

**Eastern West Virginia Community and Technical College  
COURSE ASSESSMENT REPORT**

<b>Course Title and Number:</b> MTH 200 – Geometry and Measurement	<b>Academic Term and Year of Assessment Activity (Ex: Fall, 2014)</b> Spring 2016
<b>Report Submitted By:</b> Andrea Williams	<b>Number of Students Assessed:</b> 11
<b>Date Report Submitted:</b> 5/24/16	<b>Number of Sections Included:</b> 1
<b>Course Delivery Format (list all modalities used in sections assessed. Ex: web based, VDL, traditional section, hybrid course, etc.):</b> Traditional section	

**Course Role in the Curriculum**

**Provide a description of the role the course serves in the curriculum (i.e. general education requirement, program technical core, restricted elective, etc.). Note all as appropriate.**

MTH 200 is primarily a technical core course for the Shepherd University 2 + 2 Agreement for Elementary Education, but it can also be taken as a general education math elective.

**Assessment Methods**

**Provide a description of the assessment process used. Include description of instrument and performance standards in description. Note all methods.**

Final exam questions are used as a basis for three of the four outcomes in this assessment. The final was a paper exam given in two parts on two days. Students were allowed to use a calculator and a 3x5 index card of notes they created. The students were also provided with the same formulas, theorems, postulates, etc. that they had on chapter tests throughout the semester. Students were given partial credit based on the work they showed on their test paper, but for purposes of this analysis, only questions receiving full credit are considered correct. Students were given an optional review assignment a week and a half prior to the final exam with similar questions.

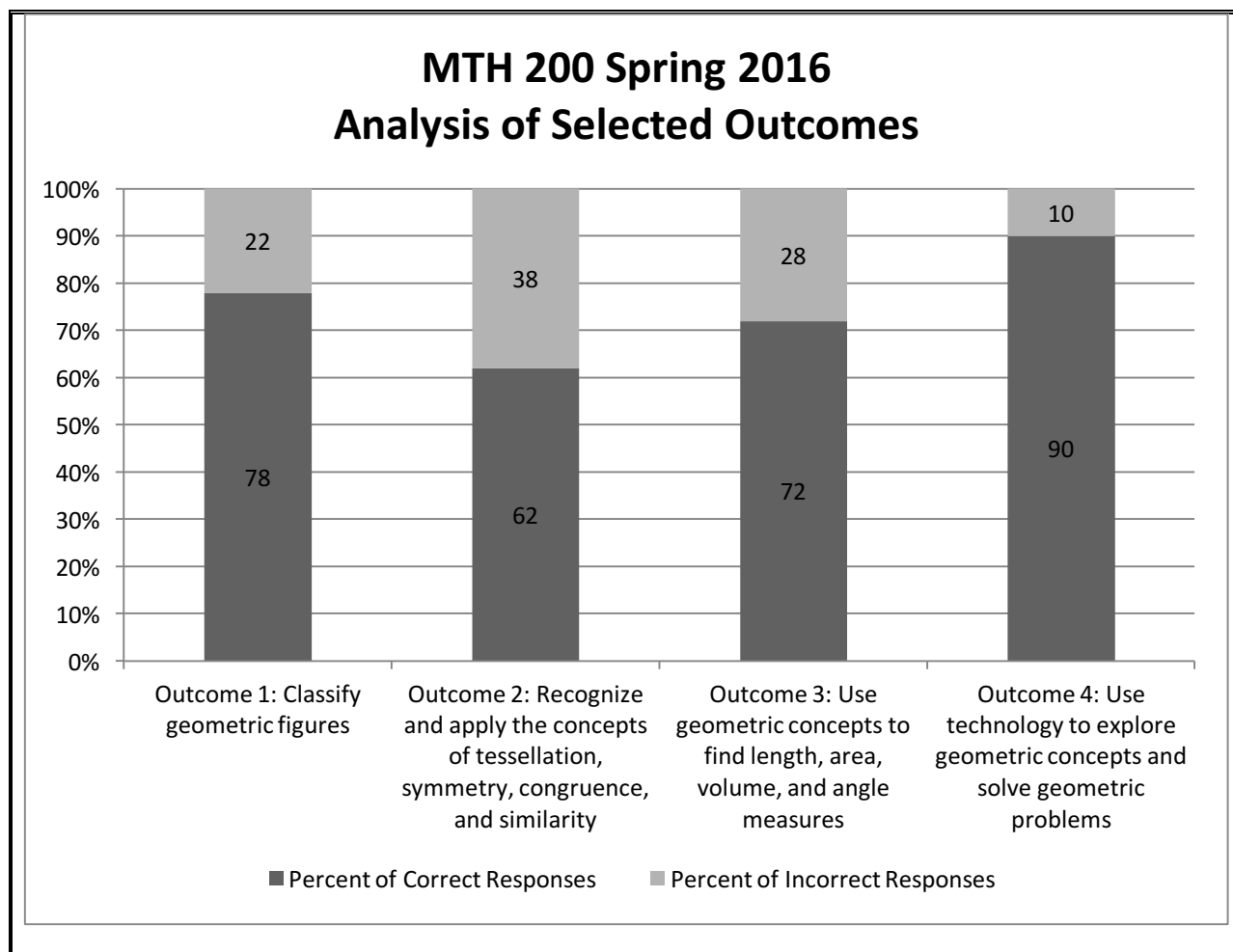
The fourth outcome was assessed based on the results of lab assignments given throughout the semester that required use of Geometer's Sketchpad. More details about the labs are given below.

