

EDUCATIONAL ASSIGNMENT for JOSEPH JOHN WUNDERLICH for his 3rd trimester of 10th grade
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This assignment covers the following Educational Objectives (Subjects marked with a "■" are the main subject, and those marked with an "□" are secondary subjects):

- 1. READING (ENGLISH)
- 2. WRITING (ENGLISH)
- 3. ALGEBRA 2
- 4. CHEMISTRY
- 5. WORLD HISTORY
- 6. LATIN II
- 7. WORLD CULTURAL ARTS
- 8. PHYSICAL EDUCATION

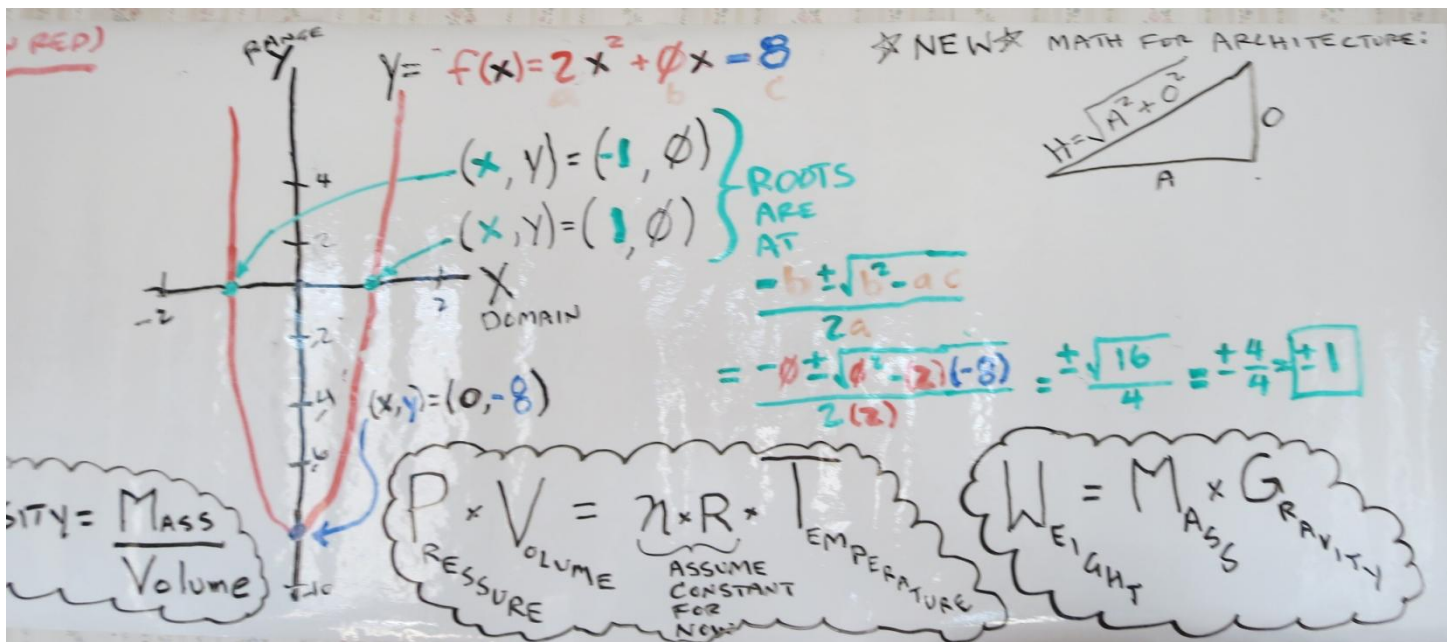
ASSIGNMENT: (1) Use our Parabola Spreadsheet "Parabolas.xlsx" that we developed to find curves (by varying the "a" coefficient from 0.001 to 0.900) to approximate the shape of arches on buildings or bridges that you took pictures of during our May 2014 3-1/2 week trip to Belgium, Italy, and England. For each arch, copy and paste a screen shot (ALT + Print Screen) of the Spreadsheet and put it under your photo like for this Japanese Garden bridge we experienced in Japan on our 2013 trip:



