Math 13800 Mathematics for Elementary Education II Spring 2018

Instructor: Christina Jamroz
Email: cjamroz@purdue.edu
Office: MATH B11

Course Coordinator: Brooke Max
Email: bmax@purdue.edu
Office: MATH 808
Office Phone: 494-1929

Welcome to Mathematics for Elementary Education courses at Purdue!

Course goals are to prepare you to:

- Be a knowledgeable and confident math teacher in the elementary classroom
- Have a deep understanding of the reasoning behind math processes
- Be able to clearly articulate math ideas with correct vocabulary

Your future students will need to know more than how to find a number answer. You will often be asked to explain your thinking or describe the process you use to solve a problem. Be prepared to show step-by-step math work and to explain your thinking clearly. Homework, quizzes, and exams will be graded accordingly.

I. Learning Objectives:

1. To reason about algebra and change.
2. To describe relationships among time, distance, and rates.
3. To write functions when given data in various formats.
4. To solve systems of equations with multiple methods (e.g., graphing, algebraic, quantitative reasoning)
5. To quantify uncertainty in various formats.
6. To calculate probability and special probability topics (e.g., expected values).
7. To represent and interpret data in more than one variable.

II. Textbook:

Reconceptualizing Mathematics **3rd Edition** by Sowder, Sowder, and Nickerson, W.H. Freeman, 2017.

- This book provides activities, discussion ideas, and questions that stimulate a deep level of thinking. We will use this workbook daily in class, and reading the section in the text before class is recommended to assist in achieving a high grade in the course.
- We will also use manipulatives to help us understand or demonstrate concepts. These manipulatives will appeal to different learning styles, and you may find them useful in clarifying ideas. Because it will be important to use them in your teaching for the benefit of your students, you will gain valuable experience using manipulatives in this course.

III. Grading:

Grades consists of three (3) evening exams (100 points each), quizzes (100 points total), homework (50 points), and a comprehensive final exam (150 points). An instruction sheet for determining your grade is available on the web page. Note that a point on homework or quiz is not equivalent to a point for the course. The following will note the grading scale, description of graded assignments, and academic integrity expectations:

Course grades are based on the following scale:

%	Grade
98 – 100	A+
90 – 97%	A

%	Grade
80 – 89	B
70 – 79	C

%	Grade
60 – 69	D
Below 60	F

A minimum of 360 points is required to earn a D or better in the course.

- **Homework:** You will turn in homework every class period. *Late homework is not accepted.* Occasions arise to prevent students from attending class. Therefore, your 4 lowest homework scores will be dropped. Homework should be done neatly and with care, all steps must be shown, and multiple pages should be stapled (one point will be deducted from each homework assignment not stapled). Correct answers without work or with incorrect work may not receive credit. The instructor will decide which problems or parts of problems the grader will grade. Only a few problems on each assignment are graded. This means that sometimes the problems selected are the ones you have incorrect or they might be ones that you have correct. Students are encouraged to attend office hours as a way of getting help with assignments or checking answers.

- **Quizzes:** Quizzes will be given frequently. It is wise to review recent lessons as a way of studying for quizzes. Two quiz scores will be dropped to allow for absences. No make-up quizzes are given. Class participation will count towards one quiz grade. Be prepared to volunteer your ideas during class discussions.

- **Exams:** Exams are intended to cover the ideas from the text but not to mimic the homework questions. Questions may require thinking or problem solving not represented by the homework questions.
    - Exam 1: Tuesday, February 6, 2018 from 8:00 – 9:00pm in BRNG 2290.
    - Exam 2: Tuesday, March 6, 2018 from 8:00 – 9:00pm in BRNG 2290.
    - Exam 3: Tuesday, April 10, 2018 from 8:00 – 9:00pm in BRNG 2290.

    - Put these dates and times on your calendar. Make-up exams will be given only if you have a valid excuse *with documentation* and **Brooke Max** has been notified prior to the exam. If you are unable to notify her prior to the exam, *a valid explanation with documentation for the missed exam must be provided*. Unexcused absence from an exam may result in a grade penalty.