Multiple questions are included in each outcome for analysis. A minimum satisfactory percent of correct responses for each outcome is 75%. Those failing to meet the standard are reviewed on an outcome-by-outcome basis.

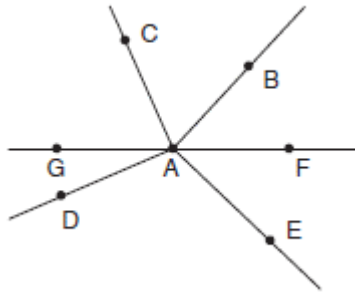
**Assessment Results**

**Provide a summary of results including tables/charts. Incorporate information from previous assessments as appropriate. Append additional pages if necessary. If appending, include notation in box to "See attached".**

Four outcomes were analyzed, and two out of the four met the 75% correct criterion. More details about the outcomes and the assessed questions are included in the action plan.



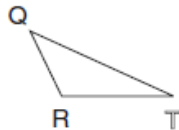
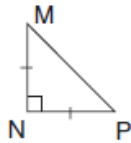
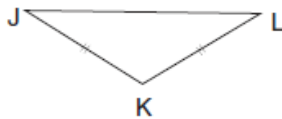
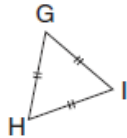
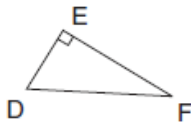
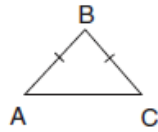
<b>Course Level Assessment Summary of Outcomes, Indicators and Results</b> <b>Course Title and Number: MTH 200 – Geometry and Measurement</b> <b>Number of students in assessment sample = 11</b> <b>Number of Sections in Assessment = 1</b> <b>Add additional rows to table if necessary</b>				
Learning Outcomes (Insert learning outcomes assessed during this cycle)	Indicator (Insert indicators used for each outcome: exam question, scoring rubric, etc. Be specific)	Percent of Correct Responses	Percent of Incorrect Responses	Performance Standard Met (75%)* (yes or no)
Outcome 1: Classify geometric figures	<b>1.2.</b> In the figure, $\overline{BA} \perp \overline{EA}$ and $G$ and $F$ are collinear. a. Name a pair of supplementary angles. b. Name a pair of complementary angles. c. Name a pair of adjacent angles in this figure.	78%	22%	Yes



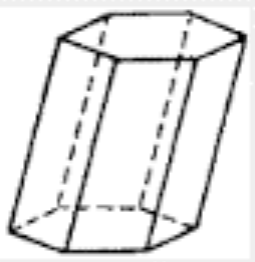
1.4. The measure of  $\angle X$  is  $6^\circ$  more than five times  $\angle Y$ . If  $\angle X$  and  $\angle Y$  are supplementary, find the measure of  $\angle X$  and classify it as acute, right, obtuse, or straight.