Coefficients of Y = f(X)			Domair	Range	Using Quadratic Equation		
a	b	c	X	Y = f(X) = -(aX ² + bX + c)	"FACTOR" is "ROOT"	"FACTOR" is "ROOT"	Comment
0.003	0	0	-4	-0.048	0.00	0.00	this is X's when Y = 0
0.003	0	0	-3	-0.027	0.00	0.00	this is X's when Y = 0
0.003	0	0	-2	-0.012	0.00	0.00	this is X's when Y = 0
0.003	0	0	-1	-0.003	0.00	0.00	this is X's when Y = 0
0.003	0	0	0	0	0.00	0.00	this is X's when Y = 0
0.003	0	0	1	-0.003	0.00	0.00	this is X's when Y = 0
0.003	0	0	2	-0.012	0.00	0.00	this is X's when Y = 0
0.003	0	0	3	-0.027	0.00	0.00	this is X's when Y = 0
0.003	0	0	4	-0.048	0.00	0.00	this is X's when Y = 0

NOTE: #NUM! means no real root

(2) Recall a related lecture by your father at home:



and then complete the following textbook problems:

Exercise A Find seven points for each function. Then sketch the parabola.

1. $f(x) = 2x^2$

2. $f(x) = -2x^2$

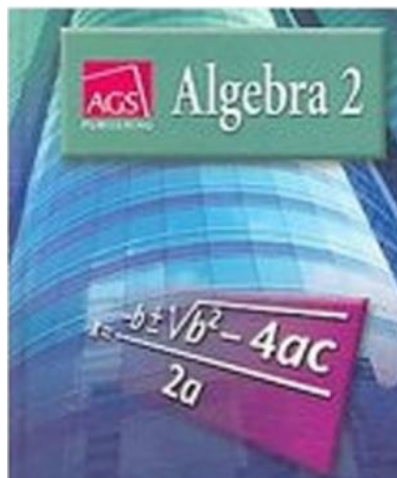
3. $f(x) = \frac{1}{2}x^2$

4. $f(x) = -\frac{1}{2}x^2$

5. $f(x) = 4x^2$

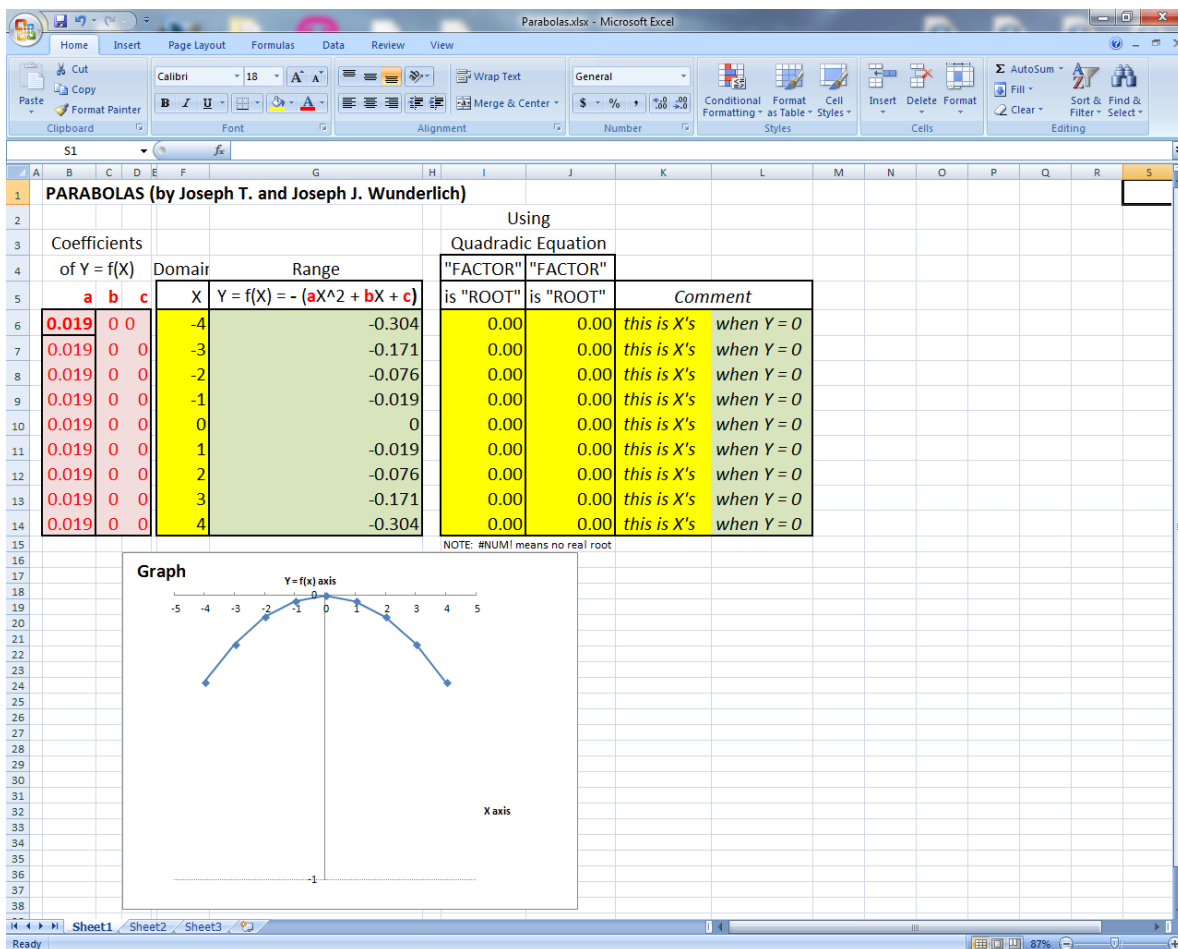
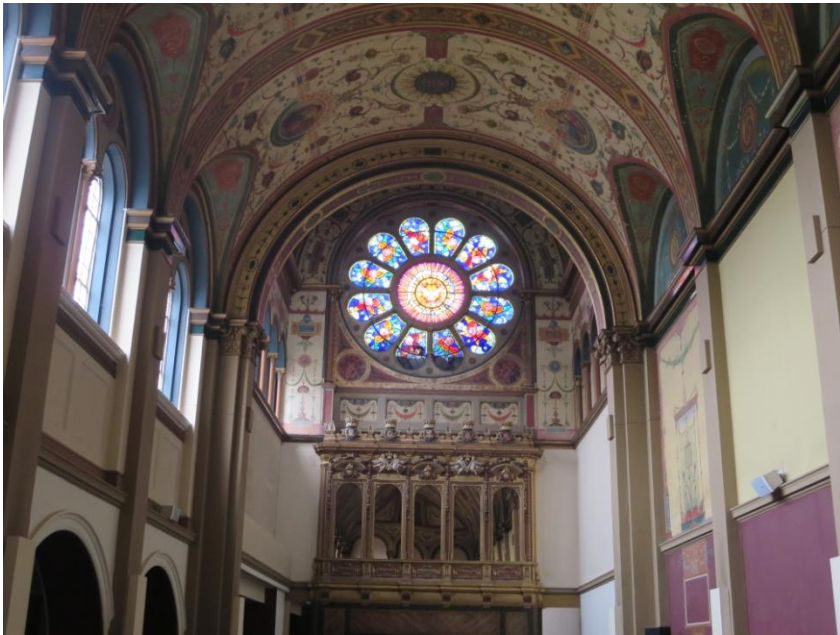
6. $f(x) = -\frac{1}{4}x^2$

