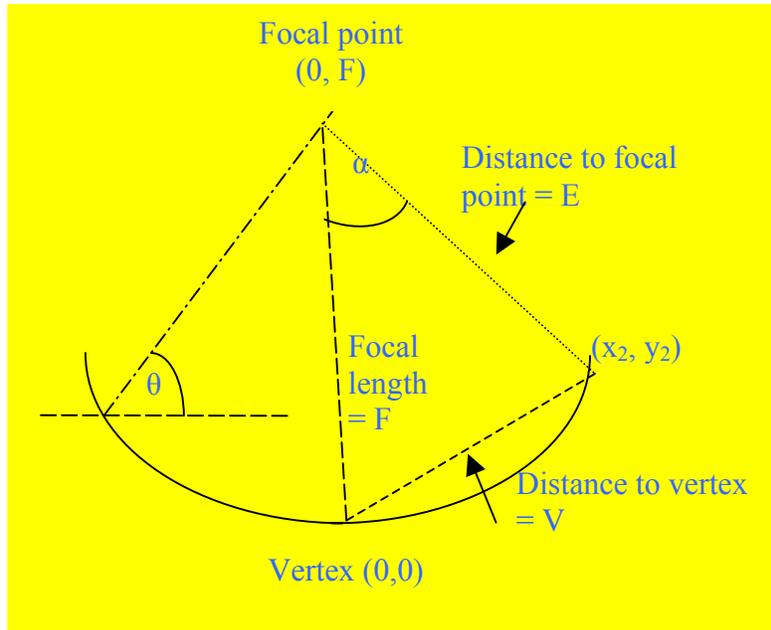


The Parabola and the Dish Worksheet

Name: _____

Date: _____

Period: _____



In order to solve for width, height, and angle of the dish using Excel follow the procedure below:

1. Create a spreadsheet with seven columns:

X value	Y value	E	V	alpha	Slope	theta
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2. For the column X value start at zero. Then make a counter that increases by 0.01.
3. For the column Y value insert equation $= x^2 / 4.16$ for each x value.
4. For the column E insert equation $= \sqrt{(x^2 + (y - 1.04)^2)}$
5. For the column V insert equation $= \sqrt{(x^2 + y^2)}$
6. For the column alpha insert equation $= \cos^{-1} \left(\frac{V^2 - E^2 - 1.04^2}{-2E \cdot 1.04} \right)$
7. For the column Slope insert equation $= \frac{2}{4.16} x$

8. For the column theta insert equation = $\tan^{-1}(\text{slope})$

Your table should have the same entries as shown below.

X value	Y value	E	V	alpha	Slope	theta
0	0	1.04	0	0	0	0
0.01	2.4E-05	1.040024	0.01	0.550917	0.004808	0.275458
0.02	9.62E-05	1.040096	0.02	1.101808	0.009615	0.550904
0.03	0.000216	1.040216	0.030001	1.652648	0.014423	0.826324
...

Problems

1. Calculate the y value for $x = .5$ by hand to see if it is the same as the Excel spreadsheet.
2. Calculate E and V at the same point above and compare with the Excel values.
3. Use the value you got for E and V to find alpha.
4. At what x and y value will alpha be 66° ?
5. When $x = 1$ find the slope and use it to calculate theta.
6. Find the focal point for this equation: $y = 2x^2$
7. What would the dish look with this focal point?