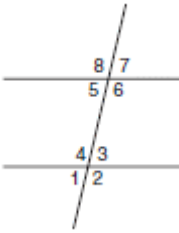
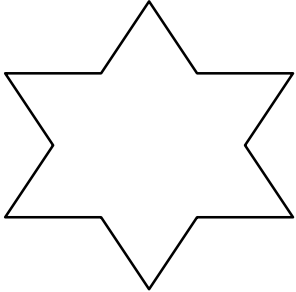
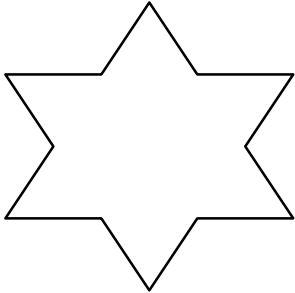
1.7. Several triangles are shown below with congruent sides, congruent angles, and right angles shown.

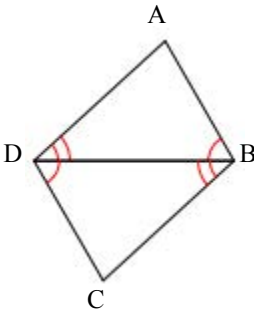
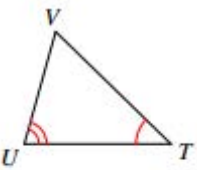
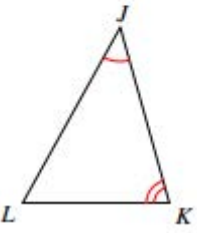

- Name an isosceles triangle.
- Name an equilateral triangle.
- Name an obtuse triangle.
- Name a scalene triangle.
- Name a right triangle.



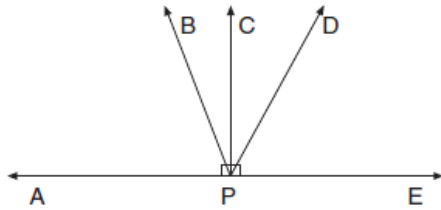
1.10. Name the given polyhedron. Be as specific as possible.



	<p><b>2.1.</b> Given the following figure, name a pair of...</p> <ol style="list-style-type: none"> <li>corresponding angles.</li> <li>alternate interior angles.</li> <li>alternate exterior angles.</li> <li>interior angles on the same side of the transversal.</li> <li>exterior angles on the same side of the transversal.</li> </ol> 			
<p>Outcome 2: Recognize and apply the concepts of tessellation, symmetry, congruence, and similarity</p>	<p><b>1.5.</b> How many lines of symmetry does the following figure have? Draw them.</p>  <p><b>1.6.</b> How many different rotation symmetries does the following figure have? Describe them (give a specific number of degrees).</p>  <p><b>1.24.</b> Give a pair of congruent triangles using this figure. Give the congruency principle that applies. Then complete the congruency statements.</p> <p><math>\triangle</math> _____ <math>\cong</math> <math>\triangle</math> _____ by _____</p> <p><math>\overline{AD} \cong</math> _____</p> <p><math>\overline{AB} \cong</math> _____</p>	<p>62%</p>	<p>38%</p>	<p>No</p>

	<p><math>\angle BAD \cong</math> _____</p>  <p><b>2.5.</b> Determine if the pair of triangles is similar. If so, write an appropriate similarity statement and explain why they are similar.</p>   <p><b>2.25.</b> Form a tessellation of the plane using the following quadrilateral. Your final answer should include at least six quadrilaterals, including the one that is given to you.</p> 			
<p>Outcome 3: Use geometric concepts to find length, area, volume,</p>	<p><b>1.3.</b> In the figure, <math>\angle APB = 84^\circ</math> and <math>\angle DPE = 73^\circ</math>. What is the measure of <math>\angle BPD</math>?</p>	<p>72%</p>	<p>28%</p>	<p>No</p>

