MATH 112
Syllabus and Introduction
Section 1.1: Getting Comfortable with Math
Section 1.2: Problem-Solving

Prof. Jonathan Duncan
Walla Walla College
Fall Quarter, 2006
Outline

1. Syllabus and Introduction
2. Getting Comfortable with Mathematics
3. Problem-Solving
4. Conclusion
Welcome to Math for Elementary Teachers!

This class will be different from just about any other math class you might have had for several reasons:

1. You will focus on the **why** and not the **how** questions.
2. You will have the opportunity to **discover** mathematical concepts on your own.
3. You will have a lab (yes, that’s right, a math lab) once a week.
4. You will spend time working in groups to solve problems.

Please follow along in your syllabus as we look more closely at expectations and procedures for the quarter.
Times and Contact Information

**Time/Place**

<table>
<thead>
<tr>
<th>What</th>
<th>When</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>11:00 a.m. Monday &amp; Friday</td>
<td>KRH 345</td>
</tr>
<tr>
<td>Labs</td>
<td>2:00 p.m. Wednesdays</td>
<td>SMH 102</td>
</tr>
</tbody>
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**Contacting Your Instructor**

There are several ways to contact me with questions or concerns.

- By Email: duncjo@wwc.edu
- By Phone: 509.527.2097
- In Person: KRH 330 (3rd floor, end closest to the church)
- Office Hours: 10:00 MTWF, 11:00 W, 1:00 MF

All of this can be found at: http://math.wwc.edu/courses/112/
**Materials You Will Need**

**Lecture Materials**

For the lectures you will need:
- Your textbook
- Note-taking materials
- Materials for homework

**Lab Materials**

For the labs you will need:
- Lab activity book
- Three-ring binder with filler paper
Lecture Assessment

Homework Guidelines

- Assignments given daily
- Taken from assignment sheet
- Due by 5:00 p.m. next class day
- Accepted one weekday late
- Use 8.5 $\times$ 11 paper folded lengthwise
- Label the front cover
- Be clear and well organized

Exam Guidelines

- Two exams: midterm and final
- Dates are given – make travel plans accordingly
Lab Assessment

Lab Participation Guidelines
Lab participation will be graded on the following criteria:
- Prompt lab attendance
- being on task during the labs
- Having a positive attitude
- Peer evaluations

Lab Reports
After each lab you will create a “lab report” which summarizes or exhibits the methods and concepts covered in that lab. Reports are due at the beginning of the next lab period.

Lab Exams
A group lab exam will be given in conjunction with the individual midterm and final.
Getting to Know You

To help me get to know you better, please fill out the blue index cards I will distribute with the following information.

<table>
<thead>
<tr>
<th>Blue Index Card</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Your name</td>
</tr>
<tr>
<td>2. The name of your most recently completed math class</td>
</tr>
<tr>
<td>3. When and where you took the class above</td>
</tr>
<tr>
<td>4. Your favorite type of doughnut</td>
</tr>
<tr>
<td>5. On a scale of 1-10, how much do you like math? (1=hate it!; 10=love it!)</td>
</tr>
<tr>
<td>6. On a scale of 1-10, how good are you at math? (1=abysmal; 10=brilliant)</td>
</tr>
<tr>
<td>7. The name of one classmate you’d like in your lab group</td>
</tr>
</tbody>
</table>
It’s All About the Attitude!

How many of you said you liked math with a score of 8 or more? Will your attitude towards math affect your performance in this class? Will it affect your performance as a math teacher?

Math and Cultural Diversity

Most of you will have to take a class on teaching culturally diverse students. Take a moment to consider the following questions.

1. Why is this included in the education program?
2. How does this relate to your attitude about math?

Please take the time to read section 1.1 and think seriously about your beliefs and attitudes towards mathematics.
What Is Mathematics?

As we begin this course, it is important to have a clear idea of what we are studying. What is mathematics?

Some People Think…

Mathematics is memorizing formulas and rules for solving specific problems with numbers.

Wrong!

This is not mathematics! In this class, we will try to undo your rote memorization of formulas and replace it with an understanding of why these formulas work.

So What Is Mathematics?

Mathematics is a process for modeling, understanding, and dealing with the world around you.
NCTM Standards

This course is designed to qualify you to teach according to the NCTM (National Council of Teachers of Mathematics) Standards.

NCTM Standards (http://www.nctm.org/)

1. Number and Operation
2. Patterns, Functions, and Algebra
3. Geometry and Spatial Sense
4. Measurement
5. Data Analysis, Statistics, and Probability
6. Problem Solving
7. Reasoning and Proof
8. Communication
9. Connections
10. Representation
What is Problem-Solving?

Problem solving is a general term which we will define using the NCTM standard.

**NCTM Standard 6: Problem Solving**

Instructional programs from pre-kindergarten through grade 12 enable all students to:

- build new mathematical knowledge through problem-solving.
- solve problems that arise in mathematics and other contexts.
- apply and adopt a variety of appropriate strategies to solve problems.
- monitor and reflect on the process of mathematical problem solving.
Problem-Solving Strategies

Example

A Problem to Solve A furniture warehouse stock manager performs an inventory of tripods (stools with three legs) and chairs (with four legs). She counts 70 items and 250 legs. How many of each furniture type does she have?

While there are many problem-solving strategies, let’s focus on solving this problem with three specific strategies.

Solve Using Each Strategy

1. Trial and Error (also called Guess and Check)
2. Draw a Picture
3. Write a Formula

Evaluation of the Strategies

Give one strength and one weakness of each strategy.
A Problem-Solving Plan

While the three strategies we used were each quite different, there is a common thread to the way we used them to solve our problem.

Polya’s Four Steps

George Polya developed a framework for problem-solving that breaks the process down into four steps.

1. Understand the Problem
2. Devise a Plan (pick a strategy or tool)
3. Monitor your Plan (is your tool appropriate?)
4. Look Back at your Work

Use Polya’s framework to help solve the following problem.

Example

In how many different ways can you make change for a quarter?
Important Concepts

Things to Remember from Sections 1.1 and 1.2

1. Review the Syllabus
2. Keep a Positive Attitude!
3. Problem-Solving Strategies
4. Polya’s Framework for Problem-Solving