



IV. Map Scale, Spatial Resolution, and Spatial Data Accuracy

- A. Map scale is an indicator of map accuracy
 - 1. The smaller the scale, in general, the lesser the accuracy, and vice versa
 - a. e.g. map accuracy at 1:100,000 scale is much less than 1:24,000 scale
- B. Locations Accuracy and Topological Accuracy in GIS
 - 1. Location Accuracy - measures the error in the absolute position of a map point or feature relative to real world, georeference coordinates.
 - 2. Topological Accuracy - a measure of the error in topology and attribute features of map features
- C. USGS Map Standards for Accuracy
 - 1. USGS maps are tested and standardized so that there is no more than 10% of total position points can be more than 0.02 inches (0.5 mm) out of position at the prevailing map scale.

In Class Exercise

At a scale of 1:65,000, 0.02 inches on the map represents how much distance on the ground in meters? Show all of your work.

$$0.02 \cdot 65,000 = 1300 \text{ in on the ground} \cdot 2.54 = 3302 \text{ cm} \cdot .01 = 33.02 \text{ m}$$

Given a scale of 1:24,000, 30 m error on the ground would represent how many millimeters of error on the map? Show all of your work.

$$\frac{30}{24,000} = .00125 \text{ M error on map} = 1.25 \text{ mm error}$$

Given a scale of 1:24,000 and a spatial feature resolution of 10 m, how many inches of resolution does this represent in map units? Show all of your work.

$$10 \text{ M} = .0004167 \text{ M on the map} = .04167 \text{ cm} \cdot 2.54 = 1.058 \text{ mm} = .04167 \text{ inches}$$
