# 92.121 Management Precalculus
# Spring 2009

Text: Larson, Hostetler, **College Algebra**, 7th edition, Houghton Mifflin, 2007; accompanying **Study and Student Solutions Guide**.

Note: The texts are packaged together at a reduced price.

Goals and objectives: This management precalculus course is a traditional approach for non-science students. Graphical understanding of the precalculus concepts with use of a graphing calculator will also be incorporated.

The strategies will consist of applications to the mathematical concepts as they are developed through graphical, numeric and analytic procedures. The primary objectives are:

- Mastery of algebra prerequisites: - A review of manipulation with exponents, development and manipulation of algebraic fractions, and solution of systems of equations. Technology will be used to help define and solve systems of linear equations.
- Function definition and linear functions: - Mathematical concepts will be developed for functional notation and examples presented for linear functions. Data will be presented and linear models developed with the aid of graphing calculator technology.
- Exponential and log functions: - Growth/decay functions, and both common and natural log functions will be graphed, trends discussed and applications developed.
- Polynomials and rational functions: - The discussion of functions beyond the linear function will be presented mathematically and graphically. Trends in the behavior of these functions and applications will be discussed.

Grading policy: There will be a total of 500 possible points during the semester. A combination of quizzes and/or technology lab assignments will be given following material coverage and review. Quizzes will be based on assigned homework. These quizzes, projects and classroom participation will be worth 100 points and account for 1/5 of the grade. There will also be three fifty-minute examinations. Each of these examinations will be worth 100 points and account for 1/5 of the grade. The common cumulative final examination will be worth 100 points and the remaining 1/5 of the grade. One half of an 8.5 by 11 sheet of paper with notes on both sides will be allowed for the common final. It is the responsibility of each student to be present for each quiz and examination. Only validated exceptions will be allowed. Graphing calculators can be used on all quizzes and exams.

A guideline for course grade assignment will be:

| FINAL AVERAGE | 94-100 | 90-93 | 87-89 | 84-86 | 80-83 | 77-79 | 74-76 | 70-73 | 67-69 | 58-66 | 0-57 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | F |

Arrangements are possible in individual sections for adjusted weights to be assigned in order to enhance individual overall performances.

Attendance policy: Students are expected to attend all classes and are responsible for all material covered. Quizzes will be given during class time. A missed quiz, late lab assignment or missed examination will result in a **zero** grade unless prior arrangements or acceptable written documentation is provided. Details of the attendance policy follow:

1. Attendance is required;
2. Students are allowed ONE unexcused absence;
3. Additional absences are excused only if the request is accompanied by a Doctor's note or a note from the Dean of Students on appropriate letterhead. This encompasses all situations and unforeseen hardships (accidents, illness, death of a relative, etc.);
4. TWO points will be deducted from the student's final course average per unexcused absence (minus the one allowed);
5. To monitor attendance, at the instructor's discretion, each student will **sign** his or her name to a daily attendance sheet. No signature will be accepted for any student entering class after the first 15 minutes of scheduled class time and no sign-in for a particular class will be allowed other than the day of that class.

Technology: The TI-84 Plus Silver Edition or equivalent will be used throughout the course as a visual aid for learning. While technology will be used, students are responsible for mastery of analytic procedures presented. An online *Graphing Technology Guide* for this text is available at http://college.hmco.com/mathematics/larson/algebra_trig/7e/resources.html. Click on "*Graphing Technology Guide*" at the previous link.

