

Location: SLC 205

Semester / Year: Spring 2017

Course Start / End Date: Jan. 8, 2018 to April 27, 2018

Professor Name: A. Freier

Professor Email: afreier@trinitybiblecollege.edu

Course Description

Mathematics 278 is designed to broaden, strengthen, and apply arithmetic concepts to the solution of problems. Arithmetic content includes whole number operations, number bases, numeration systems, modular arithmetic, place value, measures of central tendency, number theory topics, sets, relation domains, integers, and rational fraction topics including proportional reasoning. The course integrates the understanding of arithmetic content with the understanding of how students learn arithmetic concepts. Applications of algebra are integrated into the first chapter on problem solving and reinforced throughout the course. Concepts covered in Math 277 and 278 will include: introduction to problem solving; sets, whole numbers, and numeration; whole number operations and properties; whole number computation – mental, electronic, and written (chapters 2 and 3) ; number theory (chapters 3, 4, and 5), fractions, decimals, ratio, proportion, and percentages (chapter 7); integers (chapter 8); rational numbers and real numbers (chapter 9); algebra(chapter 2, 9, and end of the year review); statistics and probability (chapters 10 and 11). Math 277 will cover chapters 1-7, from the text while Math 278 covers chapters 8-16 in the text and algebra.

Standards:

The content of Math 277 and Math 278 combine to meet the **North Dakota Programs Approval Standards and Criteria addressed in 50015.2c Mathematics** The program requires the study of mathematics. Candidates know, understand, and use the major concepts, procedures, and reasoning processes of mathematics (chapters 1-4) that include number and operations (chapters 3,5,and 9), algebraic thinking (chapter 9), geometry (chapters 12, 14, 15, and 16), measurement (chapter 13) and data, statistics and probability (chapter 10) in order to foster problem solving activities.

INTASC standards

Standard 4: Content Knowledge: The teacher understands the central concepts, tools of inquiry, and structures of the disciplines(s) he or she teaches and creates learning experiences that make

these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.

Standard 5: Application of Content: The teacher understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, collaborative problem solving related to authentic local and global issues.

Standard 8: Instructional Strategies: The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

Math 277 is based on the National Council of Teachers of Mathematics (NCTM) vision of what school mathematical learning could and should be. [The standards are available at www.nctm.org/] The course also derives guidance in direction from the standards for the preparation of elementary school teachers from the Interstate New Teacher Assessment and Support Consortium (INTASC), the Education Standards and Practices Board (ESPB) of North Dakota, and consideration of PRAXIS I & II mathematics testing requirements for elementary teachers necessary for licensure in North Dakota.

Course Objectives

Upon successful completion of this course, learners will be able to:

- 1) Demonstrate the ability to understand rational numbers in both fraction and decimal form.**
- 2) Demonstrate the use of statistics and probability.**
- 3) Demonstrate the knowledge of basic geometry and measurement.**
- 4) Discuss the role of mathematics in decision making.**

The instructor's overall philosophy for teaching mathematics is that of a "constructivist" striving to provide a learner-centered environment in which students are exposed to formal standards, yet not driven to them without opportunity for discovery and personal connections in the process.

The instructor wants the class to realize that first grade teachers must be able to comprehend math taught to his or her students at the second and third grade level so his or her math curriculum builds a foundation helpful to the 1st graders at the time and also beneficial to the students' future. In a similar fashion, fifth and sixth grade teachers must prepare their students for middle school or junior high math. Educators must have an appreciation of how the entire curriculum fits together in challenging students at the level they are currently at, as well as realize the entire curriculum is leading the students to accomplish more in the future. Teachers must not only have content knowledge, but effective teachers have an appreciation and awareness for using a variety of strategies and activities to connect with students from all different cultural backgrounds

Institutional Mission Statement

Trinity Bible College & Graduate School is committed to training and educating people with theological reflection and missional passion, in order that people and communities everywhere will hear the good news of Jesus and see his love demonstrated.

Spiritual Formation Statement

Mathematics is a discipline that strengthens rather than challenges faith. Mathematics is built upon these truths that simply are. It is from these truths that the thermos rest. In much the same way, our faith is built upon these truths that cannot be proven, but simply are and likewise from these truths we build our doctrine.

Required Textbooks/Supplies

Musser, Gary L., William F. Burger, and Blake E. Peterson. *Mathematics for Elementary Teachers: A Contemporary Approach*. 10th ed. Hoboken, NJ: Wiley, 2014. Print. (Required)

Methodology

Lecture, direct and indirect instruction and cooperative learning.

