

Mathematics 113 Portfolio

To demonstrate mastery of the concepts in the *Investigating Patterns* portion of this course, each student must prepare a portfolio of assigned work. Attendance in corresponding classes is compulsory; one point will be deducted from the 30 point max for each absence. Students are permitted three “freebees” without explanation or penalty.

Written submissions for Classes 1 to 9, 13, and 19 to 24 should be inserted in 3-hole plastic sleeves and assembled in a standard 3-ring binder. These submissions will be collected on the last day of classes and evaluated on their completeness, quality, accuracy, and originality. All other (3-D) submissions will be evaluated during the final examination. All submissions will be returned.

A total of eight (8) points will be awarded for supplementary investigations – three (3) points related to material in Classes 1 to 9 (to include at least 1 point for origami, kirigami, and/or tea bag folding), 4 points related to material in Classes 10 to 18, and one (1) point for material related to Classes 19 to 24. Each student who conducts a kite workshop and prepares the associated 36 kite kits will receive 2 points towards supplementary investigations for material related to Classes 10 to 18.

Web pages can accessed from:

<http://britton.disted.camosun.bc.ca/jbsymteslk.htm>

<http://britton.disted.camosun.bc.ca/jbpolyhedra.htm>

<http://britton.disted.camosun.bc.ca/jbrubbergeom.htm>

The individual assignments are as follows:

- Class 1: – Complete the two page symmetrical logos exercise.
- Class 2: – Prepare a color *Foto-THF* tri-hexa-flexagon from 3 photos of your choice.
URL: <http://britton.disted.camosun.bc.ca/fotothf/fotothf.htm>
- Class 3: – Prepare a symmetrical paper & scissors hexagonal snowflake. Unfold and present against a contrasting backing.
- Class 4: – Draw a tessellating art region to be used with a prism kaleidoscope. An appropriate equilateral triangle base will be provided.
*USE 3 IDENTICAL OR 3 DIFFERENT CURVES FROM THE CENTRE
ADD INTERPRETING FEATURES, THEN COLOR FOR EFFECT
APPROPRIATE USE OF REFLECTION AND ARTWORK TO BE JUDGED*
- Class 5: – Prepare a tessellating template (specifically a 2-inch square modified by translation) with interior interpreting features.
- Class 6: – Draw the corresponding tessellation on an 8½ by 11-inch sheet of 2-inch dot paper. Use “window tracing” to locate interior features. Darken the outline and features with black ink. Color appropriately.
- Class 7: – Complete a two-color ink print of the preceding tessellation on an 11 by 17-inch sheet of dot paper. Fold it in half to fit in your binder.
*CLEANLINESS AND PRECISION (WITHIN REASON) TO BE JUDGED
INK PRINTS MAY BE LAMINATED AND EVALUATED IN ADVANCE.*
- Class 8: – Prepare a pop-up sponge tessellating quartet of the preceding tessellating region. Use carbon paper to locate the interior features.
Ink the outline and features with a waterproof marker.
*PLEASE DRY THE SPONGES THOROUGHLY AFTER POPPING
PLACE IN A TESSELLATING CONFIGURATION IN YOUR BINDER*

- Class 9: - Prepare *Tessellation Exploration* or *TesselMania!*-generated tessellating art to include three or more different types, at least one of which utilizes more than one transformation [that is, two or more of translation (slides), rotation (turns), reflection (flips), glide-reflection (glides)].
*OUTLINE SHOULD ENTAIL SEVERAL POLYGON MODIFYING TACKS
 USE PAINT TOOLS (LINE, PENCIL, STAMP, ETC) FOR FEATURES
 QUALITY AND COMPLEXITY OF ARTWORK TO BE JUDGED
 SUBMIT A COLOR PRINTOUT FOR EACH*
- Prepare one *Tessellation Exploration* or *TesselMania!*-generated quilt pattern based on a block of order greater than four (other than 26, 27, 32, 33, 34, 35, 40, 43, 50, 52, 54, 60 or 63).
*CONSTRUCTION MUST INVOLVE DELETION OF GRID LINES
 PRECISION AND ATTENTION TO DETAIL TO BE JUDGED
 SUBMIT A COLOR PRINTOUT*
- Class 10: - Prepare an assembled porpoise, calendar or globe dodecahedron.
ASSEMBLE USING GLUE (NO TAPE)
- Class 11: - Construct a bar straw and pipe cleaner octahedron.
- Class 12: - Prepare an assembled Ellison® elastic geometrics polyhedron from more than one kind of regular polygon and/or golden triangles.
MODEL MUST INCLUDE AT LEAST 26 POLYGONS
- Prepare an M. C. Escher cuboctahedron.
COLOR WITH EXACTLY 4 COLORS - USE TAPE ON INTERIOR ONLY
- Class 13: - Use deductive reasoning to find the number of faces, corners, and edges in a *great rhombicosidodecahedron* (4.6.10) which consists of 30 squares, 20 hexagons and 12 decagons. Verify with Euler's Formula.
- Class 14: - Prepare a no-glue icosahedron.
- Class 15: - Prepare a unit origami skeletal octahedron.
- Class 16: - Prepare a unit origami stellated octahedron (*in a small ziploc bag*).
- Class 17: - Prepare a 4-cell tetrahedron kite (*in class or outside my office*).
- Class 18: - Prepare an M. C. Escher kaleidocycle.
- Class 19: - Create anamorphic art using the cylindrical grid.
SUBMIT BOTH VERSIONS / COLOR VERSION WITHOUT GRID
- Class 20: - Create anamorphic art using a digital graphic and **Anamorph Me!**
PRESENT AS DETAILED IN ANAMORPH ME! INSTRUCTIONS
- Class 21: - Create a drawing(s) exhibiting 1-point or 2-point perspective.
- Class 22: - Complete the "fishy" maze exercise. *APPLY THE ODD/EVEN NUMBER OF CROSSINGS RULE - COLOR INSIDE TO VERIFY*
- Complete the bridges/tunnels exercise. *APPLY THE ODD/EVEN CORNER RULE TO THE SIMPLIFIED NETWORK*
- Class 23: - Assemble a hanging boots puzzle. *NO CREASE EVIDENT*
- Class 24: - Prepare a tetra-tetra-flexagon with six identical (or related) distinct stickers replacing each of the four sets of numbers.
- Prepare a numbered hexa-hexa-flexagon.