



Independent Study IN IDAHO

Math 108
Intermediate Algebra

Independent Study in Idaho
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The University of Idaho in statewide cooperation with
Boise State University — Idaho State University
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Study Guide

Independent

Study IN IDAHO

PO Box 443225

Moscow ID 83844-3225

Self-paced study. Anytime. Anywhere!

Math 108 **Intermediate Algebra**

University of Idaho
3 Semester-Hour Credits

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Independent Study in Idaho

This course is offered through the University of Idaho.


Intermediate Algebra

3 Semester-Hour Credits: UI

Welcome!

Whether you are a new or returning student, welcome to the Independent Study in Idaho (ISI) program. Before beginning this course, read the information provided below, including course description, prerequisites, required materials, course objectives, and information about lessons, exams, and grading.

Important!

As you read this section, you will see the following icon: 

Use this icon to direct yourself to the **Appendix** in the back of this study guide for essential registration information, Independent Study in Idaho policies and procedures, and forms you will need to successfully complete this course. You are responsible for understanding and following ISI policies and procedures.



Turn to the **Appendix** now. Familiarize yourself with the information in the *Registration* section, student responsibilities in *Academic Integrity*, and the necessary forms. If there is anything you do not understand, please contact the ISI office for clarification before starting your course.

Course Description

Review of algebra including factoring, rational expressions, exponents, radicals, quadratic equations, equations of lines.

Prerequisites

Although no formal prerequisite courses exist for this course, high school mathematics will be helpful.

Course Materials

Required Course Materials

- Lial, Margaret L., John Hornsby, and Terry McGinnis. *Intermediate Algebra*. 8th ed. Boston: Pearson Education, Inc., 2006. ISBN: 0-321-27920-4

Independent Study in Idaho course materials are available for purchase at the University of Idaho Bookstore. Visit the UI Bookstore's Web site, <http://www.uidahobookstore.com>, select *Textbook, Independent Study* for a list of course materials. You may order online, by telephone, (208) 885-7334, or by e-mail to genbks@uidaho.edu.

Independent Study in Idaho courses are updated and revised periodically. Ordering course materials from the UI Bookstore at the time of registration allows you to purchase the correct edition(s) of textbooks, study guides, and supplemental materials. If purchasing textbooks from another source, refer to the ISBN(s) for the textbook(s) listed for this course to ensure that you obtain the correct edition(s).

If you have questions regarding the course materials you have ordered and received, contact the UI Bookstore.

Course Introduction

Mathematics is essential in nearly all aspects of your life. This course introduces you to specific problem solving techniques. In addition, you will learn strategies to help you solve problems that don't fit the "cookie-cutter" mold usually seen in textbooks.

Course Objectives

The primary objective of this course is to help you become competent (and confident) at solving algebra problems both in the textbook setting and a "real-life" setting. Additionally, the course will prepare you for higher math courses.

Lessons

Overview

This course is divided into 15 lessons. Each lesson contains a reading assignment with practice problems (which are **not** submitted for grading) and a written assignment. Written assignments **are** submitted for grading. There are five practice exams (not graded), four regular exams, and a final exam.

I expect my students to actually read the reading assignment! Most people who have ever taken a math course listen to the instructor lecture then go immediately to the exercises at the end of each section or chapter and get to work solving problems. Unfortunately, you don't have an instructor to listen to. This means you **must** learn how to read a math textbook as well as how to do the math. While this may seem a bit intimidating at the moment, be patient with yourself. It's not as bad (or as difficult) as you may think.

Each lesson includes the following components:

- Lesson objectives
- Reading assignment
- Important terms
- Lecture with practice problems
- Written assignment

Study Hints

- **Complete** all assigned readings.
- Set a schedule allowing for completion of the course one month prior to your desired deadline. (An *Assignment Submission Log* is provided for this purpose.)
- **Do** the practice problems. It's very easy to ignore these because they are not graded and you think you understand the material. I can just about guarantee those students who do the practice problems will have much more success and fun during the course than those who do not! You can find answers to odd-numbered problems in the back of the book. Answers to even-numbered practice problems are provided for you at the back of this study guide.
- **Take** the practice exams. Answer keys are provided toward the back of this study guide.
- **Show your work!!!** I will not give credit for correct answers if there is no work. Mathematics (in my opinion) is not just about getting the right answer. It is also about demonstrating how you got that answer. In other words, **show your work.**

This is a math class. You will make mistakes. You will need to erase mistakes. Therefore, all written assignments must be done in **pencil**. Please use the following format:

- Write the original problem statement down (except for story problems).
- Write out the necessary steps to solve it.
- Work vertically (top to bottom) on the page.
- Have no more than two columns per page.

