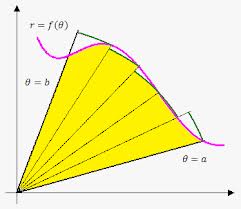
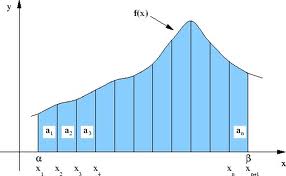
[](http://www.google.com/imgres?sa=X&rls=com.microsoft:en-us:IE-SearchBox&biw=1280&bih=843&tbm=isch&tbnid=bYHGk7ePiMSVWM:&imgrefurl=http://www.emathhelp.net/notes/calculus-2/applications-of-integrals/area-in-polar-coordinates/&docid=Hv-GQsCEaAAxOM&imgurl=http://www.emathhelp.net/images/calc/6_1_polar_area.png&w=349&h=303&ei=spAYU7vZO47JkAerrIEo&zoom=1&iact=rc&dur=640&page=1&start=0&ndsp=21&ved=0CIoBEK0DMBI)Finding area inside Polar Regions

Remember to find area under a curve you add up an infinite number of rectangles

[](http://www.google.com/imgres?sa=X&rls=com.microsoft:en-us:IE-SearchBox&biw=1280&bih=843&tbm=isch&tbnid=hmEI7QxxW8_YMM:&imgrefurl=http://www.pleacher.com/handley/lessons/calc2004/day93.html&docid=Ua1469UXeVOEAM&imgurl=http://www.pleacher.com/handley/gifs4/area1.jpg&w=552&h=340&ei=KZEYU5eSNou2kQeRtYDwAw&zoom=1&iact=rc&dur=2672&page=1&start=0&ndsp=20&ved=0CI0BEK0DMBM)Area of a rectangle = length (f(x)) \* width (dx)

