Honors Advanced Math

Name___________________

Practice Test: Geometric Trigonometry **February 3, 2012**

General instructions: *Write a complete, fully explained solution to each problem, except where directions say otherwise. The quality of your responses will be a factor in grading. If you use a graphical method to solve a problem briefly explain what you did on your calculator. Use exact answers whenever possible.*

1. a. Prove that the area of ΔABC is given by the formula $Area = \frac{1}{2}ab\sin C$.

b. Prove the law of sines.

2. Suppose in triangle DEF, $\angle D = 39^\circ$, $e = 12$, and $d = 9$. There are two possible triangles that can be drawn to fit this information. Draw both of them and completely solve each triangle. Use decimal approximations when giving your answers.

3. In ΔABC, $a = 9$, $b = 8$, $c = 10$, and M is the midpoint of side AB. Find the length of CM.

4. Here is some given information about a quadrilateral ABCD (vertices labeled consecutively):

space for sketching the quadrilateral:

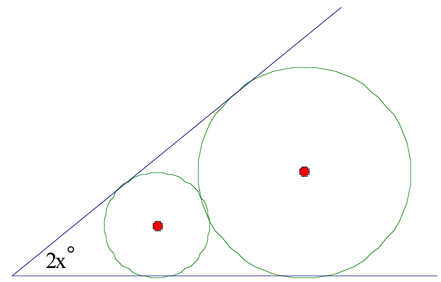
- AB = 6, BC = 8, and CD = 7.
- $\angle B = \cos^{-1}(0.2)$
- $\angle C$ is an obtuse angle such that $\sin(\angle C) = 0.9$.

a. Find the length of diagonal *AC* (exact answer, not a decimal approximation).

b. Find the area of quadrilateral *ABCD* (decimal approximation OK, but must be accurate to the nearest 0.01).

Special instructions for problems 5-7: *On your test, you will be given one of the* ***C*** *problems from the Mixed Trig section of the Brown book. You may use this practice-test to practice writing up your solutions for these three of the problems.*

5. Two circles are externally tangent. Common tangents to the circles form an angle of measure 2x. Prove that the ratio of the radii of the circles is $\dfrac{1-\sin x}{1+\sin x}$.



6. Given ΔABC with $c^2 = \dfrac{a^3+b^3+c^3}{a+b+c}$, find the measure of $\angle C$.

7. Prove that $\cot A + \cot B + \cot C = \dfrac{a^2+b^2+c^2}{4(\text{area of } \Delta ABC)}$ in any ΔABC.