

MATH 2010—Mathematics for Elementary School Teachers I

Section 01, TR, 1:00–2:15 pm, NIB 150, CRN: 20403

Spring 2010—3 credits

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Office Hours: MTWR 2:30–5:00 pm

Additional Help: NIB 134 *or* Browning Learning Resource Center

Required Text: *Mathematics for Elementary School Teachers* (8th edition) by Musser et al.

Calculator Requirement: You do not need to purchase a calculator; if you choose to purchase one, the TI–83 (any version) or TI–84 (any version) are good choices.

Prerequisite: You *must* meet at least one of the following minimum requirements. Moreover, this requirement must have been met within the past two years.

- Passed Math 1050 with a “C” or better.
- Earned ACT math score of 25 or higher.
- Earned a suitable CPT score. [For details on this test, go to <http://new.dixie.edu/math>, click on Q&A, then click on “Which math class should I take?”.]

Course Description

Math 2010 is the first course in a two-semester sequence in mathematics appropriate to the needs of the elementary/middle school teacher. Topics include sets, numeration systems, whole numbers, algorithms of arithmetic, number theory, fractions, decimals (including percents), integers, and functions. Problem solving is a fundamental goal of the entire course. The course is required for prospective elementary school teachers, as it is necessary for the Level 1 Math Endorsement and for Elementary (K–6) Certification.

Course Objectives

All classes in mathematics at Dixie State College of Utah support the general education goals of the college. Each mathematics class will:

- Require students to perform mathematical processes including fractions, percentages, decimals, proportions/ratios, algebraic equations, and/or calculus techniques
- Provide students with application problems that use a variety of methods including arithmetical, algebraic, and geometric methods
- Challenge students to make inferences from mathematical models that include formulas, graphs, and tables
- Provide students with real-life applications that use a variety of mathematical functions

Upon successful completion of Math 2010, a student will demonstrate the ability to:

- Identify and apply a sound problem solving process to a variety of mathematical problems involving elementary arithmetic operations
- Describe and apply a variety of problem solving strategies to individual problems
- Identify and apply instructional algorithms to basic arithmetic operations
- Demonstrate elementary arithmetic algorithms using manipulatives, which include: counters, blocks, and strips

Behavior Policies

1. **Your attendance and behavior are expected to reflect your dedication to excellence as a university student.** You are expected to attend class, participate in discussions and group work, and to use class time for Math 2010 activities only.
2. **You must abide by all regulations set forth in the “Student Rights and Responsibilities Code” (DSC Policy 5.33).** These regulations can be found online at <http://www.dixie.edu/humanres/polstu.html> (then click on the link to DSC Policy 5.33). In particular, you should be aware of your obligations pertaining to academic performance (“Academic Performance Responsibilities,” DSC Policy 5.33.5).
3. When completing homework, working together is ok—in fact, I encourage it. However, copying another person’s work is not ok. Furthermore, you should try your very best to do a problem before you look at the solutions manual for help. Most importantly, sharing test information is not ok, and if you’re caught, you’ll receive an “F” for the course.

Homework Policies

The goal of your doing homework should be to gain *understanding* of elementary school mathematics—above and beyond rote memorization and superficial knowledge of formulas and “facts.” With that in mind, let me present my homework policies:

1. You will read a section from the textbook *before* attending the scheduled lecture about that particular section. After actively participating in the classroom discussion on the section, you will then complete (as homework) all assigned “Problem Set A” exercises from that section.
2. Each class day is divided into three time periods: first, you will take a *quiz* which is based on homework which has already been considered in class; second, I will *lecture* on the section which you read before coming to that class session; third, you will ask me *questions* about homework problems you have completed. If you are involved in extracurricular activities (such as an athletic team), and one of your scheduled events conflicts with class, it is *your* responsibility to give me advance warning so I can give you an alternate assignment in place of the quiz.
3. Daily quizzes are worth 5 points each. Each quiz is comprised of two randomly chosen “Problem Set B” exercises from the textbook which are directly related to the “Problem Set A” exercises you had to do for homework. You will receive at least 1 point just for taking the quiz. The other 4 points are earned by completing the problems satisfactorily. (On the first day of class, I will present to you some important guidelines as to what “satisfactorily” means. If you miss the first day of class, please let me know so I can go over these guidelines with you.)
4. Quizzes will be graded in pairs. At the end of the semester, each of your two lowest paired scores earned during the semester will be boosted by up to 5 points. Furthermore, you can receive 5 extra credit points by filling out an online survey for this course. (I will provide details about this extra credit opportunity when it becomes available.)

Tutoring Project

You are required to provide mathematics tutoring for 10 hours in a classroom at a local elementary/intermediate/middle school. You must tutor at least 2 different students, preferably

of different ability levels. It is *your* responsibility to make arrangements to do this tutoring. Schools and their corresponding phone numbers are listed in the St. George phone book (in the blue pages along with government listings). At the end of the semester, you will present a creative “summary” of what you have learned through your classroom observations. During the first week or so of class, I will provide you with more details about this requirement as well as forms to fill out in order to receive credit for this requirement.