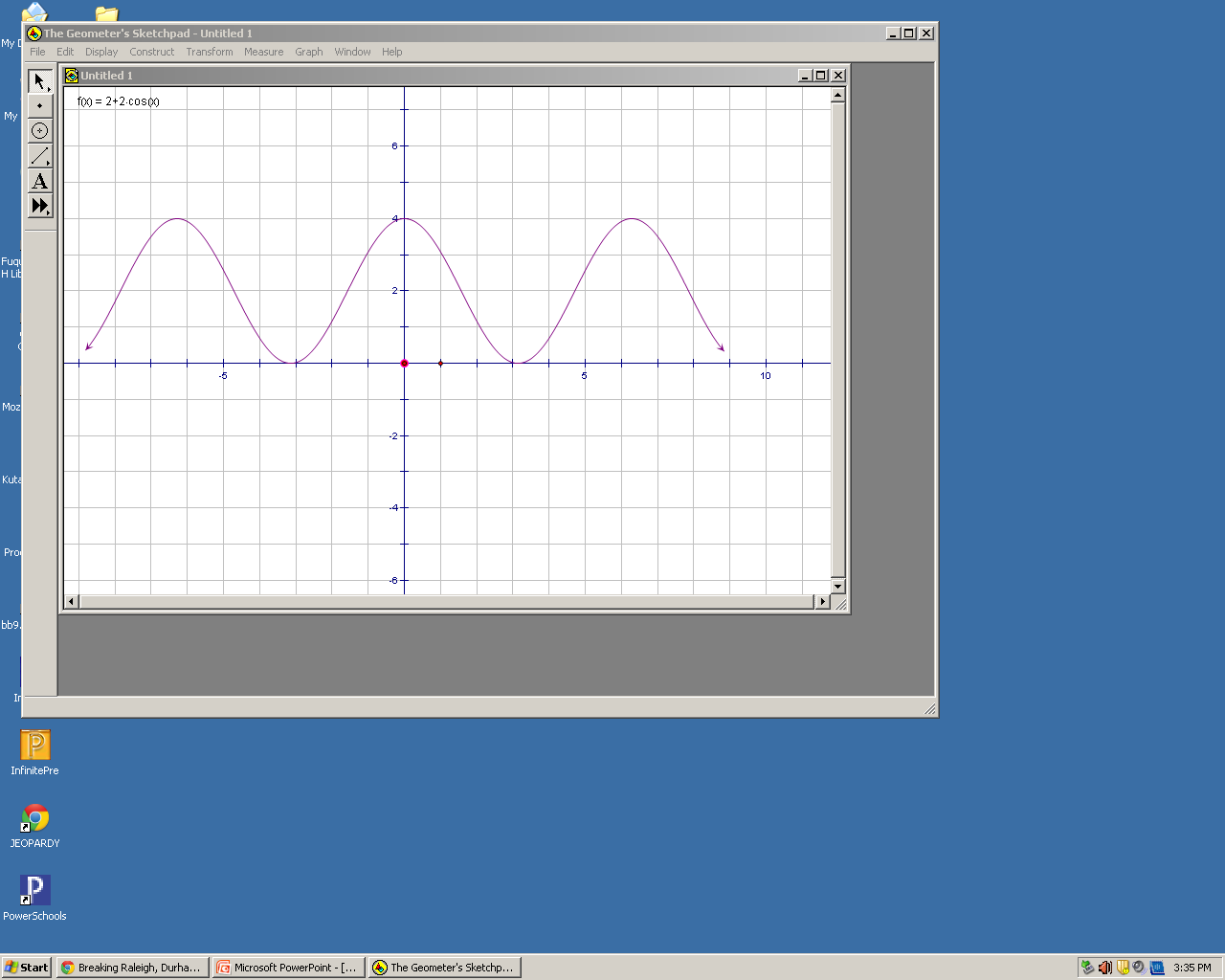
To find area enclosed by a polar curve, you add up an infinite number of sectors.

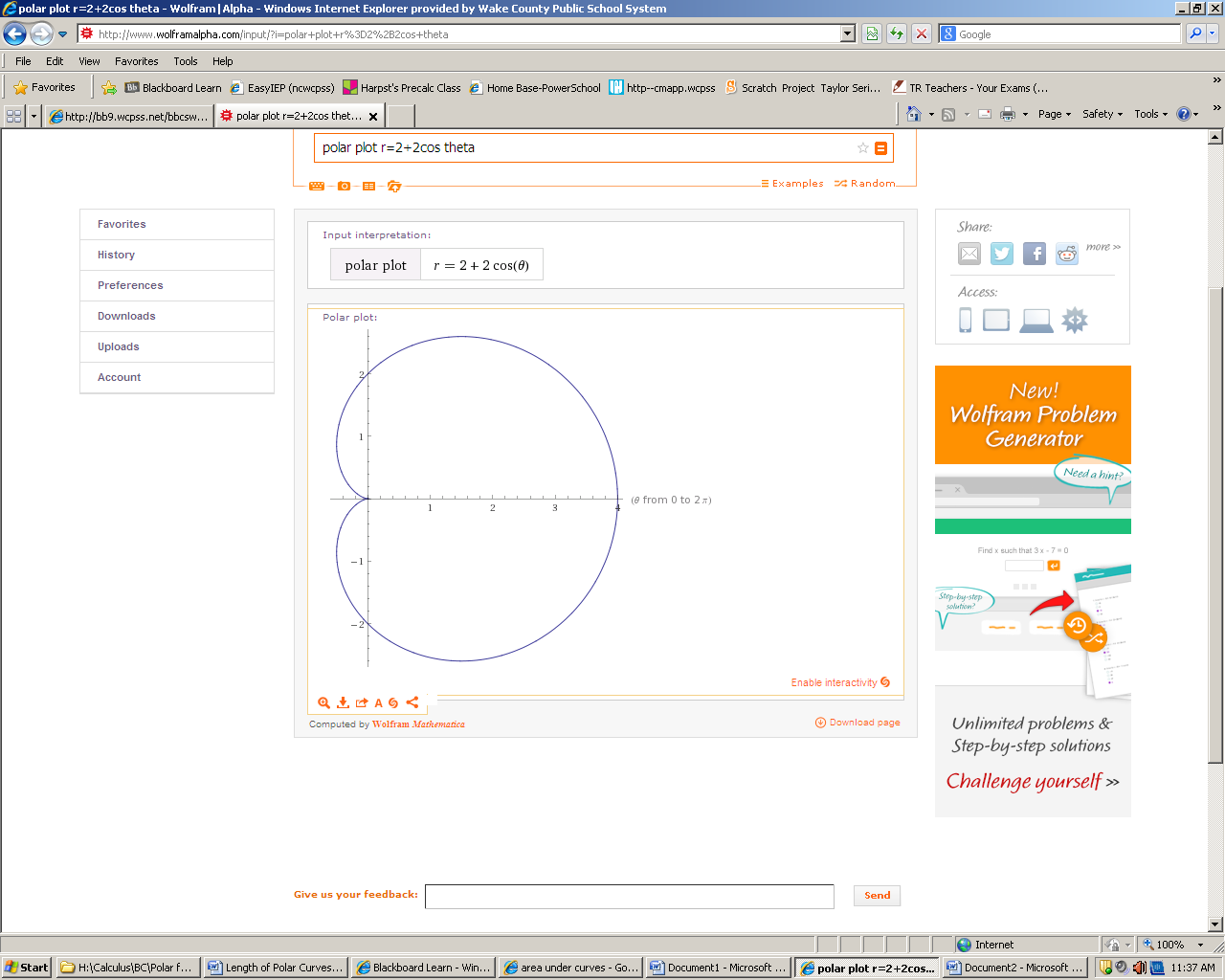
Area of a sector = fraction of a circle

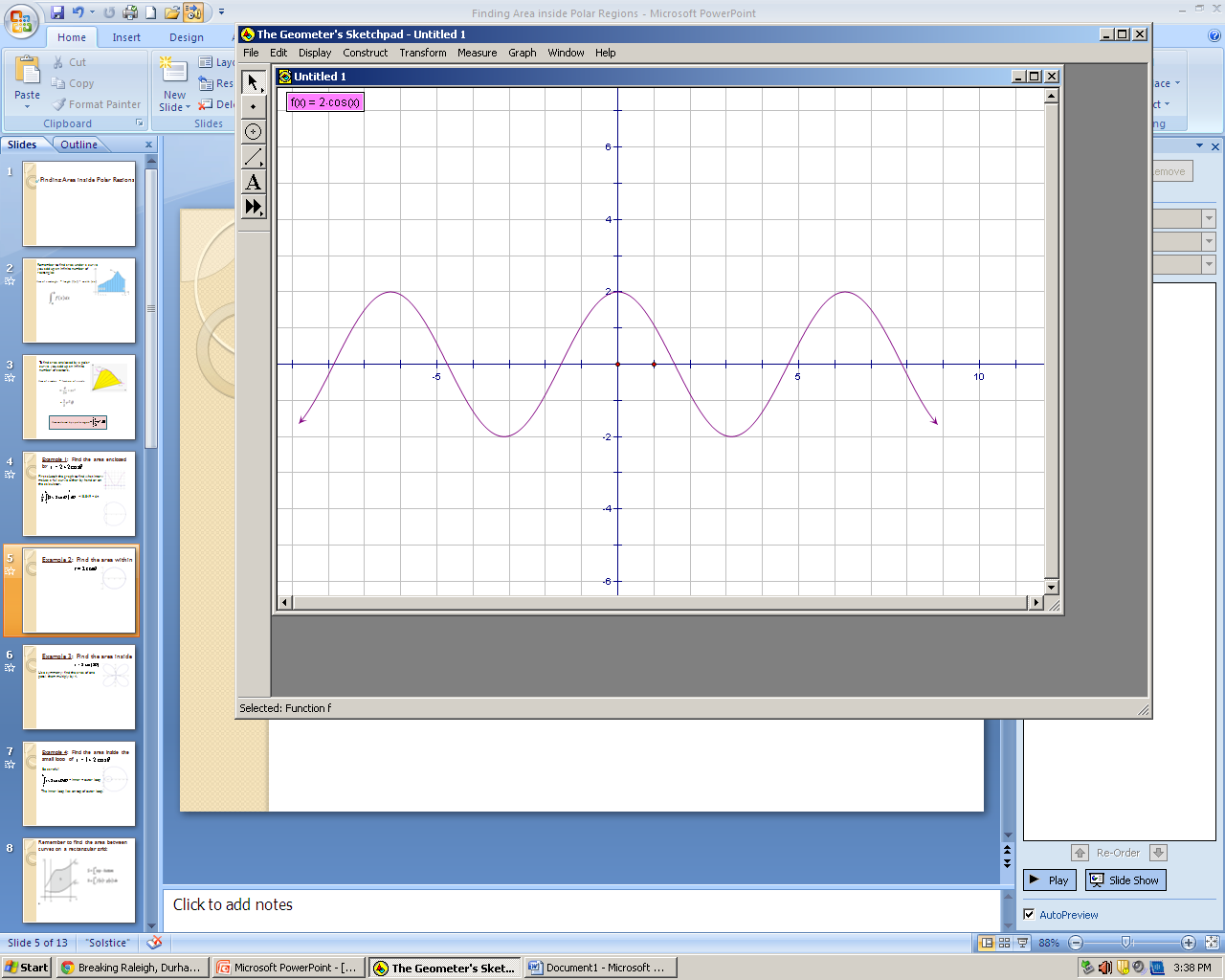
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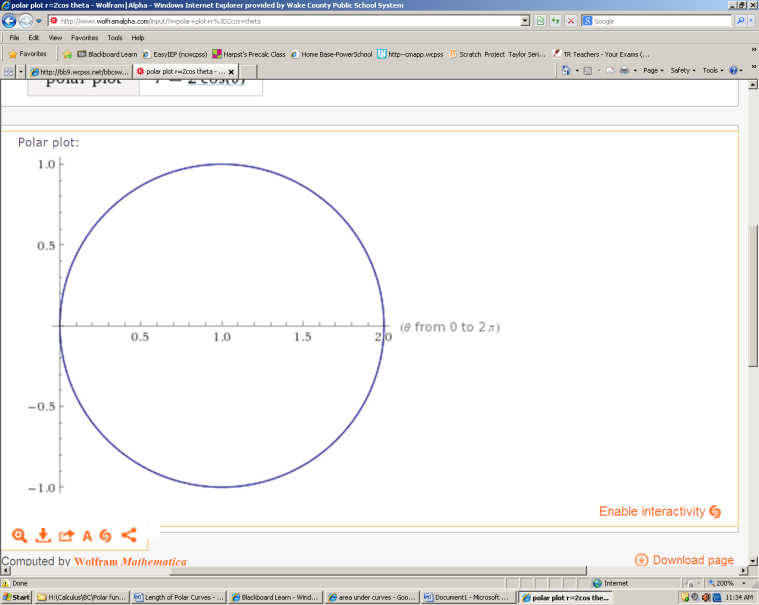