- **Academic honesty** is expected at all times. Academic dishonesty could result in a 0 for the assignment or exam or an F in the course. Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breeches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

Purdue Honor Pledge:

As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – we are Purdue.

Link to video description: https://www.purdue.edu/provost/teachinglearning/honor-pledge.html

IV. Logistical Information

- **Attendance:** Please discuss illnesses or circumstances that lead to excessive absences privately with the instructor to make appropriate accommodations. With 4 homework scores and 2 quiz scores dropped, most absences should be accounted for.
- **Cell Phone Use:** Checking for messages and sending text messages is not appropriate during class time. Be polite and leave your cell phone alone during these 50 minutes.
- **Calculators:** Another goal of the Mathematics for Elementary Education courses is to be competent doing arithmetic of whole numbers, decimals, fractions, and percentages by hand. Because of this, **No calculators are allowed on quizzes and exams.** Occasionally, a calculator will be useful for homework problems or in-class work. There will also be three quizzes given during the semester called "Arithmetic Skills Quizzes." To be prepared for those, a study guide is available on the course web page.
- **Course Evaluation:** During the last two weeks of the semester, you will be provided an opportunity to evaluate this course and your instructor. At that time, you will receive an official email from evaluation administrators with a link to the online evaluation site. Your feedback is vital to improving education at Purdue. I strongly urge you to participate in the evaluation system.
- **Campus Emergencies:** In the event of a major campus emergency, course requirements, deadlines, and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Information will be available at www.math.purdue.edu/MA13700. If a fire alarm sounds, leave the building immediately and collect by the fountain outside. You may dial 911 for a campus emergency.
- **Last Day to Drop a Course:** Friday, March 9, 2018 @ 5:00 pm

V. Resources

- **CAPS**: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and http://www.purdue.edu/caps/ during and after hours, on weekends and holidays, or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.
- **For students certified by ODOS adaptive services**
    - If you have been certified by the Disability Resource Center (DRC) as eligible for academic adjustments on exams or quizzes, see http://www.math.purdue.edu/ada for exam and quiz procedures for your mathematics course or go to MATH 202 for paper copies.
    - In the event that you want to be certified by the DRC, we encourage you to review the procedures prior to being certified.
    - For all in-class accommodations, please see your instructor outside class hours – before or after class or during office hours – to share your Accommodation Memorandum for the current semester and discuss your accommodations as soon as possible.

MA 13800 Calendar Spring 2018

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1 01/08-01/12	Lesson 1		Lesson 2		No Class
Week 2 01/15-01/19	No Class – MLK Day		Lesson 3		Lesson 4
Week 3 01/22-01/26	Lesson 5		Lesson 6		Lesson 7
Week 4 01/29-02/02	Lesson 8		Lesson 9		Lesson 10
Week 5 02/05-02/9	Review	Exam I 8-9pm BRNG 2290	No Class		Lesson 11
Week 6 02/12-02/16	Lesson 12		Lesson 13		Lesson 14
Week 7 02/19-02/23	Lesson 15		Lesson 16		Lesson 17
Week 8 02/26-03/02	Lesson 18		Lesson 19		Lesson 20
Week 9 03/05-03/9	Review	Exam II 8-9pm BRNG 2290	Lesson 21		No Class
Week 10 03/12-03/16	Spring Break No Classes				
Week 11 03/19-03/23	Lesson 22		Lesson 23		Lesson 24
Week 12 03/26-03/30	Lesson 25		Lesson 26		Lesson 27
Week 13 04/02-04/06	Lesson 28		Lesson 29		Lesson 30
Week 14 04/9-04/13	Review	Exam III 8-9pm BRNG 2290	No Class		Lesson 31
Week 15 04/16-04/20	Lesson 32		Lesson 33		Lesson 34
Week 16 04/23-04/27	Lesson 35		Review		Review
Final Exam Week 04/30-05/04					

Exam 1: Tuesday, February 6, 2018 from 8:00 – 9:00pm in BRNG 2290.
Exam 2: Tuesday, March 6, 2018 from 8:00 – 9:00pm in BRNG 2290.
Exam 3: Tuesday, April 10, 2018 from 8:00 – 9:00pm in BRNG 2290.