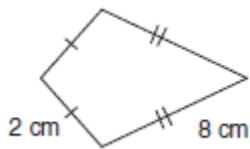
and angle measures



**1.8.** The measures of the angles in triangle are  $x$ ,  $x + 3$ , and  $2x$ . Find the value of  $x$ .

**1.9.** What is the sum of the measures of the angles in a heptagon?

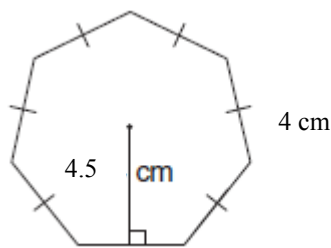
**1.11.** Determine the perimeter of the following figure.



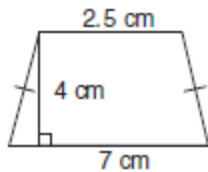
**1.12.** Find the circumference of a circle with a radius of 5 feet. Round to the nearest hundredth.

*For questions 13-14, determine the area of each figure. Round to the nearest hundredth if necessary.*

**1.13.**



**1.14.**



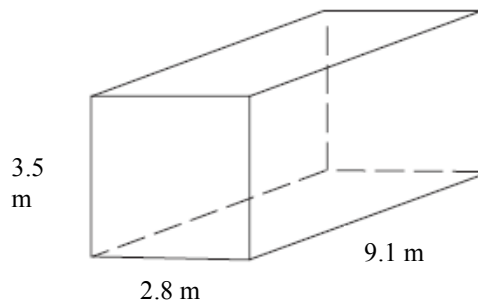
**1.15.** The area of a circle is  $64\pi$  square feet. What is its circumference to the nearest

hundredth of a foot?

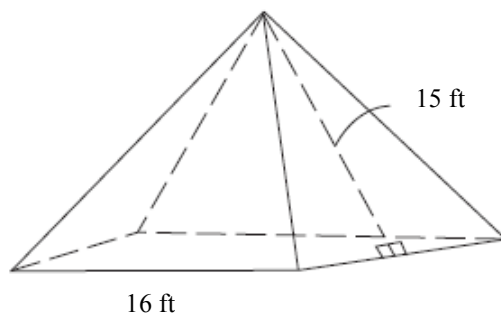
**1.16.** If the length of the leg of a  $45^\circ - 45^\circ$  right triangle is 12 cm, find the length of the hypotenuse to the nearest hundredth.

**1.17.** If the hypotenuse of a  $30^\circ - 60^\circ$  right triangle is 6 cm, find its perimeter to the nearest hundredth.

**1.19.** What is the surface area of the rectangular prism shown below?



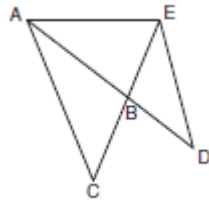
**1.20.** Find the surface area of the right square pyramid shown below.



**1.21.** Find the volume of a prism whose base is a right triangle with legs of length 2.1 cm and 6.4 cm, and the height is 15 cm.

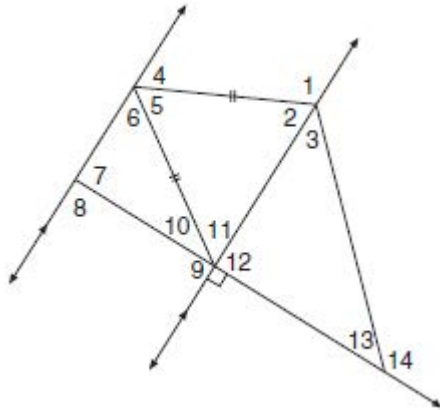
**1.22.** A soft-drink cup is in the shape of a right circular cone with capacity  $250 \text{ cm}^3$ . The radius of the circular base is 5 cm. How deep is the cup? Round to the nearest tenth.