- Circle your answer.
- Check your work!
- It would be nice if you could leave room for me to make suggestions and/or corrections.



See the **Appendix** at the back of this study guide for essential *ISI policies on submitting lessons to your instructor*. See the letter sent in your registration packet for *your instructor's requirements: how to format and submit lessons, number of lessons you may submit at one time, and lesson guidelines*.

Exams

Overview

- You must wait for grades and comments on lessons prior to taking each subsequent exam.
- For your instructor's exam guidelines, refer to the letter sent in your registration packet and the *Exam Information* sections in this study guide.

There are four one-hour examinations in this course and a two-hour final examination. Each of the hour exams consists of problems from the three lessons preceding it, and prior lessons as required. The problems are similar to the problems you will have completed in the practice and written assignments.

The final exam is similar to the hour exams except that it is comprehensive (covering material from the entire course).

Scientific calculators are allowed but not necessary. Graphing calculators are NOT allowed.

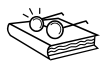
Practice Exams

There are chapter tests in the textbook with answers. I have also included five practice exams for you in this study guide. Answers to the practice exams can be found toward the back of the study guide. These are for you and should not be submitted for grading.

See *Grading* for specific information on exams, points, and percentages.

Choosing a Proctor/Scheduling Exams

All exams require a proctor.



See the **Appendix** for guidelines on *how to choose a proctor and schedule exams*.

Grading

The course grade will be based upon the following considerations:

15 written assignments at 10 points each	150
4 examinations at 100 points each	400
<u>1 final examination at 200 points</u>	<u>200</u>
Total Points Possible	750

A letter grade will be assigned upon completion of the course as follows:

A 675–750 points	B 600–674 points	C 525–599 points
D 450–524 points	F 0–449 points	

The final course grade is issued after **all** lessons and exams have been graded.



See the **Appendix** for information about *confidentiality of student grades, course completion and time considerations*, and *requesting a transcript*.

About the Course Developer

Before you get started on this great class, I would like to introduce myself.

My name is Pat Rush. I received my Bachelor of Science in Education in 1995 and my Master of Education in 2003 (both at the University of Idaho). I was a nontraditional (politically correct way to say “old”) student. While attending UI, I was working full-time and following my children to every activity ever invented! It was a hectic time, but I wouldn’t trade it for a million dollars. My guess is that many of you are doing something similar. Trust me—it’s well worth the effort.

I taught Math 108, 137, and 143 at the University of Idaho for four years. Since 1999, I have been teaching at the high school level in Kendrick. This is a small town, small school. I teach all levels of math at our high school as I am the only math teacher. I must tell you, I **love** teaching this subject. I think of algebra as a game—like a jigsaw puzzle. I only need to get the pieces in the right places to get it finished. I have a great time with my students. I expect them to work hard and they haven’t let me down yet. In the midst of all this hard work though, we do take time to share some jokes and have some fun. I hope this will also be true with you—our “paper” students.

Contacting Your Instructor

You will receive *course and instructor contact information* in your registration packet.



See the **Appendix** for detailed information on *contacting your instructor*.

Disability Support Services



See the **Appendix** for *information on Disability Support Services (DSS)*.