NOTE that there is class Wednesday March 7, 2018! The class off will be Friday, March 9 instead ☺

Math 13800 **Assignment Sheet** **Spring 2018**

Text: Reconceptualizing Mathematics, 3rd Edition by Sowder, Sowder, & Nickerson. W.H. Freeman, 2017.
Follow instructions written here in addition to instructions in the text. All documents referenced for printing can be found on Blackboard

Lesson	Section	Page	*Topic*	Problems
1	12.1/ 12.2	p. 263 & 270	*Algebraic reasoning in elementary school/Numerical patterns and algebra*	p. 263: #1aceg, 5b, 6, 7, 8, 9, 14, 15 p. 270: #1b, 1defgh,(Write a function rule for each of these), 2a, 3a, 4ac ***Print out and bring worksheet for L2.***
2	12.3	p. 278	*Functions and algebra*	1, 5, 7, 10, 12bd, 20
3	12.4	p. 288	*Algebra as generalized arithmetic*	1, 2, 4, 5, 6, 7, 8, 12c, 13, 17, 18ac
4	12.5/6	p. 296	*Algebraic reasoning about quantities/Issues for learning: NAEP*	2, 4bc, 5, 11, 12, 14b, 15 p. 300: What is NAEP? Do items 1 & 4 and read pp.300-301
5	13.1	p. 307	*Using graphs and algebra to show quantitative relationships*	3, 4, 6, 7, 10
Note: Please print off or buy graph paper. Using tick marks on notebook paper is not acceptable. Bring some to class and also use it for your homework unless you are making qualitative graphs. Please bring a ruler to class.				
6	13.2	p. 316	*Understanding slope*	1abde, 5, 6, 9, 10 *You will need 4 sheets of graph paper for the next class.*
7	13.4	p. 330	*Nonlinear functions*	1, 2, 3, 4a, 4b*, 6* (*Make a table.), supplementary ex 1a, Use graph paper and negative & positive *x*-values for supplementary 1d.
8	13.5/NCTM Illuminations		*Issues for learning: Algebra in the elementary grades*	Lesson for grades 6-8 "Patterns and Functions" Assignment #8: Worksheet Read p. 332-3: What grade do students solve two-step equations in CCSSM?
9	NCTM Illuminations		*NCTM Illuminations*	Lesson for grades 6-8 "One grain of Rice" and for grades 9-12 "Drug Filtering" Assignment #9: Worksheet
10	Inverse & Logarithmic Functions		*Inverse & Logarithmic Functions*	Assignment #10: Worksheet
Exam 1: Tuesday, February 6, 2018 from 8:00 – 9:00pm in BRNG 2290.				

