# Numbers and Operations 2
# Math 216, Fall 2014
## Four Credits

Instructor: Dr. Teri Willard
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Meeting Time: Noon, M – Th

Meeting Place: Hertz, Room 120
Office Hours: 11:00 to 11:50 am, M – Th
or by appointment, or by email!

***Prerequisite:*** completion of Math 153 with a grade of C or higher

***Text:*** *Explorations in Elementary Mathematical Concepts Through Activities,* Willard & Shiver. You will need to bring your book to class every day.

***Supplies:*** plenty of lined paper and sharp pencils, graphing calculator, 2 – 3 colored pocket portfolios (folders), 3-ring binder with 6 dividers

***Course Description:*** This course focuses on the conceptual and procedural understanding of number and operations including patterns, proportional reasoning, percentages, integer operations and models, number theory, and irrational numbers. Concepts are taught from a problem solving perspective.

***Content Details:*** The content of this course will include proportional reasoning, percentages, underpinnings of algebraic thinking that includes the following:

- analyzing, extending, and generalizing patterns
- solving algebraic equations
- fundamental operations of fractions and integer arithmetic including properties
- structure of the real number system and its subsystems including irrational numbers
- elementary number theory

Class activities will use appropriate technology and manipulatives to initiate investigations of underlying mathematical structure in the exploration of numbers and operations.

## *Mathematical Practices and Content Areas for Math 216*:*

**MATHEMATICAL PRACTICES:** These CC Standards are based upon the NCTM's five process standards of problem solving, mathematical reasoning, communicating mathematically, making connections, and representation.

| Standards for Mathematical Practices | |
|---|---|
| CCSS.Math.Practice.MP1<br>Make sense of problems and persevere in solving them. | CCSS.Math.Practice.MP5<br>Use appropriate tools strategically. |
| CCSS.Math.Practice.MP2<br>Reason abstractly and quantitatively. | CCSS.Math.Practice.MP6<br>Attend to precision. |
| CCSS.Math.Practice.MP3<br>Construct viable arguments and critique the reasoning of others. | CCSS.Math.Practice.MP7<br>Look for and make use of structure. |
| CCSS.Math.Practice.MP4<br>Model with mathematics. | CCSS.Math.Practice.MP8<br>Look for and express regularity in repeated reasoning. |

**CONTENT:** The content areas are *Number and Operation* and *Algebra and Algebraic Thinking*. These topics will be studied while employing various manipulatives, appropriate technology, and hands-on experiences. The mathematical practice standards will be integrated into the content areas.

| Content Topics |
|---|
| 1. Number and Operations<br>• apply and analyze understanding of numbers to the system of rational numbers and irrational numbers'<br>• understand and apply factors and multiples;<br>• understand and apply relationships between fractions, decimals, and percents;<br>• understand ratio concepts and use ratio reasoning to solve problems;<br>• analyze proportional relationships and use them to solve real–world and mathematical problems. |
| 2. Algebra and Algebraic Thinking<br>• write and apply algebraic expressions and equations;<br>• use properties of operations to generate equivalent expressions and equations;<br>• solve algebraic equations using a variety of methods;<br>• represent and analyze quantitative relationships between dependent and independent variables;<br>• solve real–world and mathematical problems using algebraic expressions and equations;<br>• analyze and apply the connections between proportional relationships, lines, and linear equations;<br>• define, evaluate, and compare functions;<br>• use functions to model relationships between quantities;<br>• analyze data sets and determine whether they represent a relation, a function, or both;<br>• represent a function in various ways including a word description, table, set of ordered pairs, equations, and graph. |

*Outcomes are adapted from the *Principles and Standards for School Mathematics* (NCTM, 2000) and the Common Core State Standards Initiative.

***Work and Assessment:*** Please remember that organization, neatness, and legibility count! A variety of assessment methods will be used to determine your level of accomplishment in this course.

Mathematics Experiences (**20** pts) See description sheet and due date for this assignment.

Course Reflection (**20** pts) See description sheet and due date for this assignment.

