e.	1	2, 13, 19, 20	1,3,17
	1.5 Inverse Functions and Logarithms	• Definition1: (1-1) in P.56 **or (If** $f(x_1) = f(x_2)$ **then** $x_1 = x_2$**)** • Horizontal line text. • Definition 2: Inverse Functions. • How to find the inverse function. • Logarithmic functions. • Natural logarithm. • Graphs and growth of natural logarithm. • Inverse of Trigonometric Functions: $(\sin^{-1}, \cos^{-1}, \tan^{-1}$ only). • Table 11 **(def. only without domain and range).**	1, 2, **Add prove that the function** $y=\sqrt[3]{\frac{x+2}{2}}$ **is 1-1 "by def."** 4, **Replace f(x) in example(5) by** $f(x) = \sqrt{x-1}$ **7-13 Read 3,6**	22, 23, 37(b), 40, 48(a), 51(a,b), 53(a), 57, 64, 68 (a) $\arcsin(\sin 7\pi/3)$ 68(b)	21-26(odd) 35-41(odd) 52

Ch2: Limits and derivatives	**2.2 The Limits of a Functions**	• Definition1-6. • One-sided limits. • Infinite limits: (vertical asymptote). • Figure 17.	1,7-10	9, 12, 39, 44	4,7,8,11
	2.3 Calculating Limits Using the Limits Laws	• The Limits Laws 1-11 • Theorem1, 2. • The squeezed theorem+ Figure 7. • limit of trigonometric function(by theorem)*P.191 relation 2, P.192 relation 3 +relations in 'notes in math110'.	2(a)-9,11 example (8): Let it (T or F) instead of (Show that) P. 195: 5,6	15, 23, 24, 29, 59 p.197: 42, 45, 48, 49, 50	12, 19, 20,22,25, 27, 31, 32,35-37, p. 197: 39
	2.5 Continuity	• Definition1: Continuity at A number. • Definition2: Continuity from the right and from the left. • Theorem 4-9.	2(a-c), 6, 8, 9 Read5, 7	3, 45	17, 20, 21, 25, 38, 43
	2.6Limits at infinity	• Definition1-3. • Theorem 4-6. • Infinite limits at infinity. • $\lim_{x\to\infty} ax^n$ if n odd or even.	1-11	36, 49	19, 30, 35, 37, 50
	2.7 Derivatives and rates of charge	• Tangents. • Definition 1, 2. • Derivatives. • Definition 4, 5.	1,4,5		
	2.8 The Derivatives as a Function	• Formulas 1, 2. • Other Notations. • Definition 3, Theorem 4. • Higher Derivatives.	3, 5, 7		29, 55

Ch3: Differentiation Rules	**3.1 The Derivative of polynomials and exponential function**	• Constant functions. • Power functions. • Definition of normal line P.175. • Horizontal tangent. • New derivatives from old. • Derivative of the natural exponential function.	1-6, 8	23	3-31(odd), 37
	3.2 The product and quotient rules	• The product rule. • Quotient rule.	1-5		3-33(odd)
	3.3 Derivatives of Trigonometric Functions	• Formulas 4-6. • Derivative of Trigonometric Functions.	1,2(diff. only), 4-6	21, 42, 45, 48, 49, 50	1-7(odd), 39,51
	3.4 The Chain Rule and Parametric Equations	• The Chain Rule. • The power rule combined with the chain rule. • Formula 5.	1, add to example (2) find y'' , 3-9	23, 53	1-15(odd), 44, 47, 48
	3.5 Implicit Differentiation	• Derivatives of Inverse Trigonometric Functions.	1, 2(a,b), 3-5,	12, 25	5-11(odd), 35, 37, 49, 55
	3.6 Derivatives of Logarithmic Functions	• Formulas 1-4. • Logarithmic differentiation.	1-8	19, 52	3-15(odd), 21, 31, 43-47
Ch4: Applications of Differentiation	**4.1 Maximum and Minimum Values**	• Definition 1, 2 • Definition 6 (Critical Number). • The closed Interval Method.	8	3	5,29,47,53
	4.3 How derivatives affect the shape of a graph	• Increasing/decreasing test • The First derivative Test • Definition: (concavity) + Concavity test. • Definition: inflection point	1,2,6(بدون)	1, 9	5,11

* The graphs that students must Know:
$Y=\sin x$, $y=\cos x$, $y=\tan x$
$Y=x$, $y=|x|$, $y=\sqrt{x}$, $\sqrt[3]{x}$, $\sqrt[4]{x}$, $\sqrt[5]{x}$,...
$Y=x^2$, (and similarly $y=x^4$, $y=x^6$, ...etc)
$Y=x^3$, (and similarly $y=x^5$, $y=x^7$, ...etc)
$Y=\frac{1}{x}$, (and similarly $Y=\frac{1}{x^3}$, $Y=\frac{1}{x^5}$ ...etc)
$Y=\frac{1}{x^2}$, (and similarly $Y=\frac{1}{x^4}$, $Y=\frac{1}{x^6}$ ...etc)
Exponential function, logarithmic function.

** Trigonometric functions (odd & even):

Even	Odd
$\cos x$	$\sin x$
$\sec x$	$\csc x$
	$\tan x$
	$\cot x$

Marks distribution:-

	First Exam	Second Exam	Final Exam	
Time ; marks	120 min; 33 marks	120 min; 33 marks	120 min; 44 marks	Total: 100

Note

✓ Appendices A&B are not included in the exams.
✓ See the **workshop**.