MTH 152 Projects (9pts)

Choose one of the following projects. The deadline for submission is posted on my website. Early or electronic submissions are encouraged, you'll get immediate feedback if you send it electronically. All projects must be word processed (unless otherwise stated) to earn full credit. Text: font size not exceeding 12, single or 1.5 line spacing. State your ideas clearly using complete sentences and correct grammar and spelling. Extent: 1.5 – 3 pages unless otherwise stated; It can be longer than 3 pages if more than 2 students are involved.

Important: If you are submitting an electronic copy of your paper, name the file in the format **YourLastName_Project #**. For example, a student Samantha Smith would send her measurement project as a file named "Smith_Project1". If it is a group project, the name of the submitter will do (just make sure that the names of all other members appear in the project). In the subject of your message, clearly indicate that it is a **Project Submission.**

1. Measurement Geometry (individual or group project – 4 students maximum)

Imagine that you want to repaint your apartment and replace old carpeting. Prepare a budget plan.

- Choose a real room or apartment. Specify, where the room/apartment is located. Take all necessary measurements and make a neat, accurate scale floor plan. Indicate what your scale is (for example 1cm = 1m). You must have at least 1 room per a group member.
- Calculate all necessary areas and surface areas (walls, ceiling, floor).
- Pick a color/paint for your room/apartment. Choose carpeting. Find their real UNIT prices (that is, how expensive is $1m^2$ or 1 square foot of your carpet and paint). The prices must be real, you may need to do a little research online or in a store.
- Calculate the total cost for material you need. You may compare your total cost with prices offered by carpeting/painting companies.

If it is a group project, state clearly each student's role and/or input. If you use a lot of drawings, you may hand in a neat handwritten report.

2. Geometric Shapes Scavenger Hunt (individual or group project – 4 students maximum)

You will need camera for this project. Find and photograph at least 10 of these polygons (one of each): square, rectangle (other than a square), rhombus (other than a square), parallelogram (other than a rectangle), trapezoid, right triangle, equilateral triangle, scalene triangle, isosceles triangle, acute triangle, obtuse triangle, pentagon, hexagon, octagon, 7-gon, 9-gon and polygon with more than 10 sides.

Find and photograph a circle.

Find and photograph at least one of these polyhedra: pyramid, prism, cube, tetrahedron, octahedron, and dodecahedron.

Label all your shapes with name and location. Be specific.

You may use a paper format (poster, scrapbook) or electronic format (webpage, PowerPoint presentation, Word document on the Internet, CD-ROM, floppy disc or flash memory). If you use an electronic format and you want to submit it through e-mail, be sure you resample all pictures so that your file does not exceed 1 MB (one megabyte). Larger files will not be accepted through e-mail. Mac users: please convert your files to formats fully compatible with PC formats before submitting.

If it is a group project, state clearly each student's role and/or input.

3. Tessellation (2 students maximum)

Create your own tessellation according to the following guidelines:

- Your fundamental shape must be something original – a face, an animal, etc., not just a polygon or abstract figure.
- Your tessellation must be a piece of art, ready to be displayed at an exhibition.
- List the isometries you used to create your tessellation.

A possible format of your submission will be displayed in the class; upon request, I will show you examples of tessellation projects earlier.

4. Statistics on Lot 22 (individual or group project – 6 students maximum)

Go to the parking lot 22 (the large lot across the street from Pearce and Anspach) and collect data for 50 randomly selected cars. (25 cars per a group member; that is, if you have 4 members, collect data for 100 cars). For each car, collect make and model, color, state where the car is registered and other statistical variables of your choice (you should have at least 4 characteristics).

Is your sample a random sample? Explain. Organize data using tables and graphs. Use at least 2 different kinds of graphs. Summarize your data verbally and if appropriate, use summary statistics such as averages.

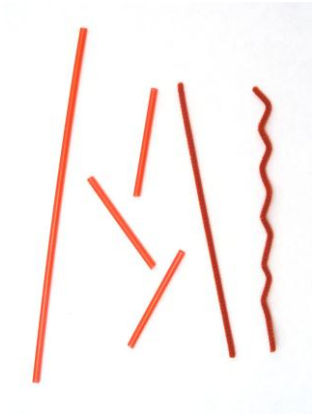
Based on your statistical analysis, try to formulate some predictions (for example: we expect that 87% cars in the Lot 22 are American cars). Verify your predictions by collecting *that particular statistical variable* again for a random sample of the same size some other day. How close your prediction was? Why?

If it is a group project, state clearly each student's role and/or input. Although you may hand in a neat handwritten report, I encourage you to use spreadsheet software such as Excel to organize your data and make your graphs. You can submit spreadsheet report electronically (to my e-mail address).

5. Polyhedra Exhibition (Project for up to 6 students)

Objective of this project is to create an exhibition of various polyhedra models. You may choose any material and technique suitable to build models but models must be true showpieces that nobody would hesitate to display in a classroom or school's hallway. Below are a few suggestions on what to use to build models; you may use one or combination of techniques to make your exhibition visually appealing, yet mathematically accurate and sound. (The first two techniques are particularly effective.)

1. For solid-face paper models, use precisely drawn polyhedra nets. Use thicker paper to make durable models, use colors to make your exhibition varied.



2. For wireframe models use drinking straws and thin "pipe cleaners", which you can get in supermarkets (in craft section) also as chenille sticks. Straws will be the edges of your polyhedra and cleaners will be used to connect these edges. You may want to make cleaners a bit wavy before sliding them into straws for a snug fit (see the picture of supplies on the left and model of icosahedron below).

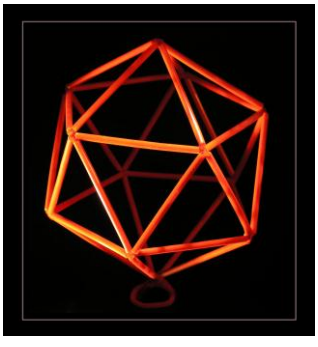
3. Other techniques to create wireframe models include using (1) small marshmallows and wooden skewers or longer toothpicks, or (2) craft metal wire. You may give free rein to your own artistic vision as long as your exhibits are visually appealing and geometrically accurate.

The exhibits must include:

- All Platonic solids
- Example(s) of prism(s) and pyramid(s) (at least one of each).

You may include:

- Archimedean solid(s), and polyhedral we did not discuss in class (Deltahedron, Antiprism, …)



Each exhibit must have a description – like in a museum or at artistic exhibition. The description should bear the name, a few fundamental facts and possibly an interesting feature(s) to catch visitor's eye. Regularity, volume and other relationships are worth mentioning. It is an exhibition so think of a general visitor and keep description short, just a few lines (yet sound and accurate).