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*Welcome to Summer Math 13900!*  The goal of this class is to prepare you to be a knowledgeable mathematics teacher in the elementary classroom.  We will strive for a deep understanding of the reasoning behind math processes so that you can be a confident teacher.  We will also strive to be able to clearly articulate math ideas using correct vocabulary. You will often be asked to explain your thinking or describe the process you use to solve a problem.  Your future students will also need to know more than just how to come up with a number answer. Be prepared to show step-by-step math work and to explain your thinking clearly.  Homework and exams will be graded accordingly.

**What is Mathematics?** Mathematics is a sense-making activity that **ALL** of you (and your future students) are capable of learning. You will make meaning of the mathematics in this course (and in your career) and help your students do the same.

I.     **Learning Objectives:**
   1. Analyze and evaluate their own understanding and children's understanding of mathematics in the content areas of geometry and measurement.
   2. Anticipate multiple methods (correct and incorrect) for arriving at given conclusions involving geometry and measurement concepts.
   3. Differentiate between various polygons and other 2-D shapes based on number of sides, length of sides, measures of angles, and other attributes.
   4. Find the sum of the measures of the interior angles of a polygon.
   5. Draw nets for polyhedra.
   6. Recognize, draw, and mathematically justify shapes that tessellate the plane (regular and semi-regular tessellations), naming them with proper notation.
   7. Determine area of plane figures, with the ability to prove the area formulas of parallelograms, triangles, and trapezoids as well as describe elementary methods to show the formulas, and surface area and volume of solid figures, also with the ability to justify mathematical formulas for those.
   8. Determine dimensions of similar planar figures.
   9. Determine surface area and volume of similar solid figures.
   10. Create constructions with straightedge and compass that include but are not limited to: angle bisectors, perpendicular bisectors, angle copies, midpoints

II.    **Textbook & Materials:** We will be using Reconceptualizing Mathematics 3rd Edition by Sowder, Sowder, and Nickerson, W.H. Freeman, 2017 because it provides activities, discussion ideas and questions that stimulate a deep level of thinking. Reading the section in the text or packet prior to class is recommended.

We will sometimes use manipulatives to help us understand or demonstrate concepts.  People have different learning styles and you may find the manipulatives 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.

- *Needed Materials:*
  - o Your own shape kit (from the textbook – if you are missing it, go to Blackboard and print off the copy there – you will want to use cardstock! ☺)
  - o Compass, Protractor, & Ruler
  - o Virtual Ang-Legs (or create your own set)
  - o Blackboard access & Scanning abilities

- *Provided Materials:*
  - o Packets for lesson activities and homework not in the book, a circle template, a set of attributes on cardstock

  **Course Format:** Plan on 2 hours per day
  - o Read sections
  - o Watch videos/do activities in videos
  - o Do homework/other assignments

**Homework:** Homework is submitted via Blackboard every day. Homework should be done neatly and with care and all steps must be shown. Correct answers without work or with incorrect work may not receive credit. The instructor will decide which problems or parts of problems will be graded by the grader. Only a few problems on each assignment will be graded. This means that sometimes the problems selected are the ones you have incorrect or they might be ones that you have correct. There are 31 homework assignments (including the preliminary assignment). Keep track of your assignments and the grades you receive on each assignment. No assignments are dropped; but the preliminary assignment is a bonus.
*Other homework information:*
- Due daily by 12:00pm EST (West Lafayette time) the day AFTER the lesson. For example, the HW 1 is due Tuesday, June 11ᵗʰ by 12:00pm (noon) via Blackboard.
- Must be single PDF with pages facing right side up; can use Pro Scanner app, Tiny Scan, Cam Scan, Scan Bot, etc.

**PRELIMINARY ASSIGNMENT (Nice 10 points to start the course ☺ ):**
- Go to Blackboard; Submit your preliminary homework of a two-page scanned document. Please put your name on the first page, and your summer location on the second page.

**Projects:** There are three projects throughout the course. Each project is worth 10 points. Detailed information about each project is on Blackboard.

