

# Nature of Mathematics

GEMS 105-01B

CRN 81315

Fall 2008



**Professor:** Todd Swanson

**Class time/Location:** MWRF 11:00-11:50 a.m. SCICTR 2128

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**Text:** *Explorations in Geometry*

**Office Hours:** I have scheduled office hours 1:00-1:50 p.m. on Monday, Wednesday, and Friday, 11:00-11:50 a.m. on Tuesday, and 9:30-10:20 a.m. on Thursday. However, when I am in my office, my door is always open and you are welcomed to come see me. You can check my class schedule at [ww.math.hope.edu/swanson/schedule.html](http://ww.math.hope.edu/swanson/schedule.html).

**Additional Help:** Besides seeking help from me, help for this course is available through the Academic Support Center. They run help sessions for all types of introductory mathematics courses, which they call the Mathematics Lab. It is open 6:00-8:00 p.m. on Sunday and 7:30-9:30 p.m. on Monday through Thursday in VZN 274.

**Curriculum:** We will look at a variety of different topics in geometry in this course. Geometry can be very visual and not so computational. Therefore, topics in geometry can be used to show the beauty of mathematics in a very accessible way. Among other things, we will look at symmetry, the golden ratio, tessellations, fractals, and Celtic knots. In doing this, we will be using what I call explorations. In writing these explorations, I attempted to *tell* as little as was needed and to *ask* as much as I could. My goal was for you to discover concepts for yourself.

I envision students working in small groups of two or three to answer the questions in the explorations. I think more can be learned by working in a small group than from either a large class or individually. However, some students prefer to work individually and they certainly could complete the questions doing so.

In writing the book for GEMS 100, *Understanding our Quantitative World*, we addressed the question, "What mathematical skills and concepts are useful for informed citizens?" In this class, my goal was to address the question, "What mathematics is most interesting and beautiful to explore?" We will not focus on the usefulness of mathematics, but instead will focus on the beauty in mathematics.



**Explorations:** Much of our time in class will be spent on working on the explorations in our text. I do not plan to collect answers to all these, however almost everything you will be graded on will be based on the questions in the explorations. Hence, it is quite important that you complete them.

**Grading:** A point distribution is as follows:

- Tests (2) - 200 points
- Quizzes and Assignments - 60 points
- Project - 40 points



Each graded piece of work will be assigned a specific number of points. The final grade will be determined simply by your percentage of the total points accumulated during the semester according to the following scale: 0-59%=F; 60-62%=D-; 63-66%=D; 67-69%=D+; 70-72%=C-; 73-76%=C; 77-79%=C+; 80-82%=B-; 83-86%=B; 87-89%=B+; 90-92%=A-; 93-100%=A.

### Tentative Schedule

	<b>M</b>	<b>T</b>	<b>W</b>	<b>Th</b>	<b>F</b>
<b>O C T O B E R</b>	13 <b>Fall Break</b>	14 <b>Fall Break</b>		16 Symmetry	17 Symmetry
	20 Symmetry	21	22 Star Polygons	23 Star Polygons	24 Polyhedra <b>Q/A 1</b>
	26 Polyhedra	27	28 Pythagorean Theorem	29 Pythagorean Theorem	30 Golden Ratio <b>Q/A 2</b>
<b>N O V E M B E R</b>	3 Golden Ratio	4	5 Drawing in Perspective	6 Review	7 <b>Test 1</b>
	10 Drawing in Perspective	11	12 Graph Theory	13 Graph Theory	14 Graph Theory <b>Q/A 3</b>
	17 Tessellations	18	19 Tessellations	20 Tessellations	21 Fractals <b>Q/A 4</b>
	24 Fractals	25	26 Celtic Knots	27 <b>Thanksgiving Break</b>	28 <b>Thanksgiving Break</b>
<b>D E C</b>	1 Celtic Knots	2	3 Shoelaces	4 Shoelaces <b>Projects Due</b>	5 Review
	8 <b>9:00 AM Test 2</b>	9	10	11	12