HOMEWORK 10 - MATH 140

DUE DATE: Monday, November 21
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. Suppose that C is the right angle of a right triangle $\triangle ABC$. Using the following information, solve the triangle:
   (a) If $b = 4, \beta = 10°$, find a, c and α.
   (b) If $a = 2, b = 8$, find c, α and β.
2. To measure the height of a building , two sightings are taken a distance of 50 feet apart. If the first angle of elevation is $40°$ and the second is $32°$, what is the height of the building?
3. Solve each of the following triangles. Be alert in case any of the data result in no triangles or more than one triangle:
   (a) If $\beta = 20°, \gamma = 70°$ and $a = 1$, find α, b and c
   (b) If $b = 4, c = 3$ and $\beta = 40°$, find a, α and γ.
   (c) If $a = 3$, $b = 7$ and $\alpha = 70°$, find c, β and γ.
4. A loading ramp 10 feet long that makes an angle of $18°$ with the horizontal is to be replaced by one that makes an angle of $12°$ with the horizontal. How long is the new ramp?
5. Solve the following triangles:
   (a) If $\alpha = 30°, b = 3$ and $c = 4$, find a, β and γ.
   (b) If $a = 4, b = 3$ and $c = 4$, find α, β and γ.
6. For any triangle show that $\cos\frac{\gamma}{2} = \sqrt{\frac{s(s-c)}{ab}}$, where $s = \frac{1}{2}(a+b+c)$.
   Hint: Use a Half-Angle Formula and the Law of Cosines.
7. Find the area of each of the following triangles:
   (a) $a = 4, b = 5$ and $c = 3$.
   (b) $a = 2, c = 1$ and $\beta = 10°$.
8. Show that a formula for the altitude h from a vertex to the opposite side a of a triangle is $h = \frac{a\sin\beta\sin\gamma}{\sin\alpha}$.
   Hint: Use two different area formulas to create a relation between h and sines.