12.215 Homework #3 **Due Wednesday, October 30, 2002**.

Question 1: (20 points) Derive the equations for:
(a) A conical map projection with the axis of the cone along the Z-axis, tangent at latitude ϕ_c and cut at longitude 180^o. Assume latitude and longitude on a spherical Earth are to be projected and that the origin of the projection is the center of the Earth.

(b) A plane projection tangent at the North Pole with the X-axis along the Greenwich meridian.

Question 2: (75 points) For the following triangle defined by latitudes and longitudes:
Point A latitude 70^o, longitude 0^o
Point B latitude 13.17944^o, longitude -30.89897^o
Point C latitude 13.17944^o, longitude 30.89897^o

Project these points and some intermediate points on the great circles connecting them with
(a) A Mercator map projection; tangent at the equator, axis along the Z-axis and cut at 180^o longitude;
(b) A conical map projection with the axis of the cone along the Z-axis, tangent at latitude 42.632195^o and cut at longitude 180^o
(c) A plane projection tangential at the North Pole with the X-axis along the Greenwich meridian.