- *Project 1: Activity Description.* With a partner, you will explore the Geometry and Measurement/Data standards and plan an activity to address one standard. This is due Thursday June 20, 2019 at 11:59pm
- *Project 2: Tessellation/Pythagorean Spiral/Lesson Plan*. You will have the option of creating one of these three things. This is due Tuesday, July 2, 2019 at 11:59pm
- *Project 3: Writing an Exam Question.* You will write a question that could be on the final exam for MA 139. This is due Wednesday, July 17, 2019 at 11:59pm.

**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. You will have three 60-minute exams worth 120 points each and one 2-hour final exam worth 150 points. Another goal of Math 13900 is to be competent doing arithmetic of whole numbers, decimals, fractions and percents by hand.  To that end, no calculators are allowed on exams.
- Exam dates:
  - Exam 1: June 24$^{th}$
  - Exam II: July 10$^{th}$
  - Exam III: July 25$^{th}$
  - Final Exam: July 31$^{st}$, August 1$^{st}$, or August 2$^{nd}$ (TBD by Purdue at a later date)
- Proctor form needs to be emailed by June 12$^{th}$. Please help your proctor if they have scanning issues.
- All proctored exams are due by 11:00 pm EST. If the proctor's schedule does not allow for this, have that person communicate directly with me at bmax@purdue.edu.
- ***On-campus regular exams will be 9:00am – 10:15am in BRNG B206.***
- On- campus final exam location will be announced when it is available.

<u>**Purdue Honor Pledge:**</u>
***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
- **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.

**Grade Breakdown:**
Exam 1: 120 points (8 lessons)
Exam 2: 125 points (9 lessons)
Exam 3: 125 points (9 lessons)
Homework: 50 points (30 homework assignments)
Projects: 30 points (3 projects)
Final Exam: 150 points (cumulative)

The grading scale is 90% and above an A, 80% and above a B, 70% and above a C, and 60% and above a D. Anything below a 60% is an F.

**I.**      **Resources**
- **If you find yourself beginning to feel some stress, anxiety, and/or feeling slightly overwhelmed, try WellTrack, https://purdue.welltrack.com/** Sign in and find information and tools at your fingertips, available to you at any time.
- **If you need support and information about options and resources,** please see the Office of the Dean of Students, http://www.purdue.edu/odos for drop-in hours (M-F 8am-5pm).
- **CAPS**: **If you're struggling and need mental health services -** 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.
- Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: **drc@purdue.edu** or by phone: 765-494-1247."
- **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.

**Summer 2019 Calendar**

|  | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
|---|---|---|---|---|---|
| *June*<br><br>**WEEK 1** | 10<br>Lesson 1<br>Attributes | 11<br>Lesson 2<br>Angles | 12<br>Lesson 3<br>Parallel &<br>Intersecting<br>Lines | 13<br>Lesson 4<br>Polygons<br><br>*Circle Activity* | 14<br>Lesson 5<br>Classifying<br>Triangles |
| *June*<br><br>**WEEK 2** | 17<br>Lesson 6<br>Constructing<br>Triangles | 18<br>Lesson 7<br>Classifying<br>Quadrilaterals | 19<br>Lesson 8<br>Interior<br>Angles of<br>Polygons | 20<br>Lesson 9<br>Tessellations<br><br>**Project 1 Due** | 21 |
| *June*<br><br>**WEEK 3** | 24<br>**EXAM 1** | 25<br>Lesson 10<br>Visualization | 26<br>Lesson 11<br>Prisms | 27<br>Lesson 12<br>17.1 | 28<br>Lesson 13<br>17.3 |
| *July*<br><br>**WEEK 4** | 1<br>Lesson 14<br>17.4 | 2<br>Lesson 15<br>18.1<br><br>**Project 2 Due** | 3<br>Lesson 16<br>22.6/23.1 | 4<br>**HOLIDAY** | 5<br>Lesson 17<br>23.1 |
| *July*<br><br>**WEEK 5** | 8<br>Lesson 18<br>23.2 | 9 | 10<br>**EXAM 2** | 11<br>Lesson 19<br>21.2 | 12<br>Lesson 20<br>Area<br>Concepts |
| *July*<br><br>**WEEK 6** | 15<br>Lesson 21<br>Area and<br>Perimeter | 16<br>Lesson 22<br>Parallelograms<br>and Triangles | 17<br>Lesson 23<br>24.1 Area &<br>Surface Area<br>**Project 3 Due** | 18<br>Lesson 24<br>Surface Area | 19<br>Lesson 25<br>24.2 Volume |
| *July*<br><br>**WEEK 7** | 22<br>Lesson 26<br>24.3/25.1 | 23<br>Lesson 27<br>25.1 | 24 | 25<br>**EXAM 3** | 26<br>Lesson 28<br>Circles |
| *July/August*<br><br>**WEEK 8** | 29<br>Lesson 29<br>26.1/26.2<br><br>*Polygon Machine* | 30<br>Lesson 30<br>GLOBE/NASA | 31<br><br>Final | 1<br><br>Exam | 2<br><br>TBA |