$-3, -2, -1, 0, 1, 2, 3$

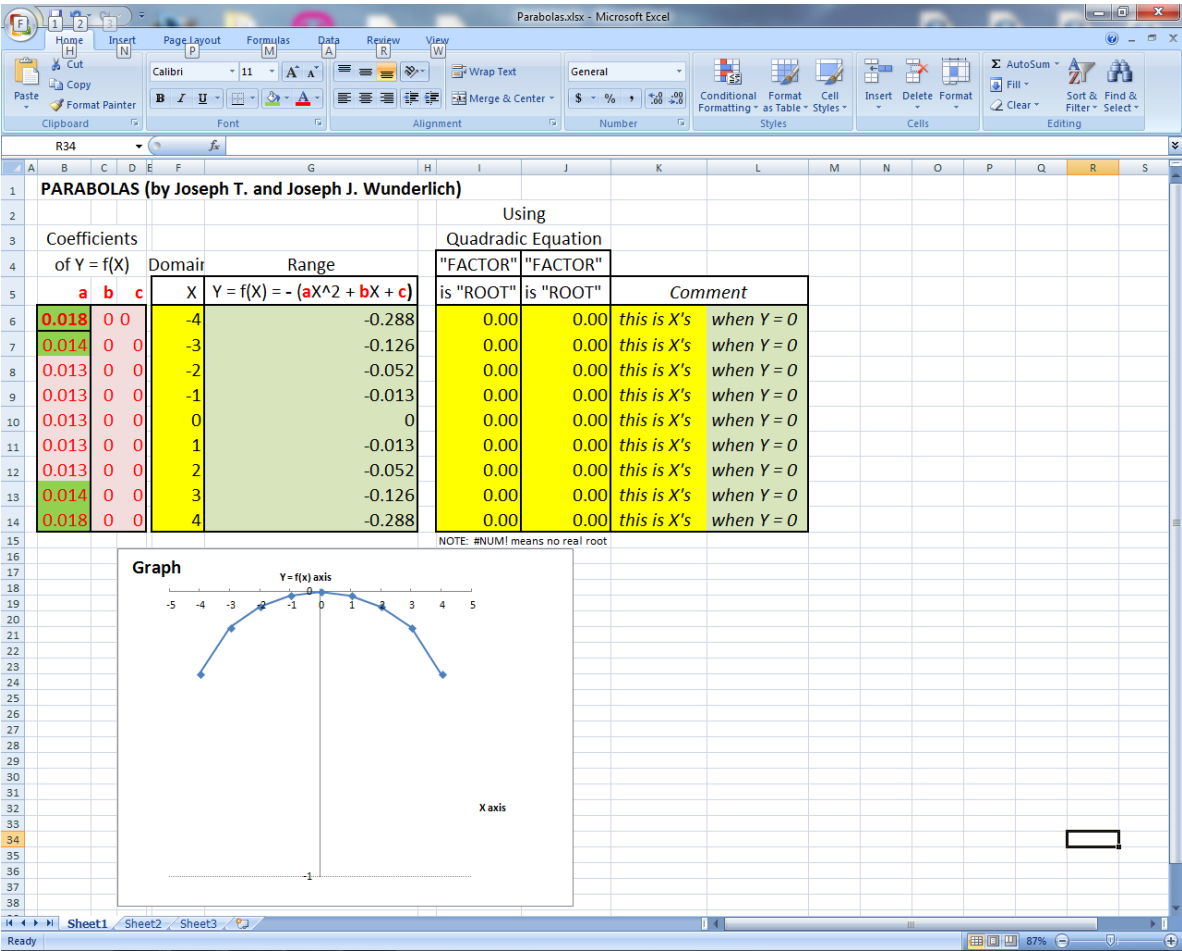


