

# Formulae for Panelized Hemisphere Construction

By: Ricky D. Spears

- 1) Decide the radius of the hemisphere ( $R_0$ ). In our example, the radius is 36".
- 2) Decide the number of Longitude Sections (A). In our example, we have 16 Longitude Sections. [A=16]
- 3) Decide the number of latitudinal sections (B). In our example, we have 4 latitudinal sections. [b=4]
- 4) We are now ready to begin finding the panel sizes. First we will need to find the radius of the circles that define the latitude lines. ( $R_C$  - where C is an integer between 0 and B-1. The higher the value of C, the smaller the circle, and the nearer to the top of the hemisphere it will be.) You can do this with the following formula:

$$R_C = \sin(90-(90/B)*C)*R_0$$

In our example, we are building a hemisphere of radius 36". Our resulting values are:

$$R_0 = 36.000"$$

$$R_1 = 33.260"$$

$$R_2 = 25.456"$$

$$R_3 = 13.777"$$

- 5) With this information, it is an easy matter to determine the width of the edge of a panel along any latitude with the following formula:

$$W_C = R_C(\sin(360/A))/(\sin(90-(180/A)))$$

With our 36" radius hemisphere, our values are:

$$W_0 = 14.046"$$

$$W_1 = 12.977"$$

$$W_2 = 9.932"$$

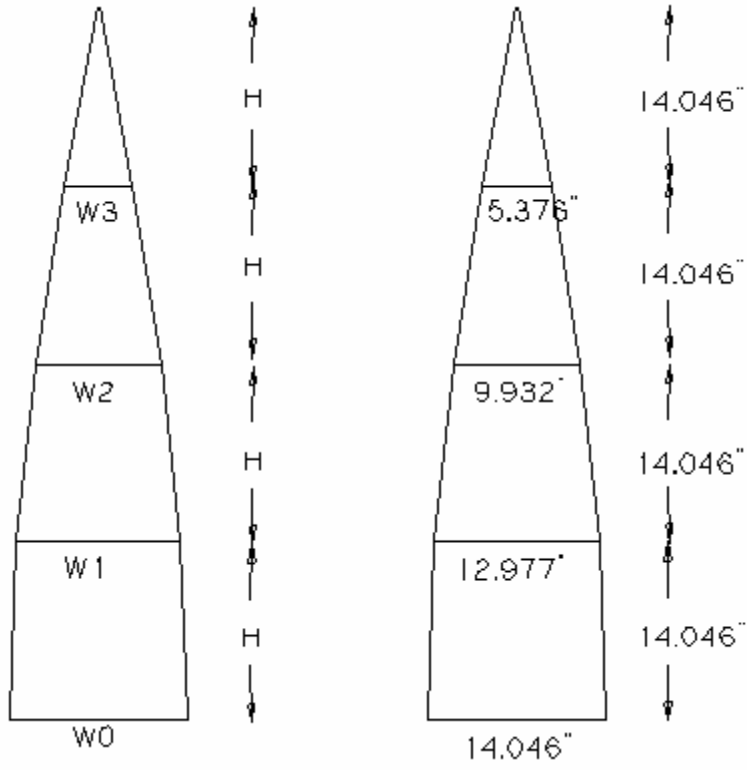
$$W_3 = 5.376"$$

- 6) Finally, we can determine the height (H) of each panel by using the formula:

