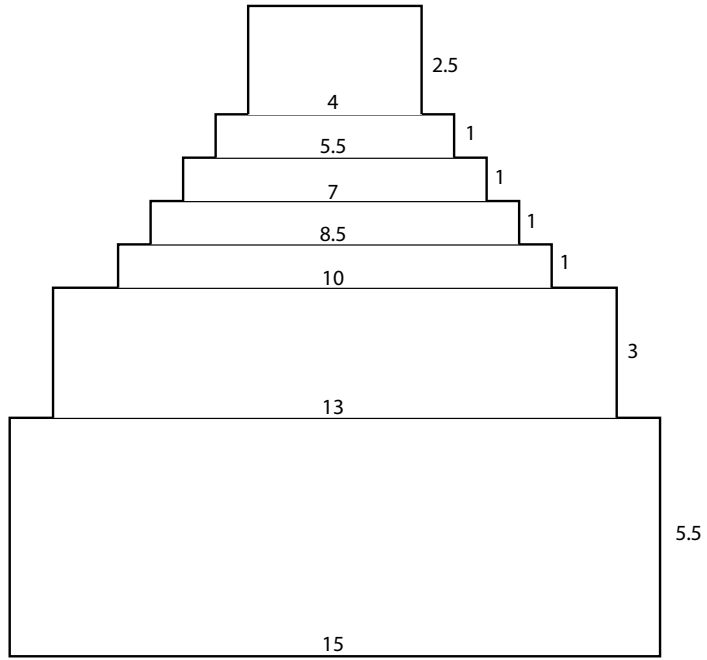
Problem 221

by Benjamin Bloch, Ph.D.

To make a map projection of the northern hemisphere, the ancient Egyptians found a simple mathematical and geometrical means of reducing the curved surface of the globe to a flat surface with a minimum amount of distortion: they used the stepped pyramid, or ziggurat, each face of which could represent a 90 degree quadrant of the hemisphere and each level of which could represent a mapable zone between two parallels of latitude.



The area between the equator and the poles was divided into seven zones, each diminishing in width to correspond to the shrinking degree of longitude.

In the original design the first step of the ziggurat of Babylon was intended to represent the 30th parallel, but in Mesopotamia it was raised to 33 degrees, the approximate latitude of Babylon.

This diagram shows the relative dimensions of the Babylonian ziggurat.

1. Calculate the total surface area of the ziggurat.
2. Calculate the surface area of each of the seven zones compared to the total area. Call the largest area Zone 1.
3. Compare each of these zonal area values with the results of problem 219.