Assignment Submission Log

Lesson	Section	Reading	Written Assignment	Date submitted
1	1.4, 2.1, 2.2	pp. 35–40 pp. 54–59 pp. 65–69	p. 42, #34, 36 p. 62, #24, 32, 54, 62 p. 72, #16, 22, 28, 36	
2	2.3, 2.4, 3.1	pp. 77–84 pp. 91–94 pp. 114–122	p. 86, #20, 32, 46, 52 p. 96, #14, 22, 24 p. 123, #8, 30, 40	
3	3.2, 3.3, 4.1	pp. 129–133 pp. 139–142 pp. 167–172	p. 136, #30, 40, 50, 56 p. 147, #44, 48, 56 p. 174, #12, 36, 40	
<p>Complete Practice Exam 1. Answers are in the back of this study guide. If you have any problems or confusion, contact your instructor or tutor for clarification before taking Exam 1.</p>				
<p>It is time for you to make arrangements with your proctor to take Exam 1.</p>				
4	4.2, 4.3	pp. 177–184 pp. 191–196	p. 186, #32, 38, 50 p. 200, #22, 24, 36, 40, 50, 54, 68	
5	4.5, 5.1	pp. 213–222 pp. 252–260	p. 224, #16, 22, 42, 50, 54, 68 p. 262, #10, 24, 30, 45	
6	5.3, 6.1	pp. 277–284 pp. 312–321	p. 285, #4, 18, 24, 28 p. 324, #28, 44, 52, 80, 102, 124	
<p>Complete Practice Exam 2. Answers are in the back of this study guide. If you have any problems or confusion, contact your instructor or tutor for clarification before taking Exam 2.</p>				
<p>It is time for you to make arrangements with your proctor to take Exam 2.</p>				
7	6.2, 6.3	pp. 329–332 pp. 335–339	p. 333, #16–22 evens, 52, 56 p. 341, #6, 16, 24, 26, 32, 34	
8	6.4, 6.5, 7.1	pp. 343–348 pp. 353–356 pp. 372–376	p. 350, #30, 38, 50, 86 p. 357, #10, 22, 46 p. 377, #22, 32, 50	
9	7.2, 7.3	pp. 379–384 pp. 387–390	p. 385, #8, 10, 26, 32, 46 p. 391, #12, 24, 38, 42, 46	

Complete Practice Exam 3. Answers are in the back of this study guide. If you have any problems or confusion, contact your instructor or tutor for clarification before taking Exam 3.

It is time to make arrangements with your proctor to take Exam 3.

10	7.4, 8.1	pp. 395–399 pp. 414–420	p. 402, #20, 28, 32, 42–44 p. 422, #36, 48, 62, 76
11	8.2, 8.3, 8.4	pp. 425–430 pp. 435–438 pp. 441–444	p. 432, #38, 54, 64 p. 439, #14, 20, 30, 32 p. 446, #20, 24, 36
12	9.1, 9.2	pp. 27–28 pp. 480–484 pp. 489–493	p. 486, #26, 34, 48 p. 495, #22, 28, 42, 58, 66, 76, 88

Complete Practice Exam 4. Answers are in the back of this study guide. If you have any problems or confusion, contact your instructor or tutor for clarification before taking Exam 4.

It is time to make arrangements with your proctor to take Exam 4.

13	9.3, 9.4, 9.5	pp. 499–504 pp. 511–512 pp. 515–520	p. 507, #54, 72, 92, 98, 104, 106, 114 p. 513, #18, 28, 44, 48, 52, 54 p. 521, #14, 22, 40, 60, 66, 74, 82
14	9.6, 9.7	pp. 527–530 pp. 535–540	p. 531, #10, 14, 20, 34 p. 541, #14, 18, 28, 44, 46, 58
15	10.1, 10.2	pp. 558–564 pp. 569–573	p. 565, #10, 16, 44, 54, 62, 66 p. 575, #4, 8, 14, 22

Complete Practice Final Exam. Answers are in the back of this study guide. If you have any problems or confusion, contact your instructor or tutor for clarification before taking the Final Exam.

It is time to make arrangements with your proctor to take the Final Exam.

Lesson 1

Properties of Real Numbers and Linear Equations

Lesson Objectives

After completing this lesson, students will be able to do the following:

1. Use the distributive property and other properties that are presented
2. Solve linear equations including those with fractions and decimals
3. Solve and apply formulas
4. Solve percent problems

Reading Assignment

Read pages 35–40, 54–59, 65–69.

Important Terms

distributive property	commutative property
identity property	multiplication property of 0
associative property	algebraic equations
algebraic expressions	formula
linear equation	first-degree equations
addition and multiplication properties of equality	fractional equations
inverse property	

Lecture

Note: This is a good time to become familiar with your textbook. You will notice that the important words and/or concepts are highlighted in bold text and in blue boxes. You may find it helpful to put this information on 3 x 5 index cards and make yourself a set of “flash cards” as a study tool. Also, when I assign practice or written problems, I will just give you the first page number even though the problems may be spread out over two or three pages.