Course Outline

Jan. 8: Syllabus

Jan. 10: Integers 8.1

Jan. 12: 8.2

Jan. 15: No School Martin Luther King Jr. Day

Jan. 17: Rational Numbers, Real Numbers, and Algebra: 9.1

Jan. 19: 9.2

Jan. 22: 9.3

Jan. 24: 9.4

Jan. 26: **Test over Chapters 8 and 9**

Jan. 29: Statistics 10.1

Jan. 31: 10.2

Feb. 2: 10.3

Feb. 5: Probability 11.1

Feb. 7: 11.2

Feb. 9: 11.3

Feb. 12: 11.4

Feb. 14: **Test over Chapters 10 and 11**

Feb. 16: Geometric Shapes 12. 1

Feb. 19: 12.2

Feb. 21: 12.3
Feb. 23: 12.4
Feb. 26: 12.5
Feb. 28: 12.6
March 2: **Test over Chapter 12**
March 5-9: Go Trips
March 12-16: No School Spring Break
March 19: Measurement 13.1
March 21: 13.2
March 23: 13.3
March 26: 13.4
March 28: **Test over Chapter 13**
March 30: No School Easter Break
April 2: No School Easter Break
April 4: Geometry Using Triangle Congruence and Similarity 14.1 and 14.2
April 6: 14.3 and 14.4
April 9: 14.5
April 11: Geometry Using Coordinates: Chapter 15
April 13: Geometry Using Transformation Chapter 16
April 16: Tessellations
April 18: Tessellations; **Tessellations due by 5 pm**
April 20: Algebra
April 23: Algebra
April 25: Algebra
April 27: Algebra

Course Breakdown

Homework: Homework will be assigned for each section covered in the text. Completion of homework is essential to understanding course content, as math is a subject you must practice in order to improve.

Exams will be centered on each chapter(s) and continued throughout the semester. The instructor's goal is to apply number sense, repetition, and promote mastery of the most significant math concepts. While most students master many of the concepts, the instructor also wants to promote remedial assistance when necessary, as well as challenge students for deeper level connections by providing problems in class and on tests to motivate even the highest scoring students on each exam.

Tessellations: Using the knowledge acquired within this class, students will construct a tessellation. It must be a true tessellations with a repeating scene, not color pattern, created throughout.

Course Requirements

Classroom Behavior Expectation

Proper classroom behavior and respect for the instructor during lectures and for those who are speaking in class is expected. The following will not be tolerated: excessive talking, sleeping, passing notes, or any other disruptive behavior. This is an important college level course and your attention and participation is crucial for optimal learning.

Students are expected to read the assigned material **before** they come to class, as well as be an **active participant** in class discussions and activities. Questions are always welcomed and will increase your learning experience!

Digital devices of any kind are allowed in the classroom. However, use common sense in your use of these devices as this is essential for student attention and class participation to be maximized.

Attendance

Class Attendance: Trinity Bible College attendance regulations are guided by the principle that in a traditional classroom setting students receive benefit from the discussion, interaction, and emphasis of a class session which they can get no other way, even with the assignment of make-up work. To miss class is to experience a loss that may not show up on a final examination but is nevertheless real. The policy encourages faithful class attendance with allowances provided for necessary absences. Each student is encouraged to be responsible about attending all class sessions unless illness or school sponsored activities make it necessary to be absent. With this thought in mind, understand that just being in class is not being in attendance, you must participate, be an active learner, otherwise you may be marked absent.

Tardiness: Students are considered tardy if they arrive after class has started. Three instances of tardiness will be charged as one absence. If a student arrives more than 15 minutes late it will be considered an absence. Similarly, except for emergencies, students may not leave the classroom early without prior approval of the instructor or the student may be penalized and counted tardy or absent.

Total Absences: Total absences may not exceed the allowable number established by the college. This is a 3 credit class which means on the 12th absence you may fail this class.

Grading Procedure

Assignment Expectations

Unless otherwise stated, all exams will be open notes (not open book). Therefore, it will greatly benefit you to take good notes during class.

Calculators will be allowed for most assignments; however certain assignments may prohibit calculator use.

Late Assignment Policy

All assignments are due by 11:59 p.m. of the due date period. It is the professor's preference that all assignments are turned in on time. Any homework assignment that has not been turned in by the test date will receive a zero.

Quizzes/Exams: Students who will miss these due to approved extra-curricular activities should meet with the instructor **before** the scheduled test date to set up an alternate test time. *The instructor reserves the right to significantly alter the content and/or format of any test or quiz taken late.*

Grading Evaluation:

Homework: 45 percent

Chapter Tests and Tessellations: 55 percent

Bibliography

Billstein, Libeskind, Lott. *A Problem Solving Approach to Mathematics for Elementary School Teachers*, 2nd ed. Benjamin/Cummings Publishing.

Denholm, Underhill. *Elementary Algebra*. Houghton Mifflin.

Addendums

This syllabus is provided to students and participants for their general guidance only. It does not constitute a contract; either expresses or implied, and is subject to change without notice.

Trinity Bible College & Graduate School

50 S. 6th Avenue
Ellendale, North Dakota 58436

Phone: 701.349.3621

Fax: 701.349.5786

www.trinitybiblecollege.edu