Homework (**60** pts): Expect to read the textbook and do homework daily. Homework will be collected for each unit on the day of the test for that unit (test dates for Tests 1 – 3, but not the final). Please place the homework, well–labeled by section, in a portfolio. The criteria for homework points will be completeness and random answer checks. If you need help with homework, arrange for help from me, classmates, or the math help center.

Activities (**60** pts): We will be doing a number of activities/worksheets in class. If you do not complete them in class, you will be responsible for finishing them outside of class. Activities will be collected for each unit on the day of the test for that unit (test dates for Tests 1 – 3, but not the final). Please place the activities, well–labeled, in a portfolio. The criteria for activity points will be completeness and random answer checks.

Notebook – (**20** pts): I suggest a 3-ring binder with 6 sections labeled as shown on the Notebook Checklist. This notebook should be an excellent resource when you enter the elementary classroom.

Quizzes/Daily Grades/Presentations (**150** pts): Each item in this category will be worth 25 points. There will be at least 7 of these scores, which could include: quizzes (in-class or take–home) and special in–class activities or presentations in class (announced and unannounced). At least **1 (one)** of the scores in this category will be dropped for a total of 150 points. These quizzes will be placed in a portfolio when turned in. **Make–up grades are not possible (includes absences and quizzes that are papers).**

Tests (**500** pts): There are 2 tests covering several chapters each and a comprehensive final. The first three tests are 150 points each. The final is worth 200 points. Dates will be announced well in advance. Make-up tests will be allowed only for extraordinary circumstances. You must do your own work on tests. Notes, cell phones, headphones, or similar items will not be allowed during testing situations. Calculators, not attached to cell phones, are allowed. **No TEST grades are dropped!**

## *Grades: total points = 830 from above*

In order to teach others, you must have a good command of the subject. If you do not understand the material well enough to teach it, both you and your students will suffer. Therefore, your work in this course must be assigned a grade.

**Points and Letter Grades**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 93-100% | 90-92% | 87-89% | 83-86% | 80-82% | 77-79% | 73-76% | 70-72% | 67-69% | 63-66% | 60-62% | <60% |
| A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | F |

# Additional Topics

## Attendance and Professionalism

If you are to fully benefit from this class, you must attend class. As you prepare to become a teacher, you need to become accustomed to setting a good example for students. Attendance demonstrates professionalism and dedication. High quality work and organization demonstrate professionalism, as well. Today, electronic devices, such as cell phones and personal tablets, are captivating and addictive. Professionalism includes setting these devices out of reach during class time.

## Academic Honesty

There are times when it is proper to get help from others and times when it is not. Feel free to ask others for help on homework, take-home quizzes, and activities. You can only learn how to do something new by doing it correctly. During in–class quizzes and tests, you must do your own work. Academic dishonesty will not be tolerated during testing situations.

## Schedule

I will keep you informed of the schedule and assignments and you can record them on the calendar I will hand out. Keep the calendar in your notebook.

## Success

To be successful, you must work hard and **be organized**. I encourage you to form study groups. You must also study regularly, take notes, do your homework, and read the textbook. You must seek help before you are in trouble and/or too far behind. Never hesitate to ask for help from me, your classmates, or anyone else who can help. I am here to serve you and help you be successful. If you need help, decide what you need help with and write it down. If you are working on a problem unsuccessfully, write down the approaches you have tried. Then seek help with your paper in hand. Write down the helpful hints you receive.

## The Future

Finally, after you successfully complete your elementary education degree, do not let this be your last course in mathematics. After you join the ranks as a teacher take more courses, attend workshops, read professional journals, attend conferences, and network with other teachers. Successful teachers continually renew themselves. Teaching can and should be a fulfilling and rewarding career.

## Additional Note

Students with disabilities who wish to set up academic adjustments in this class should give me a copy of their "Confirmation of Eligibility for Academic Adjustments" from the Disability Support Services Office as soon as possible so we can discuss how the approved adjustments will be implemented in this class. Students without this form should contact the Disability Support Services Office, Bouillon 205, or dssrecept@cwu.edu or 963–2171.

**Good luck** in this course! I hope you find it enjoyable and never hesitate to talk to me if you have any problems.