**Course Topics and Assignments:**

| Lesson | Section | Title | Page | Problems |
|---|---|---|---|---|
| 1 | | *Attributes* | Packet | 1, 2, 3, 4, 7, 10, 12, 13a, 15 |
| 2 | | *Angles* | Packet | 1, 2, 3ac, 4, 5, 7, 8, 9ac, 10, 12, 13, 14<br>*Have tracing paper or thin paper ready for Lesson 3* |
| 3 | | *Parallel and Intersecting Lines* | Packet | 1bf, 4, 5, 8, 9, 11ac, 12abcd (just 2 pairs of each) |
| 4 | | *Polygons* | Packet | Circle Activity on BlackBoard and:<br>2, 3, 4, 5c, 6, 8acd, 9, 10, 11ac<br>*You will need your Ang-Legs for the next 2 lessons.* |
| 5 | | *Classifying Triangles* | Packet | 1a, 2, 3, 6, 7, 9, 12<br>*Don't forget Ang-Legs for the next lesson as well.* |
| 6 | | *Constructing Triangles* | Packet | 1, 2, 4, 5, 6, 7, 9, 11, 12, 13 |
| 7 | | *Classifying Quadrilaterals* | Packet | 1, 2, 3, 4, 5, 6, 7, 8, 9, 12 |
| 8 | | *Interior Angles of Polygons* | Packet | 3, 5, 6, 7, 9, 13, 15 |

**Project 1 due Thursday June 20th at 11:59pm**

| Lesson | Section | Title | Page | Problems |
|---|---|---|---|---|
| 9 | | *Tessellations* | Packet | 2 (use at least ½ sheet of unlined paper), 3 (use at least ½ sheet of unlined paper), 6a, 7, 8<br>*You will need isometric dot paper for Lesson 10* |

**Exam 1: June 24, 2019 from 9-10:30am in BRNG B206 or with proctor.**

| Lesson | Section | Title | Page | Problems |
|---|---|---|---|---|
| 10 | | *Visualization* | Packet | 2, 3a, 4a, 7ac |
| 11 | | *Prisms* | Packet | 1, 2, 3 (draw just 2 of them), 4, 5a, 6, 8ad, 11<br>*Print off isometric dot paper for the next lesson* |
| 12 | 17.1 | *Shoeboxes have faces and nets!* | p. 431 | 1, 2, 3, 4, 5ab (Draw front, right, top, and left for each.), 6ab, 7; *Also do p. 433 Activity 3 – follow the instructions and complete the worksheet on Blackboard for Lesson 12* |
| 13 | 17.3 | *Representing and visualizing polyhedra* | p. 441 | 3, 4def, 5ab, 7, 8, 10ab, 13 (draw all possible pentominoes), 14a, 16a, 17a, 19bc<br>*Have isometric dot paper for the next lesson* |
| 14 | 17.4 | *Congruent Polyhedra* | p. 446 | 1(Use isometric dot paper; Shade 2 cubes to right in I and 2 cubes on top in J), 3, 4, 6, 9(Use unlined paper to draw a LARGE quadrilateral with no equal sides or angles, each side length 5 cm or greater. Draw the second figure upside down.)<br>*You will need tracing/patty paper for L15.* |