Although the Tutoring Project is not worth points, it will affect your grade negatively if you do not complete all of your tutoring hours or if you fail to turn in a creative “summary” of your work. To be specific, I reserve the right to penalize any student’s overall Math 2010 grade up to one full letter (e.g., a solid “A” could be dropped to a solid “B”) for failing to follow all of the necessary steps involved in the Tutoring Project.

Exam Policies

1. **Exams cannot be made up for any reason.** Midterm exams will be administered in the Testing Center, while the final exam will be administered in our regular classroom.
2. You must bring the following items to each midterm exam: (a) #2 pencil (not mechanical); (b) photo ID. Moreover, you are allowed to bring your graphing calculator as well as one “cheat sheet” (8½ by 11 inches, front and back) to each midterm exam. **Important:** You should photocopy your cheat sheet before you take the midterm exam for at least two reasons: (i) The Testing Center staff will not allow you to take it with you after you complete the exam, for test integrity purposes; and (ii) You will be allowed to bring your accumulated collection of photocopied midterm exam cheat sheets to the final exam.
3. If you miss a midterm exam, your score on that exam will be extrapolated from the *next* midterm exam (or from the final exam, if necessary). Extrapolated midterm exam scores are subject to an automatic penalty of 50% of the total value of the missed exam.
4. If you miss a second midterm exam or the final exam, you will receive an automatic **zero** for that exam, regardless of excuse.
5. A 10% penalty will be given to any student showing up more than 10 minutes late for the final exam. A 30% penalty will be given to any student missing the exam period by more than an hour. (This is to ensure students do not “hang back” and study longer than their classmates.)

Grading

Quiz pairs (10 pts. each)	110 points
Midterms (50 pts. each)	150 points
Final Exam (<i>comprehensive</i>)	100 points

There are 360 total points possible. Assuming you have successfully completed the Tutoring Project, your grade will be determined solely according to the percentage of points you earn in this course.

≥ 92.0% A	≥ 89.0% A–	≥ 86.0% B+	≥ 82.0% B
≥ 79.0% B–	≥ 75.0% C+	≥ 70.0% C	≥ 67.0% C–
≥ 64.0% D+	≥ 60.0% D	< 60.0% F	

Disability Resource Center

If you are a student with a documented physical or mental impairment that will substantially limit a major life activity, please contact the Disability Resource Center on the main campus. The Center Coordinator and staff will assist you in evaluating your eligibility for services. If you are deemed eligible, reasonable accommodations that are appropriate for your disability will be assigned. If you have any questions concerning this process, please contact the Center at (435) 652-7516 or go to the Student Services Center (located next to the Testing Center).

Website Resources

Library	http://library.dixie.edu/
Writing Center	http://new.dixie.edu/english/dsc_writing_center.php
Testing Center	http://new.dixie.edu/testing/
Tutoring	http://dsc.dixie.edu/tutoring/index.htm

Communication Policy

Important class and college information, including lecture notes, syllabus changes, etc. for this class, will be sent to either the preferred email account you submitted to Dixie State College when you began school here or to your “Dmail” account. This information includes your DSC bill, financial aid and scholarship notices, notification of dropped classes, reminders of important dates and events, and other information critical to your success in this class and at DSC in general. You will be held responsible for any emailed information sent to you by me or by DSC, so please check your email account often. When trying to get in contact with me, the best option is to call my office phone and leave a message. If you are not comfortable with that option, please email me.

My Philosophy

I believe every future elementary teacher, including **you**, can learn the material taught in this course. I am confident that learning this material will make a **vital** difference in your ability to teach the basics of mathematics to your future elementary school students. Learning about mathematics should be **fun!** If we’re not having fun while we learn, we’re not really learning! ☺

Lecture Schedule

MATH 2010—Spring 2010

<u>DATE</u>	<u>QUIZ</u>	<u>LEC.</u>	<u>?s</u>	<u>DATE</u>	<u>QUIZ</u>	<u>LEC.</u>	<u>?s</u>
1/12		Intro		3/8 to			
1/14		2.1		3/12	Spring Break		
1/19		2.2	2.1	3/16	5.2	–Review–	
1/21	2.1	2.3	2.2	3/18		6.2	6.1
1/26	2.2	2.4	2.3	3/23	6.1	6.3	6.2
1/28	2.3	3.1	2.4	3/25	6.2	7.1	6.3
2/2 [☼]	2.4	3.2	3.1	3/30	6.3	7.2	7.1
2/4	3.1	3.3	3.2	4/1	7.1	7.3	7.2
2/9	3.2	4.1	3.3	4/6	7.2	7.4	7.3
2/11	3.3	–Review–		4/8	7.3	8.1	7.4
2/16		4.2	4.1	4/13	7.4	–Review–	
2/18	No Math 2010 meeting			4/15		8.2	8.1
2/23	4.1	4.3	4.2	4/20	8.1	9.2	8.2
2/25	4.2	5.1	4.3	4/22	8.2	9.3	9.2
3/2	4.3	5.2	5.1	4/27	Tutoring Project summaries		
3/4 [☼]	5.1	6.1	5.2	4/29	9.2	–Review–	

Midterm exams open the class day on which we review the preceding material. They close *two days* later. The final exam will be at 12:30 pm on Thursday, May 6th (in class).