**1.23.** In the figure shown,  $\overline{AC} \cong \overline{CE}$ ,  $\overline{BD} \cong \overline{BE}$ , and  $\overline{AE} \cong \overline{DE}$ . If  $\angle AED = 100^\circ$ , find the measures of  $\angle AEC$  and  $\angle CAB$ .

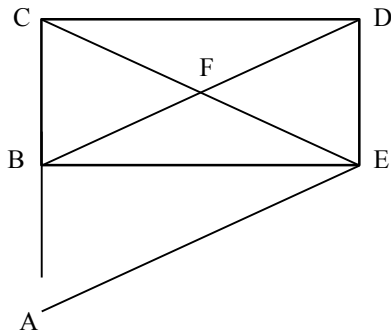


2.2. In the following figure,  $\angle 3 = 46^\circ$  and  $\angle 10 = 38^\circ$ . Find the measures of the rest of the numbered angles.

- |                       |                        |
|-----------------------|------------------------|
| $\angle 1 =$ _____    | $\angle 8 =$ _____     |
| $\angle 2 =$ _____    | $\angle 9 =$ _____     |
| $\angle 3 = 46^\circ$ | $\angle 10 = 38^\circ$ |
| $\angle 4 =$ _____    | $\angle 11 =$ _____    |
| $\angle 5 =$ _____    | $\angle 12 =$ _____    |
| $\angle 6 =$ _____    | $\angle 13 =$ _____    |
| $\angle 7 =$ _____    | $\angle 14 =$ _____    |

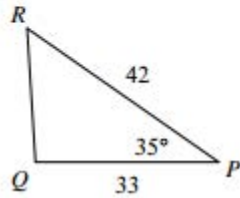
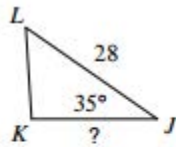


2.3. In the following figure,  $BCDE$  is a rectangle and  $ABDE$  is a parallelogram. If  $AE = 12$  cm and  $\angle CEB = 30^\circ$ , find the exact lengths  $CF$ ,  $CB$ , and  $CD$ .

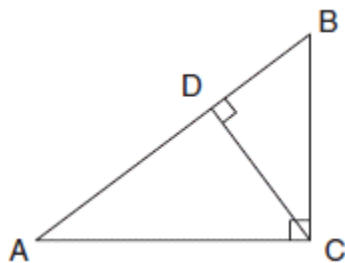


2.6.  $\Delta LKJ \sim \Delta RQP$ . Find the length of  $KJ$ .

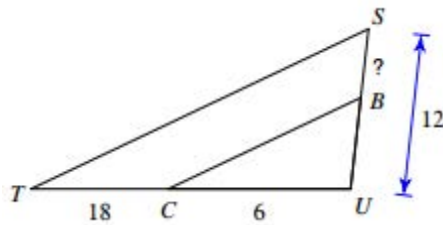




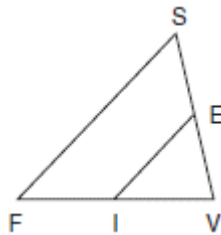
2.7. In  $\triangle ABC$ , if  $AD = 11$  and  $BD = 9$ , find  $CD$ , rounded to the nearest hundredth.



2.8. Given the figure below with  $BC \parallel ST$ , find the length of  $BS$ .



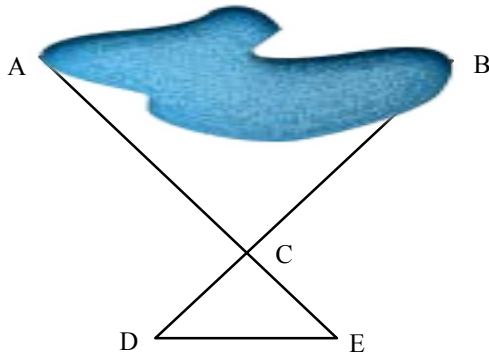
2.9. Given the figure with  $EI \parallel SF$ , midpoints  $E$  and  $I$ ,  $EV = 8$  cm,  $VI = 9$  cm, and  $EI = 14$  cm, find  $FS$ .