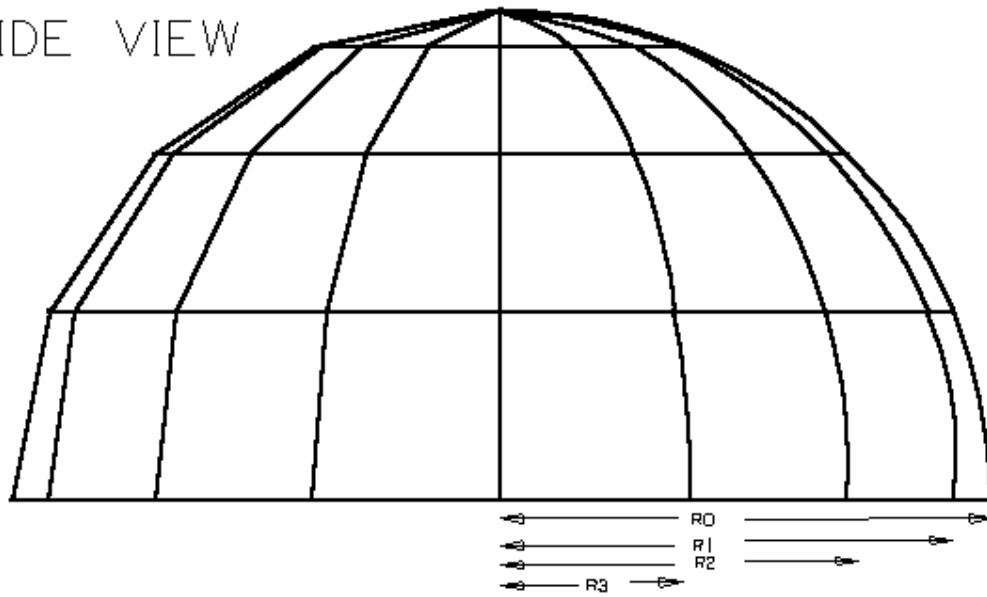
$$H = R_0(\sin(90/B))/(\sin(90-(45/B)))$$

In our example,  $H = 14.046"$

- 7) our hemisphere will be constructed of A times B number of panels. In our example, 64 panels total.

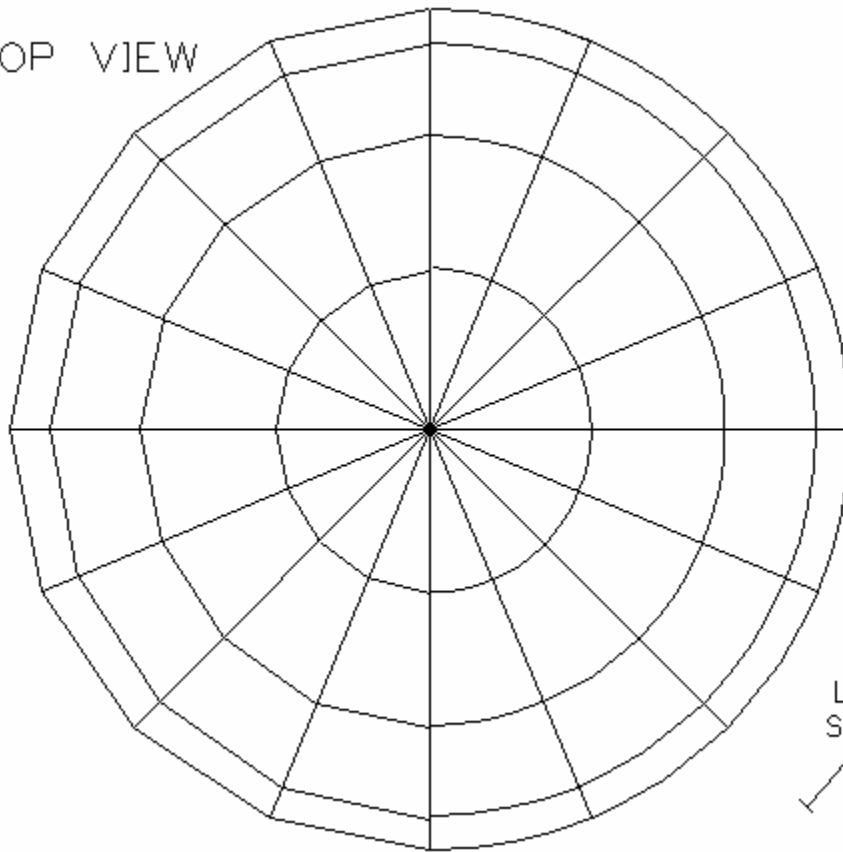


SIDE VIEW



FOUR  
LATITUDE  
SECTIONS

TOP VIEW



LONGITUDE  
SECTIONS