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1) The zonal area is given by $A = 2\pi r^2 (\sin \alpha_2 - \sin \alpha_1)$ where α_1 and α_2 are latitude degrees.

0 to 33 degrees: $(\sin \alpha_2 - \sin \alpha_1) = (\sin 33 - \sin 0) = 0.5446$

33 to 51 degrees: $(\sin 51 - \sin 33) = 0.2325$

51 to 57 degrees: $(\sin 57 - \sin 51) = 0.0615$

57 to 63 degrees: $(\sin 63 - \sin 57) = 0.0523$

63 to 69 degrees: $(\sin 69 - \sin 63) = 0.0426$

69 to 75 degrees: $(\sin 75 - \sin 69) = 0.0323$

75 to 90 degrees: $(\sin 90 - \sin 75) = 0.0341$

The zonal areas are $2\pi r^2$ times each of these values.

2) The total zonal area is simply $2\pi r^2$ because adding all the sin values $(\sin 90 - \sin 0) = 1$.

3) The ratio of each zonal area to the total area is simply the values of each of the previous 0.5446, 0.2325, ... values.

4) With stacked rectangles.

Hint: As we investigate in forthcoming problems, the ancients designed a structure whose name started with the letter Z.