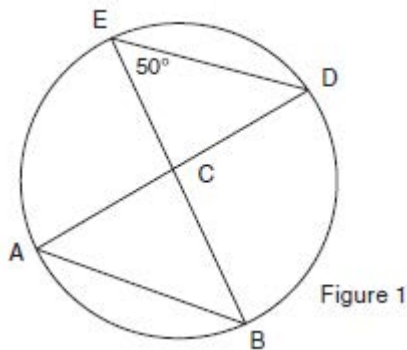
2.10. Scale drawings will be created for the Eiffel Tower which is 986 feet tall and the Empire State Building which is 1250 feet tall. If the Empire State Building is drawn 5.6 cm long, how long should the Eiffel Tower be

drawn? Round to the nearest tenth.

**2.11.** To measure the distance across a lake, you mark points  $A$  and  $B$  on opposite ends of the lake. From point  $B$ , you walk 65 yards and place a stake at point  $C$  then continue 20 yards to point  $D$ . From point  $D$ , you walk parallel to  $\overline{AB}$  and locate point  $E$  such that  $E$ ,  $C$ , and  $A$  are collinear. If  $DE = 42.5$  yards, what is the distance across the lake? Round to the nearest whole yard.



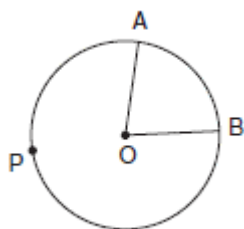
For questions 12-13, use Figure 1 below.  $\overline{EB}$  and  $\overline{AD}$  are diameters of circle  $C$ .



**2.12.** What is the measure of  $\angle BCD$ ?

**2.13.** What is the measure of  $\widehat{AB}$ ?

**2.14.** Points  $A$ ,  $B$ , and  $P$  are on circle  $O$ , as shown.  $OA = 8$  cm and  $\angle AOB = 75^\circ$ . Find the length of  $\widehat{AB}$ . Round your answer to the nearest tenth if necessary.

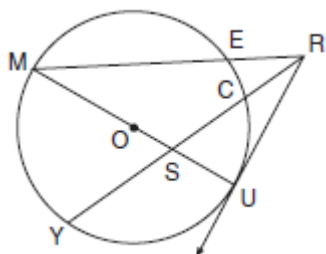


**2.15.** The minute hand on a clock is 3.5 cm long. What is the area swept out by the hand in 15 minutes? Round your answer to the nearest tenth if necessary.

**2.16.** Points  $A, B, C,$  and  $D$  are points on a circle.  $\overline{AC}$  intersects  $\overline{BD}$  at  $E$ . If  $\widehat{AD} = 95^\circ$  and  $\angle BDC = 23^\circ$ , find  $\angle AEB$ .

**2.17.** Two chords of circle  $O$ ,  $\overline{PR}$  and  $\overline{QS}$ , intersect at  $T$ . If  $PT = 12$  ft,  $TR = 5$  ft, and  $QS = 19$  ft, find  $TS$ .

For questions 18-20, use the figure below.  $\overline{RU}$  is tangent to circle  $O$  as shown.  $\widehat{ME} = 110^\circ$ ,  $\widehat{CE} = 20^\circ$ , and  $\angle MRY = 14^\circ$ .



**2.18.** Find  $\widehat{MY}$ .

**2.19.** Find  $\angle MRU$ .

**2.20.** Find  $\angle URY$ .

<p>Outcome 4: Use technology to explore geometric concepts and solve geometric problems</p>	<p><b>Lab #1</b> – Students were asked to construct angles, supplementary angles, a right angle, a square, and a right triangle. They also learned how to find the area of a polygon. The purpose of this lab was to introduce the students to the many tools available in Sketchpad.</p> <p><b>Lab #2</b> – Students were asked to create a</p>	<p>90%</p>	<p>10%</p>	<p>Yes</p>
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	<p>sketch that verified the Pythagorean Theorem and then write a proof of the Pythagorean Theorem.</p> <p><b>Lab #4</b> – Students were asked to create sketches that verified Aabel’s Theorem and Thebault’s Theorem.</p> <p><b>Lab #5</b> – Students were asked to construct the midquad of various quadrilaterals and determine what shape they had created based on properties of quadrilaterals.</p> <p><b>Lab #7</b> – Students were asked to first construct an irregular polygon and then create a tessellation of that polygon. They had to determine what angle of rotation to use for the tessellation to work correctly.</p>			
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\* Please note if using a different minimum performance standard.

