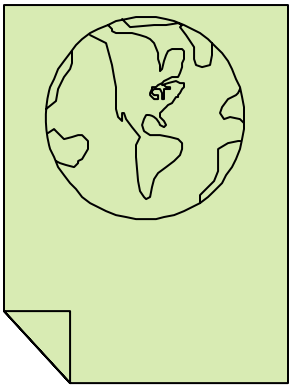
Chapter 4 Web Task

Map Projections

When part of Earth is drawn on a map, we get a two-dimensional representation of a three-dimensional shape. The map creators have to take the three-dimensional globe and transfer it to a two-dimensional map. When a three dimensional object is represented on a two-dimensional page, errors result.



a) Use a map in an atlas, and the scale on the map, to find the distance between Sarnia and Niagara Falls. Both places are in southern Ontario.

b) Check the actual distance using the Internet. Possible sites to use are *http://www.infoplease.com/atlas/calculate-distance.html* or *www.foundlocally.com/Rockies/Trans/Trans_DistanceCalc.htm*.

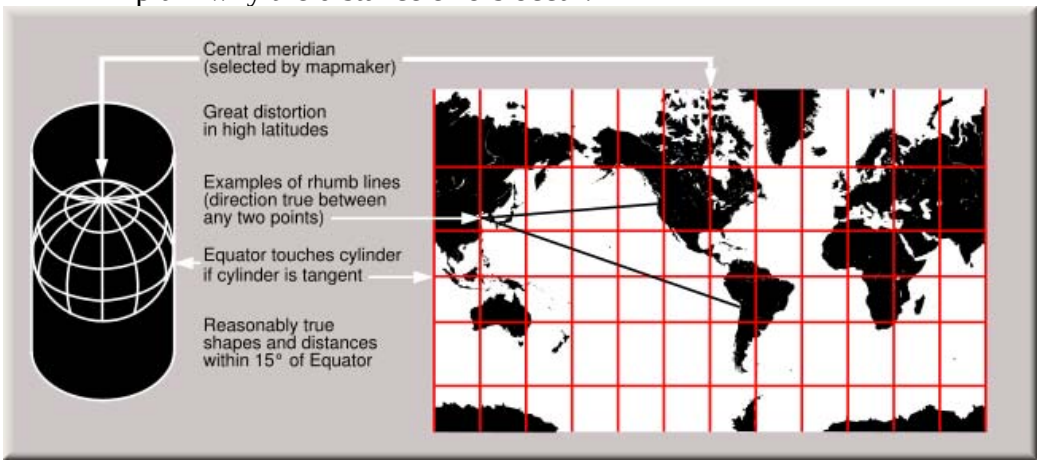
c) Determine the percent error for the distance you find in step a).

d) Repeat steps a), b), and c) for the distance between Iqaluit and Yellowknife.

e) Were the errors greater for the Northern cities or the Southern ones? Suggest some possible reasons why this occurred.

f) Various techniques have been refined over time to draw maps. Look at the atlas you have been using. What method was used to draw its maps? A commony used method of map drawing is the Mercator projection. One step in calculating the location of a given point involves the expression $\tan\left(45° + \frac{L°}{2}\right)$ where L is the latitude of the point.

- Rewrite the expression and simplify it.
- Determine the value of the expression for L = 60°.
- Explain why the distance errors occur.



f) Research and report on at least two more map projections.