Area enclosed by a polar region

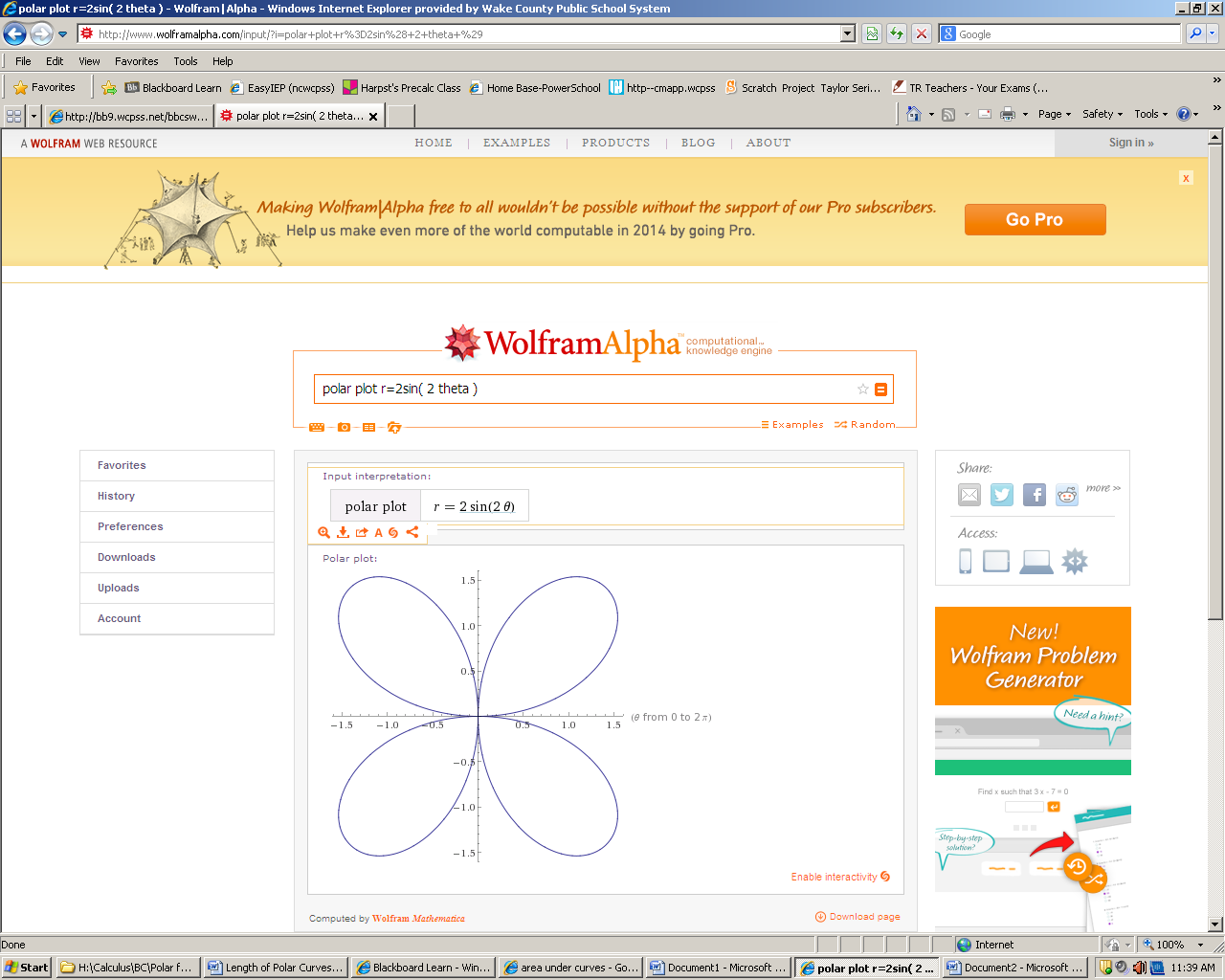
Example 1: Find the area enclosed by

First sketch the graph to find what interval makes a full curve either by hand or on the calculator.



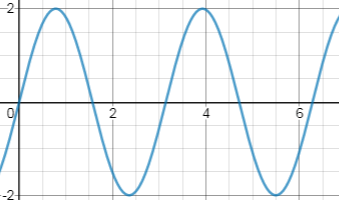
Example 2: Find the area inside .