11	14.1	p. 339	*Distance-time and position-time graphs*	2 (Label the 5 parts of the graph A, B, C, D, E. Label the 5 parts of your story and the 5 parts of your new graph with the same letters.), 3, 4, 9(Give answer in hours and minutes.), 10ab
12	14.3	p. 348	*Graphs of speed against time*	2(Use the negative speeds.), 5, 6bd, 7b, 8, 9c, 10ab
13	14.4/ 14.5	p. 353 & 360	*Interpreting graphs/Common graphing errors*	p. 353: 1ab (Copy graph and explain.), 3, 4ab, 6, 7 p. 360: Activity 11 #2, 3
14	15.1	p. 365	*Finding linear equations*	3, 5, 7, 9, 11, 13, 16, 18, 19, 20bd, 21, 22bd
15	15.2	p. 372	*Solving two linear equations in two variables*	6, 9, 12, 17, 21, 22, 23, 25, 27a, 30
16	15.3	p. 380	*Different approaches to problems*	1*, 6, 7*, 11* (*Make graphs large enough to fill one side of a page of graph paper. Note that instructions for #7, 11 are at the bottom of page 381.)
17	15.4	p. 386	*Average speed and weighted averages*	1, 2, 4a*, 5, 9, 12* (*Use an entire side of graph paper for each.)
18	15.5 & 15.6	p. 392 & 397	*More about functions/Topics in algebra*	p. 392: 1c, 2bc, 3, 4 (Break down into TWO function machine rules.), 10 (Do only $3\times 4\times 6$.) p. 397: 2, 3, 4f
19	27.1	p. 646	*Understanding chance events*	1abcd, 2, 4, 5, 6
20	27.2/4	p. 654	*Methods of assigning probabilities/Research on the understanding of probability*	3, 4, 5, 6, 7, 8, 9bd, 13abdf, 15ab, 24a, 26 p. 665 “Think About”
Exam 2: Tuesday, March 6, 2018 from 8:00 – 9:00pm in BRNG 2290.				
21	28.1	p. 672	*Tree diagrams and lists for multistep experiments*	1, 2, 3, 7, 9
22	28.2	p. 676	*Probability of one event or another event*	2, 4, 6, 8, 10, 13
23	28.3	p. 681	*Probability of one even and another event*	3, 6abcd, 7, 8, 10, 11, 12
24	28.4	p. 688	*Conditional probability*	2, 4, 6, 7, 9, 11

25	29.1 & 29.2	p. 696 & 702	*What are statistics?/Sampling: The why and the how*	p. 696: #2, 3; p. 702: 3, 4, 5, 6, 8, 9 *Please bring a compass and protractor to the next class. Have graph paper and unlined paper with you.*
26	29.4 & 30.1	p. 709 & 718	*Types of data/Representing categorical data*	p. 709: 1, 2, 3 p. 718: 2a (Show arithmetic with % to nearest 0.1 and angle to nearest degree.), 2b*, 3* (*Use an entire side of graph paper.), 4 and 5 – Print out from Excel, 6, 7, 8bc.
27	30.2	p. 726	*Representing and interpreting measurement data*	2a, 3, 4, 5, 7 (Make a histogram by hand. Use 0-4, 5-9, 10-14, etc.)
28	30.3	p. 734	*Examining the spread of data*	3, 4*, 5*abcde (*Make up a data set when possible.), 6, 9
29	30.4	p. 742	*Measures of center*	1, 2 (Write data sets for each.), 3, 5, 9, 11, 13, 15, 16
30	30.5	p. 749	*Deviations from the mean as measures of spread*	1 (Do work by hand.), 2, 5, 8a(Subtract 5.), b(Divide by 5.). Use Excel or a calculator to do the calculations for problems 5 and 8. Do the standard deviation by hand for this set of numbers: 2, 3, 7, 9, 10, 11
Exam 3: Tuesday, April 10, 2018 from 8:00 – 9:00pm in BRNG 2290.				
31	30.6	p. 757	*Examining distributions*	1ab (Use a line plot.), 2, 3, 5, 6a (Use a line plot.)
32	30.6 & 30.7	p. 758 & 762	*Examining distributions/ Understanding the mean*	p. 758: 4, 8, 9, 10, 11a(Show z-scores.), add part c: 400 six-year-olds: How many are taller than 48.6 in?; How many are shorter than 44.4 inches?, 13, 14, 16 p. 762: 1, 2
33	33.1	p. 808	*Expected value*	1, 2(Refer to the table on p.672, & make a new table of sums.), 3, 4, 6, 7, 8, 9
34	33.2	p. 815	*Permutations and combinations*	1, 2, 4ab, 5ab, 6b, 9
35	33.2	p. 815	*Permutations and combinations*	10, 11, 12, 13, 16, 17

Math 13800 Course web page: www.math.purdue.edu/MA13800