



**College Algebra - MAC 1105
Departmental Syllabus
Revised Fall 2011 (by Anna Wlodarczyk)**

Text: Algebra and Trigonometry, 9th edition, by Michael Sullivan

Prerequisites: A C or better in Intermediate Algebra (MAT 1033) or an adequate placement score

Description: The focus of this course is on functions and their properties. In particular, properties and graphs of linear, quadratic, polynomial, rational, exponential and logarithmic functions are discussed. Ways of solving systems of equations are introduced at the end of the semester.

Objectives: After finishing the course students should have a good understanding of the concept of a function, its domain and range. They should be able to graph basic functions and be familiar with their properties. They should be able to perform operations on functions, form composition and find the inverse of some one-to-one functions. They should know and be able to apply properties of logarithms. They should be able to solve exponential and logarithmic equations and systems of linear and nonlinear equations.

Organization of the course: The class meets either twice a week (Tuesday/Thursday, Monday/Wednesday) for 75 minutes or three times per week (Monday/Wednesday/Friday) for 50 minutes. In a regular semester there are about 28 75-minute and 42 50-minute lectures. A suggested pace is outlined below. The schedule allows for in-class exams: three 75-minute exams for 2-day schedule and five 50-minute exams for 3-day schedule. The last exam must cover exponential and logarithmic functions. The 2.5 hour departmental final exam is comprehensive and mandatory for all students. **The final exam must count for 25% of the final grade.**

The exams are to test students' knowledge and ability to perform specific tasks, so open book/notes, formula sheets/cards are not allowed.

Graphing calculators are prohibited in this course and the use of scientific calculator (TI-30XA) should be reduced to minimum.

All sections are required to use MyMathlab for online assignments. Each semester, the coordinator will provide the course ID that will be used to copy the course for use in each section. The explanations in MyMathlab are very detailed, so students CAN learn from them. This means that you do not have to do 10 examples in the class- 1-2 would suffice most of the time.

Suggested pace

(the number of lectures for a 2-day schedule is given)

Chapter R - 2 lectures

Treat this chapter as a review only; do not spend more than 1 week covering it. If students are not familiar with these topics, they can either learn from online assignments or register for Intermediate Algebra instead.

Chapter 1 and sec 5.4 – 2 lectures

Lecture 1: Review sec 1.1, 1.2, 1.4 ; emphasize sec 1.2. Do not cover complex solutions

Lecture 2: Cover briefly sec 1.5 (Example 7,8,9); emphasize sec 5.4. Do not use concept of a function in 5.4

Chapter 2, sec 2.1-2.4 - 3 lectures

When finding intercepts in sec 2.2, use examples that lead to quadratic equations

Students are usually familiar with the content of section 2.3.

Chapter 3 – 5 lectures

Cover operations on functions from Sec 3.1 together with sec 6.1.

Use the handout More on Functions when discussing the domains of functions in sec 3.1. Make sure to include similar problems on the test covering this section

In sec 3.4 skip greatest integer function

Chapter 4, sec 4.3 - 4.5 – 2 lectures

In Sec 4.3, emphasize objectives 3 and 4; in sec 4.4 cover objective 1 only.

Combine sec 4.5 with 4.4; show 1-2 examples only

Chapter 5, sec 5.2-5.3 – 2 lectures

In sec 5.2, make sure that students understand what an asymptote is; do not use limit notation. Omit oblique asymptotes.

In sec 5.3, use only intercepts, asymptotes and the sign analysis to sketch the graph of a rational function. Restrict your test examples to functions of the form $(ax+b)/(cx+d)$

Chapter 6, sec 6.1-6.8 – 7 lectures

Cover operations on functions from sec 3.1 with Sec 6.1; make sure to cover examples 6,7.