JOSEPH'S WORK:

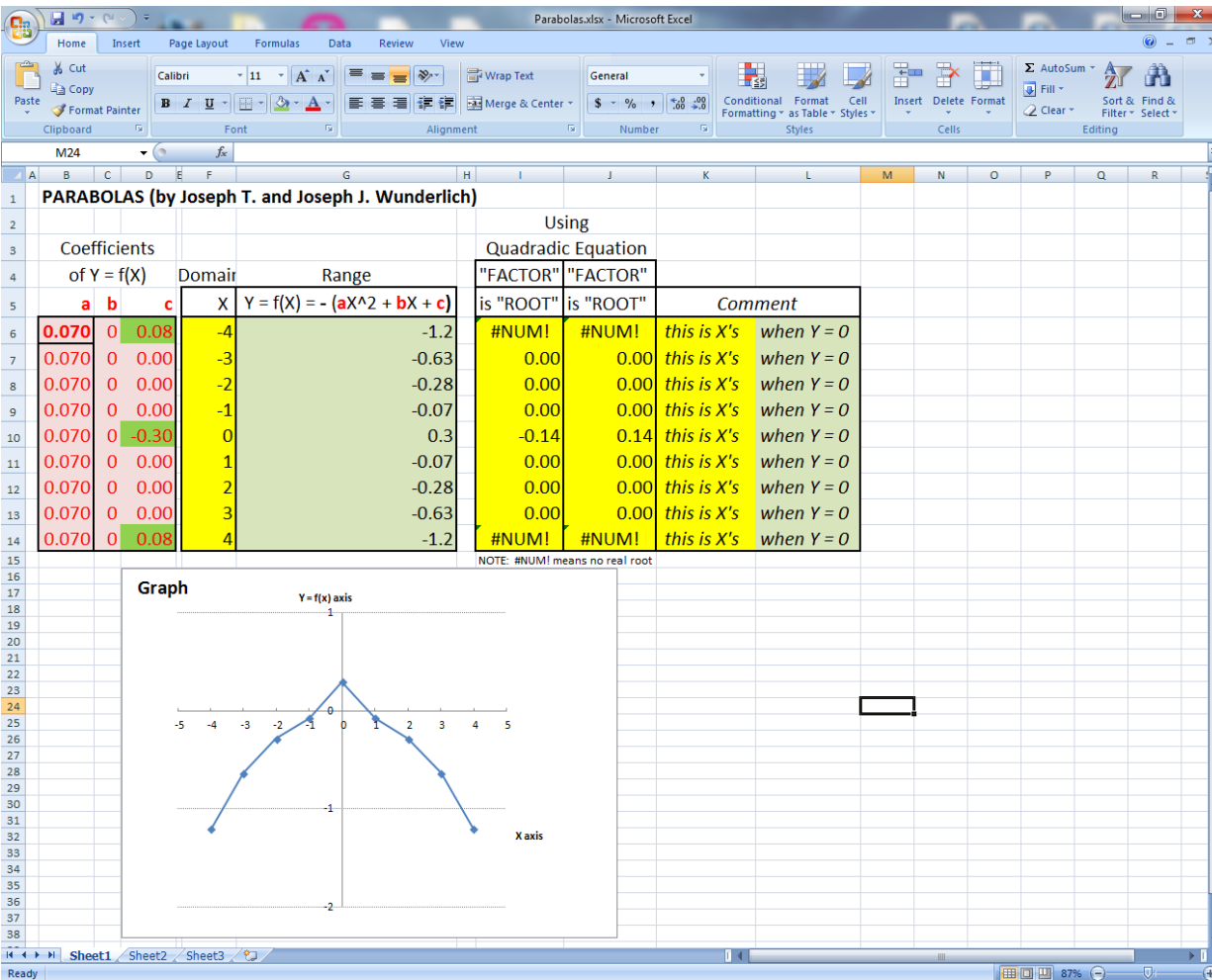
1)



