9. Coordinate Systems

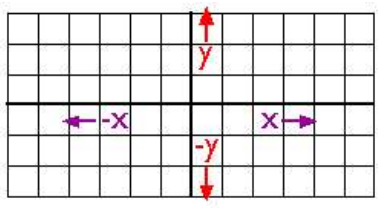

Figure 2.10.1 A Cartesian coordinate system.

As you probably know, locations on the Earth's surface are measured and represented in terms of **coordinates.** A coordinate is a set of two or more numbers that specifies the position of a point, line, or other geometric figure in relation to some reference system. The simplest system of this kind is a Cartesian coordinate system (named for the 17th century mathematician and philosopher René Descartes). A Cartesian coordinate system is simply a grid formed by juxtaposing two measurement scales, one horizontal (x) and one vertical (y). The point at which both x and y equal zero is called the **origin** of the coordinate system. In Figure 2.10.1, above, the origin (0,0) is located at the center of the grid. All other positions are specified relative to the origin. The coordinate of upper right-hand corner of the grid is (6,3). The lower left-hand corner is (-6,-3). If this is not clear, please ask for clarification!

Cartesian and other two-dimensional (plane) coordinate systems are handy due to their simplicity. For obvious reasons, they are not perfectly suited to specifying geospatial positions, however. The **geographic coordinate system** is designed specifically to define positions on the Earth's roughly-spherical surface. Instead of the two linear measurement scales, x and y, the geographic coordinate systems juxtaposes two curved measurement scales. The east-west scale, called **longitude** (conventionally designated by the Greek symbol *lambda*), ranges from +180° to -180°. Because the Earth is round, +180° (or 180° E) and -180° (or 180° W) are the same grid line. That grid line is roughly the International Date Line, which has diversions that pass around some territories and island groups. Opposite the International Date Line is the **prime meridian**, the line of longitude defined by international treaty as 0°. The north-south scale, called **latitude** (designated by the Greek symbol *phi*), ranges from +90° (or 90° N) at the North pole to -90° (or 90° S) at the South pole. We'll take a closer look at the geographic coordinate system next.

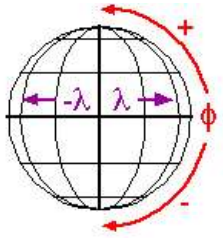

Figure 2.10.2 The geographic (or "geodetic") coordinate system.

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