Make sure that students understand what a logarithm to the base a of b is and are able to find values of simple logarithms without a calculator

Discuss the domain of logarithmic functions

In sec 6.6, cover objectives 1 and 2 only

In sec 6.8 cover objectives 1 and 2 only

Chapter 12, sec 12.1-12.6 – 1 lecture

In Sec 12.1 cover objectives 1-4 only; emphasize system of nonlinear equations. Make sure that students understand what the solution of a dependent system is; cover some word problems

**DEPARTMENTAL HANDOUT
MORE ON FUNCTIONS**

Find the domain of the given function

$$1) f(x) = \frac{1}{2-3x}$$

$$2) f(x) = \frac{x-2}{x^2+5x+6}$$

$$3) f(x) = \frac{2x}{3-x^2}$$

$$4) f(x) = \frac{x-1}{x^2-7x+2}$$

$$5) f(x) = \frac{-3}{x^2+1}$$

$$6) f(x) = \frac{2x+1}{x(x+1)(x-3)}$$

$$7) f(x) = \frac{4x^2}{3x^2+6x}$$

$$8) f(x) = \frac{-2}{|3x+2|-1}$$

$$9) f(x) = \frac{1-x-x^2}{4|2x-3|+1}$$

$$10) f(x) = \sqrt{\frac{1}{3}x+2}$$

$$11) f(x) = \frac{-1}{\sqrt{3-2x}}$$

$$12) f(x) = \sqrt{6+x-x^2}$$

$$13) f(x) = \sqrt{\frac{x}{1-x}}$$

$$14) f(x) = \sqrt{x^2-4}$$

$$15) f(x) = \sqrt[3]{x+2}$$

$$16) f(x) = \sqrt{3x^2-x-2}$$

$$17) f(x) = \sqrt{\frac{x}{x^2-4x-5}}$$

$$18) f(x) = \frac{5}{\sqrt{4x+1}-2}$$

$$19) f(x) = \frac{3x-1}{\sqrt{x+5}+1}$$

ANSWERS

$$1) \{x | x \neq \frac{2}{3}\} = (-\infty, \frac{2}{3}) \cup (\frac{2}{3}, +\infty) \quad 2) \{x | x \neq -3, -2\} = (-\infty, -3) \cup (-3, -2) \cup (-2, +\infty),$$

$$3) \{x | x \neq -\sqrt{3}, \sqrt{3}\} = (-\infty, -\sqrt{3}) \cup (-\sqrt{3}, \sqrt{3}) \cup (\sqrt{3}, +\infty)$$

$$4) \{x | x \neq \frac{7-\sqrt{41}}{2}, \frac{7+\sqrt{41}}{2}\} = (-\infty, \frac{7-\sqrt{41}}{2}) \cup (\frac{7-\sqrt{41}}{2}, \frac{7+\sqrt{41}}{2}) \cup (\frac{7+\sqrt{41}}{2}, +\infty)$$

$$5) (-\infty, +\infty) \quad 6) \{x | x \neq -1, 0, 3\} = (-\infty, -1) \cup (-1, 0) \cup (0, 3) \cup (3, +\infty)$$

$$7) \{x | x \neq -2, 0\} = (-\infty, -2) \cup (-2, 0) \cup (0, +\infty) \quad 8)$$

$$\{x | x \neq -\frac{1}{3}, -1\} = (-\infty, -1) \cup (-1, -\frac{1}{3}) \cup (-\frac{1}{3}, +\infty)$$

$$9) (-\infty, +\infty) \quad 10) \{x | x \geq -6\} = [-6, +\infty) \quad 11) \{x | x < \frac{3}{2}\} = (-\infty, \frac{3}{2})$$

$$12) \{x | -2 \leq x \leq 3\} = [-2, 3] \quad 13) \{x | 0 \leq x < 1\} = [0, 1)$$

$$14) \{x | x \leq -2 \text{ or } x \geq 2\} = (-\infty, -2] \cup [2, +\infty) \quad 15) (-\infty, +\infty)$$

$$16) \{x | x \leq -\frac{2}{3} \text{ or } x \geq 1\} = (-\infty, -\frac{2}{3}] \cup [1, +\infty)$$

$$17) \{x | -1 < x \leq 0 \text{ or } x > 5\} = (-1, 0] \cup (5, +\infty)$$

$$18) \{x | x \geq -\frac{1}{4}, x \neq \frac{3}{4}\} = [-\frac{1}{4}, \frac{3}{4}) \cup (\frac{3}{4}, +\infty)$$

$$19) \{x | x \geq -5\} = [-5, +\infty)$$