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|---|---|---|---|---|
| **Project 2 Due Tuesday July 2, 2019 at 11:59 pm** |
| 15 | 18.1 | *Symmetry of Shapes in a Plane* | p. 457 | 1, 4ace, 5ace, 6, 7ac, 8bde, 11, 12 |
| 16 | 22.6 & 23.1 | *Promoting Visualization in the Curriculum* | p. 549 & 555 | p. 549: 1, 2, 3, 4(Label the pictures 1, 2, 3 for reference.)<br>p. 555: 1bdfhj, 2bdfhj, 4bcfhjln, 5bdf, 6b, 9gh, 10 |
| 17 | 23.1 | *Key Ideas of Measurement* | p. 556 | 1acegi, 2acegi, 4adegikm, 5ace, 6 (yes, do *b* again), 7, 8bcd, 9ab, 12(no explanation needed), 13, 14acd, 15, 16bdfh, 18bd, 19, 22bdf, 24a |
| 18 | 23.2 | *Length and Angle Size* | p. 564 | 1c, 3, 4, 5, 6bdhi, 7a(name 10) c(name 6), 9, 12, 14, 16bdfh, 17, 18ac, 20, 22b, 24, 25bdf, 26defg, 27bcd, 31, 34a, 35a, 39bdf, 40bdf, 41a, 43 |

<div align="center"><strong>Exam 2: Wednesday, July 10, 2019 from 9-10:30am in BRNG B206 or with proctor.</strong></div>

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|---|---|---|---|---|
| 19 | 21.2 | *Constructions* | p. 508 | 1, 2(Use 4cm radius.), 5befh, 6(f is 180°), 8XY, 9(Each side should be 5 cm or greater.), 10ac, 11a, 12d, 13bd, 19, 20c, 21ad |
| 20 | | *Area Concepts* | Packet | 1, 2ace, 3ae, 4, 6a, 8, 10<br>*You will need square tiles or grid paper for L21.* |
| 21 | | *Area and Perimeter* | Packet | 1, 3, 5, 8, 10 |
| 22 | | *Parallelograms and Triangles* | Packet | 1, 2, 4ace, 5ab, 7 |
| 23 | 24.1 | *Area and Surface Area* | p. 583 | 5, 6bdfh, 7, 9bd, 11bd, 12bdfhj, 13b, 14b, 15a, 16, 17, 21a, 26, 28d |

<div align="center"><strong>Project 3 Due Wednesday July 17, 2019 at 11:59 pm</strong></div>

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|---|---|---|---|---|
| 24 | | *Surface Area* | Packet | 1, 2, 3, 5, 9 |
| 25 | Packet & 24.2 | *Volume* | Packet & p. 591 | Packet: 1, 2a, 3, 4, 7, 8, 10, 11, 12<br>p. 591: 1bdfjl, 3bdf, 4ac, 6, 7bd, 8bc, 9b, 10bd, 12, 14b, 18bdfhjl |
| 26 | 24.3 & 25.1 | *Issues for Learning Measurement & Volume* | p. 597 & 605 | p. 597: 1, 2<br>p. 605: 2bd, 3, 4b, 5, 6, 8b, 9be, 14, 16ab, 17, 18bdfhijkl<br>*You will need circular objects and string for L27.* |
| 27 | 25.1 | *Circumference, area, and surface area formulas* | p. 605 | 2a, 4a, 8a, 9ad, 18aceg, 19b, 21acfg, 23ab, 24b, 25bd, 26, 29, 35<br>*You will need scissors for L28.* |

<div align="center"><strong>Exam 3: Thursday, July 25, 2019 from 9-10:30am in BRNG B206 or with proctor.</strong></div>

| 28 | | *Circles* | Packet p. 605 | 1, 2, 3, 4 p. 605 #2c, 10, 18f |
|---|---|---|---|---|
| 29 | 26.1 & 26.2 | *Pythagorean Theorem/Some Other Kinds of Measurement* | p. 627 p. 635 | p. 627: 2, 3adf(Give exact answer only.), 4bd, 7, 8, 9 (Hint: draw the net ☺) p. 635: 4bc, 10ac, 11, 12, 16ab, 18a, 23abd, 27b *Download app for next lesson (see details on Blackboard)* |
| 30 | | *GLOBE/NASA Lesson* | p. 627 | Read article on BB and answer Reflection Questions there |
| **Final Exam TBA July 31st, Aug 1st, or Aug 2nd.** |||||

*The syllabus is subject to change with notice from the instructor.*