1.4 Properties of Real Numbers

- ◆ **Real numbers** are the numbers we work with every day. These include integers, fractions and decimals. Please don’t let the language of mathematics scare you off!
- ◆ The **distributive property** is incredibly important. Be sure you understand how to use it. While the other properties listed are important, I don’t really care if you know their names. It’s more important that you know how and when to use them, and that will come with practice.
- ◆ Be sure you can recognize **like** terms.
- ◆ Although the book hasn’t made a big deal about it, I think it is time to point out the difference between **terms** and **factors**.
 1. *Factors* are the numbers and/or variables being multiplied together.

Example:
 $-5abc$ has factors of -5 , a , b , and c .
 2. A *term* is an indicated product that may have any number of factors.

Example:
 In $7xy + 5abc$, $7xy$ is a term with factors 7 , x , and y . $5abc$ is a term with factors 5 , a , b , and c .
- ◆ As a general rule, terms are separated by a $+$ or $-$ sign.

Practice Problems

Work page 41, #1–10, 11, 15, 19, 23, 27.

(Answers to even-numbered problems are given toward the back of this study guide.)

2.1 Linear Equations in One Variable

- ◆ An expression *does not* contain an equal sign. It can only be simplified. It is considered an **algebraic expression** when it contains variables such as x or y .
- ◆ An equation *does* contain an equal sign. Equations must be solved. An **algebraic equation** contains at least one variable.
- ◆ You will see the term **linear equation** used frequently. What makes an equation linear is the fact that the variable is never raised to a **power** other than one. When the power (or **exponent**) of a number or variable is one, we generally don't write it. For example: x^1 is the same as x . For this reason, these equations are sometimes called **first-degree equations**.
- ◆ As you read through this material, take your time! These are the building blocks for much of what we will do during the course. It is essential that you understand the concepts.
- ◆ You can do anything you want to an equation as long as you do it to both **sides**.
- ◆ I really like the way this text explains solving equations involving fractions (I call these **fractional equations**) and decimals.
- ◆ Here is another example of a fractional equation:

$$\frac{3a-1}{4} + \frac{a-2}{3} - \frac{a-1}{5} = \frac{21}{20} \quad \text{LCM is 60, so}$$

$$60\left(\frac{3a-1}{4} + \frac{a-2}{3} - \frac{a-1}{5}\right) = 60\left(\frac{21}{20}\right)$$

$$60\left(\frac{3a-1}{4}\right) + 60\left(\frac{a-2}{3}\right) - 60\left(\frac{a-1}{5}\right) = 60\left(\frac{21}{20}\right)$$

$$15(3a-1) + 20(a-2) - 12(a-1) = 3(21)$$

$$45a - 15 + 20a - 40 - 12a + 12 = 63$$

$$53a - 43 = 63$$

$$53a = 106$$

$$a = 2$$

Practice Problems

Work page 61, #9–41 (every other odd), 43, 49, 55, 59.

2.2 Formulas

- ◆ Solving **formulas** for a specific variable is not only fun, it is also very useful. I like to call these **manipulation** problems because you are manipulating the formula to make it useful for *you!*
- ◆ **Percent** problems always give people trouble. Percent is from Latin: *per* means “by,” *centum*, “one hundred.” This means, for us, “by hundreds.”

- ◆ I teach my students that percent is *the part divided by the whole*. In this text, the authors say the same thing, but they phrase it differently, saying that percent is *the partial amount (a) divided by the whole amount (b)*. What you need to do is figure out what makes sense to you and use that.

Practice Problems

Work page 72, #7–17 odd, 21, 27, 35, 37.

Written Assignment



Please read the **Appendix** in the back of this study guide for essential Independent Study in Idaho policies and procedures, and forms you will need to successfully complete this course. You are responsible for understanding and following ISI policies and procedures. If there is anything on these pages you do not understand, contact the ISI office for clarification. Before starting the written assignment for Lesson 1, see the letter in your registration packet for your instructor's requirements: **how to format and submit lessons, number of lessons you may submit at one time, and lesson guidelines.**

Work the following pages and problems: (10 points)

42 (#34, 36)

62 (#24, 32, 54, 62)

72 (#16, 22, 28, 36)