Math 275 - Spring 2016
Homework 4
Due March 1, 2016

If I have seen further than other men, it is because I have stood on the shoulders of giants.
—Isaac Newton

Turn in: 6.18, 7.2, 7.4, 7.5, 7.9, 7.12

7. Traditionally the earth's surface has been modeled as a sphere, but the World Geodetic System of 1984 (WGS-84) uses an ellipsoid as a more accurate model. It places the center of the earth at the origin and the north pole on the positive z-axis. The distance from the center to the poles is 6356.523 km and the distance to any point on the equator is 6378.137 km.

a. Find an equation of the earth's surface as used by WGS-1984.
b. Curves of equal latitude are traces in the planes $z = k$. What is the shape of these curves?
c. Meridians (curves of equal longitude) are traces in planes of the form $y = mx$. What is the shape of these meridians?

Recommended: 6.16, 6.17, 7.1, 7.3, 7.6, 7.8, 7.13

Reduce the equation to one of the standard forms, classify the surface and sketch it.

15. $x^2 - y^2 + z^2 - 4x - 2z = 0$

16. $x^2 + y^2 - 2x - 6y - z + 10 = 0$

Answers: 15. $\frac{(x-2)^2}{5} - \frac{y^2}{5} - \frac{(z-1)^2}{5} = 1$. Hyperboloid of one sheet.
16. $z = (x-1)^2 + (y-3)^2$. Elliptic Paraboloid.