HOMEWORK 9 - MATH 140

DUE DATE: Monday, April 18

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each homework problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. In the following, assume that $\gamma = 90°$. Solve the triangles:
   (a) $b = 4, \beta = 10°$
   (b) $a = 2, b = 8$
2. A ship is just offshore of New York City. A sighting is taken of the Statue of Liberty, which is about 305 feet tall. If the angle of elevation to the top of the statue is $20°$, how far is the ship from the base of the statue?
3. Solve the following triangles:
   (a) $\beta = 20°, \gamma = 70°, a = 1$
   (b) $b = 4, c = 3, \beta = 40°$
   (c) $a = 3, b = 7, \alpha = 70°$
4. Two sensors are spaced 700 feet apart along the approach to a small airport. When an aircraft is nearing the airport, the angle of elevation from the first sensor to the aircraft is $20°$ and from the second sensor to the aircraft it is $15°$. Determine how high is the aircraft at this time.
5. Solve the triangles:
   (a) $b = 3, c = 4$ and $\alpha = 30°$.
   (b) $a = 4, b = 3$ and $c = 4$
6. Use the half-angle formula and the Law of Cosines to show that for any triangle $\cos\frac{\gamma}{2} = \sqrt{\frac{s(s-c)}{ab}}$, where $s = \frac{a+b+c}{2}$ is, as usual, the semiperimeter of the triangle.
7. Find the area of each of the following triangles:
   (a) $a = 2, c = 1, \beta = 10°$
   (b) $a = 4, b = 5, c = 3$
8. Show that a formula for the altitude h_a from the vertex to the opposite side a of a triangle is $h_a = \frac{a \sin\beta \sin\gamma}{\sin\alpha}$.