Precalculus

(Mathematics 640:115:Sec. 27-30 — Fall 1995)

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Textbook: *College Algebra and Trigonometry with Applications*, 2nd edition, by Josè Barros-Neto,
ISBN # 0-314-04790-5, West Publishing Company.

Lectures: MW 6, HCK-101 (Douglass/Cook).

Recitations: Sec. 27: F2* HCK-202; Sec. 28: F3* BIO-205; Sec. 29: F4* RAB-207; Sec. 30: F5* HCK-119. Recitation instructor: Jason Jones, 342 Hill Center (Busch); Office ✎ 445 - 2268; `E-mail jjones@math.rutgers.edu`.

Grade: The final grade for the course will be based on two midterms (20% each), on a final exam (40%) and, in addition, on a set of weekly quizzes (20%). Note that the final is comprehensive. All exams are closed-book. No *cheat-sheets*, notes, and calculators are allowed. You must bring your picture I.D. card to every exam.
The quizzes will be given during the recitations starting on Sept 22. The lowest two quizzes will be dropped and NO make-up quizzes will be offered. Make-up exams will be given only in case of emergency or if a valid excuse is given and verified in advance.
Attendance and active participation to class life will be also taken in consideration when computing the final grade.
Homework will be mandatory but I will not collect it; I encourage you to work together in doing it.

Comments: You are expected to know most of the elementary algebra found in Chapters 1 and 2 of the book. A brief review of these two chapters will be done during the first week of class.
You will receive a list of 50 problems, and their respective answers, selected from Chapters 1 and 2 in order to help you determine whether or not you have the necessary algebra background to follow Math 115. If you are unable to score at least 40 correct answers out of the 50 problems you will then have difficulty in following this course and you are strongly advised to drop-down to Math 111-112 (which is the equivalent of Math 115, but it is taught in two semesters).
You will need to work very hard in this course. Don't fall behind and do come to class. The outline lists what will be covered during this semester and your homework assignments.
I suggest that you trade phone numbers with someone in class who will take notes for you and let you know what you missed just in case you are deathly ill and have to miss a class.
I also suggest that you read the material before I cover it in class. You will find that you learn more that way.

Outline: The following is a temptative schedule for this course:

Chapter:	Sections:	Content/Problems:
One	**1.3-1.8**	Polynomials; special products, factoring; rational expressions; radicals; rational exponents. Review Exercises: 1-18.
Two	**2.1-2.8**	Linear and quadratic equations; linear and quadratic inequalities; word problems. Review Exercises: 19-50.
Three	**3.1-3.3**	Cartesian coordinates; the distance formula; equations of lines; standard forms; $m' = -1/m$; graphs of equations. 3.1: (pp. 126/7) 3–15 (odd), 23, 24, 30. 3.2: (pp. 137/8) 5, 7, 9–27 (odd), 33–36, 43–49, 54, 57. 3.3: (pp. 147/8) 29–32, 35–43 (odd), 49.
Four	**4.1-4.3**	The function concept; algebra of functions; functions defined by formulas. Polynomial and quadratic functions. Sketching, with use of translation and scaling. 4.1: (pp. 178/9) 15–21 (odd), 32–40 (domain). 4.2: (pp. 186/7) 1–17 (odd), 31–35 (odd), 37–46, 47–49, 51, 57. 4.3: (pp. 194/5) 1–21 (odd). Ch. 4: (pp. 202/3) 7, 9, 11, 41, 43, 49.
Five	**5.1-5.4**	Graphing quadratic functions, quadratic inequalities by factorization. Graphing polynomial functions. Graphing rational functions, using inequalities; asymptotes. Composition and inverse functions. Dummy variables. 5.1: (pp. 211/2/3) graph 5–12, 33–35, 38, 39, 41, 43, 46. 5.2: (p. 218) 9, 11, 12, 13, 18. 5.3: (pp. 228/9) 1–4, 6, 7, 24, 26, 31, 43, 44, graph $y = x^2/1 - x^2$, $y = x/x^2 + 1$, $y = x/x^2 - 1$. 5.4: (pp. 238/9) 1–9 (odd), 13, 17, 21, 23, 25, 27–44.

First hourly exam through Section 5.2. (1 hr and 20 m).

Six	**6.1-6.5**	Introduction to exponential functions. Algebraic properties; graphs. Applications of exponential functions: compound interest, growth and decay problems. The number e. Logarithmic functions: their definition; graphs, tied back to inverse-function ideals of Section 5.4. Logs to base 10 and e. Intelligent calculator use to evaluate logs and exponentials. Exponential and logarithmic equations; change of base. 6.1: (p. 252) 23–30. 6.2: (pp. 262/3) 7–12, 14–16, 19, 20, 24.

Outline (cont.): Chapter: Sections: Content/Problems:

6.3: (pp. 271/2) 1–25, 41–50, 55–67, 71, 73, 75.
6.4: (pp. 277/8) 1–18.
6.5: (pp. 285/6) 9–22, 31–37, 47–52, 57–61.
Ch. 6: (pp. 288/9) 1, 3a, 5, 7, 13, 15, 19–22, 35–39, 41–44.

Seven **7.1-7.3** Introduction to trigonometry: angle measurament. Right-triangle trigonometry; the trigonometric functions. Special angles; complementary angles. Evaluation of trigonometric functions using calculators and/or tables. Solving right triangles.
7.1: (p. 300) 1–28, 37–62.
7.2: (pp. 315/7) 1–24, 47–54.
7.3: (pp. 321/2) 11–20, 21–27.
Ch. 7: (pp. 325/6) 1, 3, 5, 8, 9, 10, 11, 23, 43, 45.

Second hourly exam from Section 5.3 through Section 7.2 (1 hr and 20 m);

Eight **8.1-8.4, 8.6** Introduction of circular functions. The Pythagorean identities. Circular functions on non-unit circles. The use of reference angles. Evaluation of circular functions. Graphs of circular functions. Amplitute and period. Maxima and minima, bounds and asymptotes. Inverse trigonometric functions.
8.1: (pp. 338/9) 1–30 (unit circle $r = 1$), 1–14 use special angles.
8.2: (p. 343) 21–23, 24, 27.
8.3: (p. 348) 1–24, 37–48, $\cos x = .4785$ ($Q4$), $\sin x = 1/2$, $\tan x = .6245$, $\cos x = -3/2$, $\sin x = -.7642$ ($Q3$), $\tan x = -1$.
8.4: (p. 363) 11, 13, 14, 19, 20, 25, 26, $y = 3\tan(2x + 50)$, $y = \sin(3x - 120)$.
8.6: (p. 375) 1–49 (odd).

Nine **9.1-9.6** Trigonometric identities of Pythagorean type. Addition formulas for trigonometric functions. Double- & half-angle formulas. Trigonometric equations and their solutions. The low of cosines.
9.1: (pp. 382/3) 11–23 (odd), 26, 27, 28, 31, 32, 39, 40, 43, 51, 52.
9.2: (pp. 390/1) 1, 3, 6, 11, 12, 21–26, 31–36, 37–44.
9.3: (pp. 396/7) 1, 3, 5, 9, 11, 13, 35–40.
9.4: (pp. 400/1) 1–5, 9, 10, 17–20, 29–33, 49–52, $\sin 3x = -3/2$, $\cos 2x = 1/2$.
9.5: (pp. 407/8) 1, 4, 5, 6, 39, 46, 47.
9.6: (p. 413) 1–8.

FINAL EXAM.