**Syllabus**
**92.121 Management Precalculus**

| Section | Topic | Exercises |
|---|---|---|
| Chapter P | Prerequisites | |
| P.1 | Real Numbers and Properties | p.9/19-37 odd,39,45,61,63,67,71,75,79,81, 83,97,99,101 |
| P.2 | Exponents and radicals | p.21/1-35 odd,37,39,65,67,69,73,79,81,95, 97,99,107,110 |
| P.3 | Polynomials and Special Products | p.29/25-53 odd,93,99,103 |
| P.4 | Factoring | p.38/11,19-43 odd,47-59 odd,65,67,79,81, 87,89 |
| P.5 | Rational Expressions | p.48/9-25 odd,31,32,35-49 odd,55,57,69,70, 73 |
| P.6 | Errors and the Algebra of Calculus | p.56/1-7 odd,8-15 all,17,19,21,43,45 |
| P.7 | Rectangular Coord. System/Graphs | p.64/1-15 odd,23-35 odd,47,49,50,55,56,57 |
| Chapter 1 | Equations and Inequalities | |
| 1.1 | Graphs of Equations | p.86/1-11 odd,13,14,15,63,64 |
| 1.2 | Linear Equations in One Variable | p.94/23,25,29-37 odd,49,51,53,93,95,99 |
| 1.4 | Quadratic Equations/Applications | p.120/7-15 odd,21-27 odd,35-43 odd,51,53, 55,67,69,71,79,81,123,125,127 |
| Chapter 2 | Functions and Their Graphs | |
| 2.1 | Linear Eqs in Two Variables | p.183/5-17 odd,21,23,29,31,39,45,47,51,53, 65,67,69,73,79,81,87,101,103,105,107,113 |
| 2.2 | Functions | p.197/11,12,13,15,17,25,27,29,57,59,61,97 |
| 2.5 | Transformations of Functions | p.228/9,11,13,15,43,45,47,51 |
| 2.6 | Combinations of Functions | p.238/5,7,13,15,19,21,35,37,63 |
| 2.7 | Inverse Functions | p.248/13-19 odd,33,39,42,43,55,82 |
| Chapter 3 | Polynomial Functions | |
| 3.1 | Quadratic Functions | p.270/9,13,14,53,55,57,59,61,79,81,83 |
| 3.3 | Polynomial Division | p.295/5,7,11,13,69,70 |
| 3.5 | Least Squares Regression (p.314) | p.320/9,10 |
| Chapter 4 | Rational Functions | |
| 4.1 | Rational Functions and Asymptotes | p.341/1-7 odd,43,44,45 |
| 4.2 | Graphs of Rational Functions | p.350/1-7 odd,13,22,23,82,83 |
| Chapter 5 | Exponential and Log Functions | |
| 5.1 | Exponential Functions and Their Graphs | p.392/7,9,11,13,33,37,43,59,61,63 |
| 5.2 | Logarithmic Functions and Their Graphs | p.402/1,3,9,17,19-23 all,25,45,53,59-67 odd, 87,89 |
| 5.3 | Properties of Logarithms | p.409/39-57 odd,61,63,65,69,73 |

| | | |
|---|---|---|
| 5.4 | Exponential and Logarithmic Eqs | p.419/9-17 odd, 31,37,39,47,75,77,83,91, 107,109 |
| Chapter 6 | Systems of Equations | |
| 6.1 | Solving Systems of Equations | p.455/5,7,15,23,49,63,64,67 |
| 6.2 | Two-Variable Linear Systems (elimination, and application to linear least squares regression) | p.467/1-7 odd,11,13,45,47,53,55,57,63 |

## Graphing Calculator Implementation

Systems of Equations

The following approach can be used for n by n systems of equations.

- $ax + by = c$
- $dx + ey = f$
- $y_1 = y_2$: 2nd CALC intersect
- $AX = B$
- $X = A^{-1}B$

ex:
$3x + 2y = 7$
$5x - y = 3$

a) MATRX, -> to EDIT, 1 to edit matrix A
b) 2 enter (row), 2 enter (column)
3 enter 2 enter
5 enter -1 enter to define matrix A then 2nd QUIT
c) MATRX, -> to EDIT, 2 to edit matrix B
d) 2 enter (row), 1 enter (column)
7 enter
3 enter to define matrix B then 2nd QUIT
e) to compute $X = A^{-1}B$, MATRX 1 (i.e. matrix A), $x^{-1}$ (inverse of A),
* (multiplication symbol is optional) MATRX 2 (i.e. matrix B), enter

output is $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$

f) MATRX, 1, $x^{-1}$ enter, yields $A^{-1}$

ex: show that $AA^{-1} = I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$: MATRX, NAMES, 1 (i.e. matrix A)

then * (optional), MATRX, NAMES, 1 (i.e. matrix A), $x^{-1}$ (inverse of A), enter

Linear Regression

ex: Model the Dow Jones (D.J.) weekly data with a linear regression model $y = ax + b$.

a) STAT, EDIT to create data

| $L_1(time)$ | $L_2(D.J.)$ | $L_1(time)$ | $L_2(D.J.)$ |
|---|---|---|---|
| 1 | 8775 | 6 | 8750 |
| 2 | 8625 | 7 | 8725 |
| 3 | 8650 | 8 | 8825 |
| 4 | 8575 | 9 | 8950 |
| 5 | 8700 | 10 | 9025 |

b) 2nd QUIT, 2nd CATALOG, DiagnosticOn, enter (twice)
c) STAT, CALC, LinReg(ax+b)
d) LinReg(ax+b) $L_1, L_2, y_1$ enter
e) 2nd STAT PLOT, option 1 , on
f) ZOOM, option 9
g) turn off plot 1 at y=screen or at STAT PLOT

Additional notes:

1. Collaborative techniques will be used as appropriate to supplement the suggested list of homework assignments and to help get the material across.

2. Use the TI repeatedly to encourage learning by visual, numeric and analytic approaches. The TI-84 Plus Silver Edition is recommended for new purchases.

3. Instructions for TI-86 and TI-89 methods to solve systems of equations and linear regression are available as a link at http://faculty.uml.edu/mstick/

4. The attendance policy WILL BE followed. To set the tone that students need to conscientiously do the homework, at least two evaluations (quizzes or exams) WILL BE given by the end of the third week of class.