

MATH 5200/7200 Exam 3

Dr. McCrory 12/3/08

For problems 1 and 2, use a calculator to compute your answer, draw a diagram, and show all the steps in your computation.

1. (25 points) A cruise ship leaves an island and sails 50 miles at a bearing of North 80 degrees East. It then sails 30 miles at a bearing of South 55 degrees West and stops for the night. How far is the ship from the island?

2. (25 points) The perimeter of a field is surveyed. The field has four sides. The lengths of the sides and the angles between them are measured as follows:

Side a length 54.507 meters, angle from side a to side b 117.68 degrees.

Side b length 48.128 meters, angle from side b to side c 61.44 degrees.

Side c length 65.356 meters, angle from side c to side d 106.35 degrees.

Side d length 43.179 meters, angle from side d to side a 74.53 degrees.

What is the area of the field?

3. (50 points) (a) What is the relation between the angles of a triangle and the area of a triangle in hyperbolic geometry and in spherical geometry?

(b) What is the relation between the angles of a polygon and the area of a polygon in hyperbolic geometry and in spherical geometry?

(c) A sphere is divided up into congruent spherical quadrilaterals. Each of the quadrilaterals has two angles equal to $\pi/2$ radians and two angles equal to $2\pi/3$ radians. How many quadrilaterals are there?