☼ The last day you may drop the class without a “W” appearing on your transcript is Tuesday, February 2nd. The last day you may drop the class is Friday, March 5th. Other important dates on the academic calendar for this semester can be found online at <http://new.dixie.edu/reg/?page=calendar&sid=201020>.

“Problem Set A” Homework Assignments

(1) 2.1: 2, 4, 5, 7, 9, 12, 15, 24, 28, 32

2.2: 1, 2, 4, 6*, 20

* For part (a), verify your answer using the set method. For part (b), verify your answer using the counting chant method. For part (c), verify your answer using the number line method.

(2) 2.3: 1, 2, 8, 9, 16, 17, 20, 22

2.4: 1, 4, 7, 9, 13, 16*, 18, 20, 22

* Do not bother to prove that fraction equality is an equivalence relation. Simply describe the equivalence class that contains $1/2$.

(3) 3.1: 1, 2, 4, 8, 11, 13*, 14*, 15

3.2: 1, 2(not a), 6, 8, 11, 12**, 23

* The directions for these problems should be changed. For problem #13, identify which of the cells in the table I provided is applicable to the story problem given. For problem #14, write a story problem that naturally suggests the use of the missing-addend (translation) approach on part (a) and a story problem that naturally suggests the use of the missing-addend (comparison) approach on part (b).

** The directions for this problem should be changed—it should say this: “Identify each of the following problems as an example of either a fair-sharing or a repeated-subtraction division. Justify your answer.”

(4) 3.3: 4, 5, 8, 9, 11, 12, 14, 20

4.1: 1, 2, 3, 4, 5, 9 (range estimates only), 11, 12, 41 (change problem to read "...is supposed to bring exactly 4 liters back.")

(5) 4.2: 1, 5, 7*, 12, 19**, 20(a & b), 24***, 29, 33

4.3: 1, 6, 9, 16

* Add the words "...without carrying" to the end of the directions.

** Ignore the directions given and do both subtraction problems using the Euro-Latino algorithm which was demonstrated in class.

*** Do lattice multiplication *and* the intermediate algorithm on part (a); do lattice multiplication *only* on part (b).

(6) 5.1: 2, 4*, 6(a), 7, 8, 9**, 13, 14, 35, 38

5.2: 1, 3, 4***, 5, 6(c & d), 9, 10***, 16, 17

* Ignore the directions involving the rectangular array. If a statement is false, change the location of the *numbers* in the statement so as to make it true.

** There is a misprint on the fourth line of this problem. It should say "subtract 2×6 from 1727".

*** For problem #4, use the difference algorithm to find the GCF; for problem #10, use the prime factorization method to find the LCM.

(7) 6.1: 1, 2*, 3, 8, 11, 14(a & b), 21, 23

6.2: 1, 4, 5(c)**, 6, 7, 8, 16, 18, 22, 26

* Technically, fraction strips *are* a kind of area model, so do not do part (a).

** Demonstrate the problem using a number line *and* using an area model (both with the take-away approach).

(8) 6.3: 2, 4, 7*, 12(a & b)**, 13, 15, 26, 28, 29

7.1: 1, 2, 3, 4, 6***, 8, 13, 17, 19

* Ignore the directions and draw pictures using a repeated subtraction approach (with an area model) like I did in class.

** Find both quotients using the "common denominator" algorithm discussed in class.

*** We did not discuss this type of problem in class, but the theorem that applies here is on p. 289.

(9) 7.2: 1(a), 2(a), 5(a & b), 8, 9, 13, 14, 15, 30

7.3: 1, 3, 7, 8, 11, 12, 21, 24

For fun, try #30 from Section 7.3 ☺

(10) 7.4: 1, 8*, 9**, 10, 19, 23, 26, 31

8.1: 6(ii), 10(a)***, 10(b)***, 11(b)***, 14, 16, 18, 21, 23

* For parts (a) and (b), use the grid approach only; for parts (c), (d), & (e), use the proportion approach or the equation approach (your choice).

** For this problem, use whichever approach you would like.

*** For each of these problems, make a picture for *both* take-away approach methods (discrete models).

(11) 8.2: 2, 4*, 12, 14(a, b, & d), 15(a, b, & d), 19(e & f) *by hand*, 25**, 33

9.2: 1, 6, 11, 12, 14(a), 15, 18, 19, 22***, 24(a & c)***, 35

9.3: 4, 15, 17, 18, 22

* Represent each multiplication problem using a discrete model. Then create two integer division problems using the factors and product of the two multiplication problems and represent them using the modified repeated-subtraction approach.

** For each of the four tables you are asked to create, add both a row and a column for "0". Additionally, please provide a heading for each of your tables' rows and columns (e.g., for the subtraction table make headings of "minuend" for the rows and "subtrahend" for the columns).

*** Use the balancing method (with pictures) on these problems.

Remember!

The final exam will be administered in NIB 150 at 12:30 pm on Thursday, May 6th.