A higher order polynomial would be required to achieve a perfect half circle. The above picture is of the chapel of the Beumont Estate in Old Windsor, England.



Instead of using a new polynomial for this stranger arch, I instead changed several a coefficients. Highlighted in lime green are the coefficients that I modified. Picture taken near Windsor castle in Windsor, England.



I modified the C coefficient this time. Middle eastern style arches taken in Venice, Italy.

2)

Joseph Wunderlich

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1. $f(x) = 2x^2$

x	y
-3	18
-2	8
-1	2
0	0
1	2
2	8
3	18

2. $f(x) = -2x^2$

x	y
-3	-18
-2	-8
-1	-2
0	0
1	-2
2	-8
3	-18

3. $f(x) = \frac{1}{2}x^2$

x	y
-3	4.5
-2	2
-1	0.5
0	0
1	0.5
2	2
3	4.5

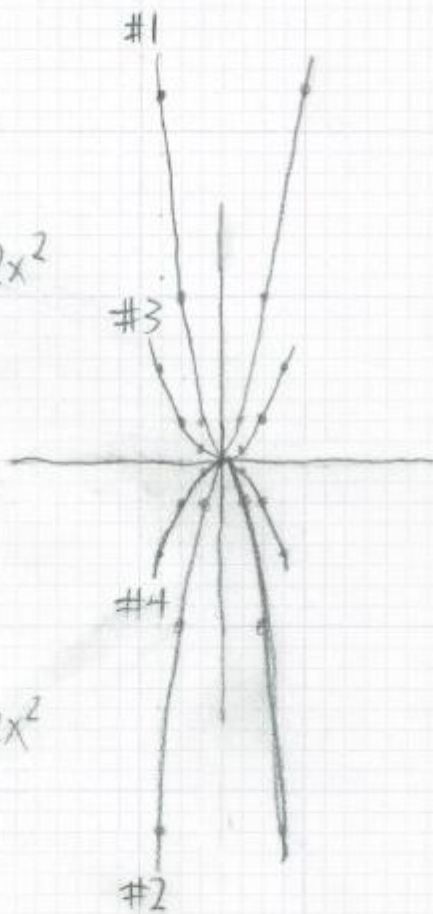
5. $f(x) = 4x^2$

x	y
-3	36
-2	8
-1	4
0	0
1	4
2	8
3	36

4. $f(x) = -\frac{1}{2}x^2$ 6. $f(x) = -\frac{1}{4}x^2$

x	y
-3	-4.5
-2	-2
-1	-0.5
0	0
1	-0.5
2	-2
3	-4.5

x	y
-3	2.25
-2	1
-1	0.25
0	0
1	0.25
2	1
3	2.25



$$\begin{array}{r} 2.14 \\ 48.8 \\ -41.6 \\ \hline -1.8 \end{array}$$