<p><b>Conclusions</b></p> <p><b>Provide a brief summary of conclusions derived based on analysis of data. Append additional pages if necessary. If appending, include notation in box to “See attached”.</b></p>
<p>This course proved to be more difficult than what the students had originally anticipated; however, they were a highly motivated group that were willing to put in the extra effort necessary to be successful. Although only two of the four outcomes met the performance standard, few adjustments should be necessary to bring the other two up to expectations (see the Action Plan below).</p>

<p><b>Previous Assessment Reports and Results</b></p> <p><b>Date of Previous Assessment: N/A</b></p> <p><b>List of Outcomes Not Met:</b></p> <p><b>Summary of Actions Taken to Address Unmet Learning Outcomes: Append additional pages if necessary. If appending, include notation in box to “See attached”.</b></p>

<p><b>Action Plan and Date for Reassessment</b></p> <p><b>Identify action plan for improvement or maintaining current performance levels including outcomes identified for re-assessment, curriculum revision, LOT proposal, new or revised course activities to reinforce learning outcomes, etc. Append additional pages if necessary. If appending, include notation in box to “See attached”.</b></p>
<p>Outcome 1: Classify geometric figures This outcome was met with 78% correct responses, so no adjustment in instruction is recommended at</p>

this time.

**Outcome 2: Recognize and apply the concepts of tessellation, symmetry, congruence, and similarity**  
The two questions affecting the success rate of this outcome were 1.5 and 1.6, the two on symmetry. The text does not include many problems on this topic, but the instructor will pull from other sources to include more examples and more homework problems on symmetry the next time this course is offered.

**Outcome 3: Use geometric concepts to find length, area, volume, and angle measures**  
This is the biggest outcome for the course in terms of the amount of material that is included under this outcome. The performance standard was only missed by 3%, so there is not much cause for concern at this point. The questions with the lowest number of correct responses included 2.3 (with no students getting the problem completely correct), 2.8, 2.16, 2.18, and 2.19. 2.3 was a multiple-step problem that required knowledge of both quadrilaterals and 30-60-90 triangles; most students did not recognize the triangle part of the problem. In the future, a different question will be used to test just their knowledge of quadrilaterals since the 30-60-90 triangles are covered in another question. For 2.8, most students set up the problem correctly, but did not find the length of the correct segment. It will be ensured that a similar problem is on the final exam review. Students were expected to construct their own drawing before solving 2.16, and that proved to be the difficult part of the problem. In the future, students will be given the figure and just be asked to find the angle measure. Students struggled with questions similar to 2.18 and 2.19 on the chapter test as well. More homework problems will be assigned on this topic, and those questions will be reviewed after the chapter test to ensure the students know how to do them before the exam.

**Outcome 4: Use technology to explore geometric concepts and solve geometric problems**  
The students did an excellent job on the labs requiring the use of Geometer's Sketchpad and, overall, seemed to enjoy completing them. Hopefully the future educators in the class will consider using it in their own classroom. The only recommended change is to consider incorporating a couple more labs allowing the students to explore more of the features of Sketchpad.

Other recommendations to consider the next time the course is offered:

- The list of homework problems should be reviewed. Some problems turned out to be more difficult than what the instructor intended to assign.
- As noted above, the final exam review was an optional assignment. In the future it will likely be a requirement with enough weight toward the final grade to motivate the students to do well on it.

Proposed date for the next assessment is Spring 2018.

**Assessment Committee Recommendation/Approval  
(To be posted by Assessment Committee Chair)**

- Approved as presented  
 Approved with recommendations for future reports (Explanation Required)  
 Resubmission Required. Reason for Resubmission:

**Date: 8-25-16**