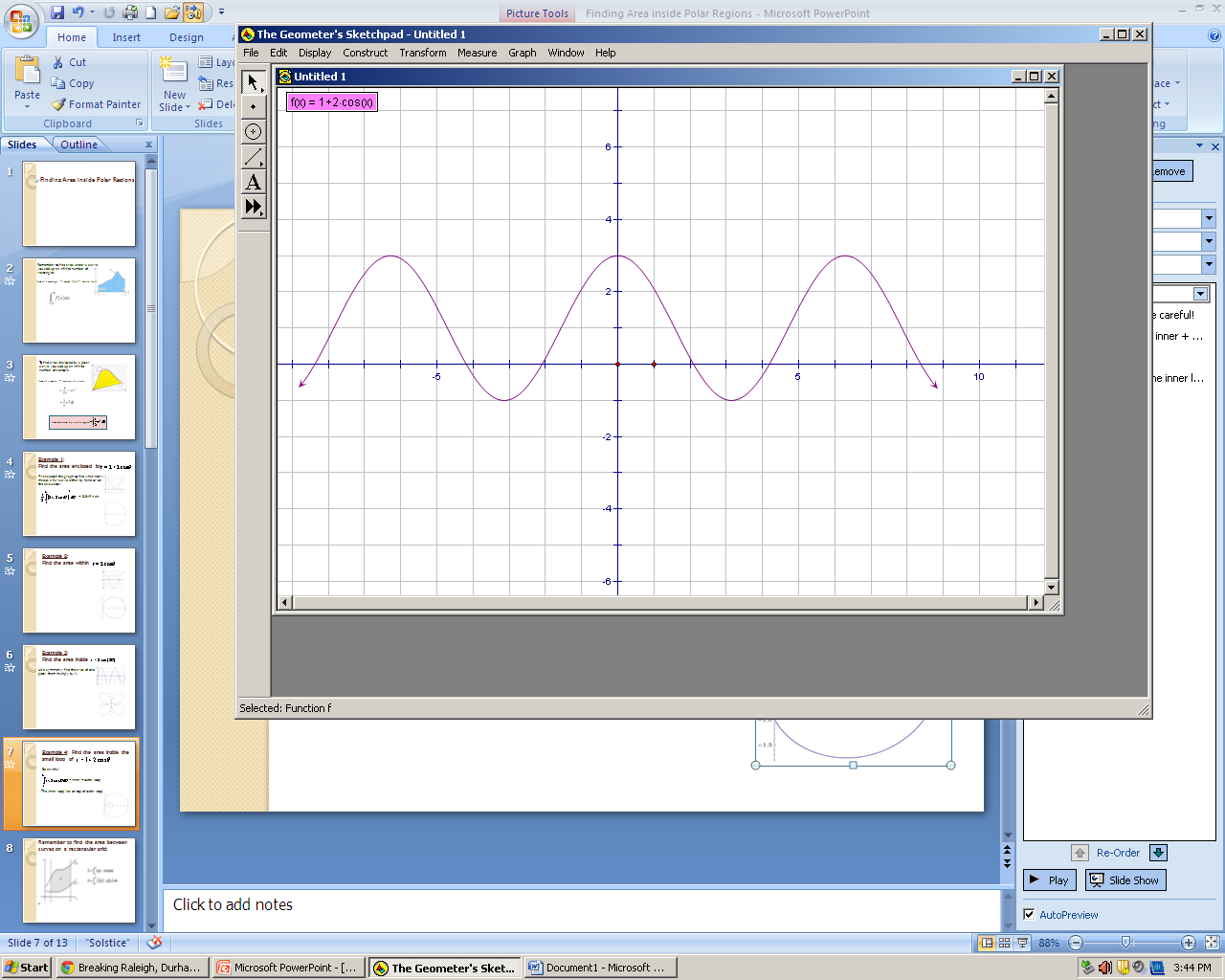


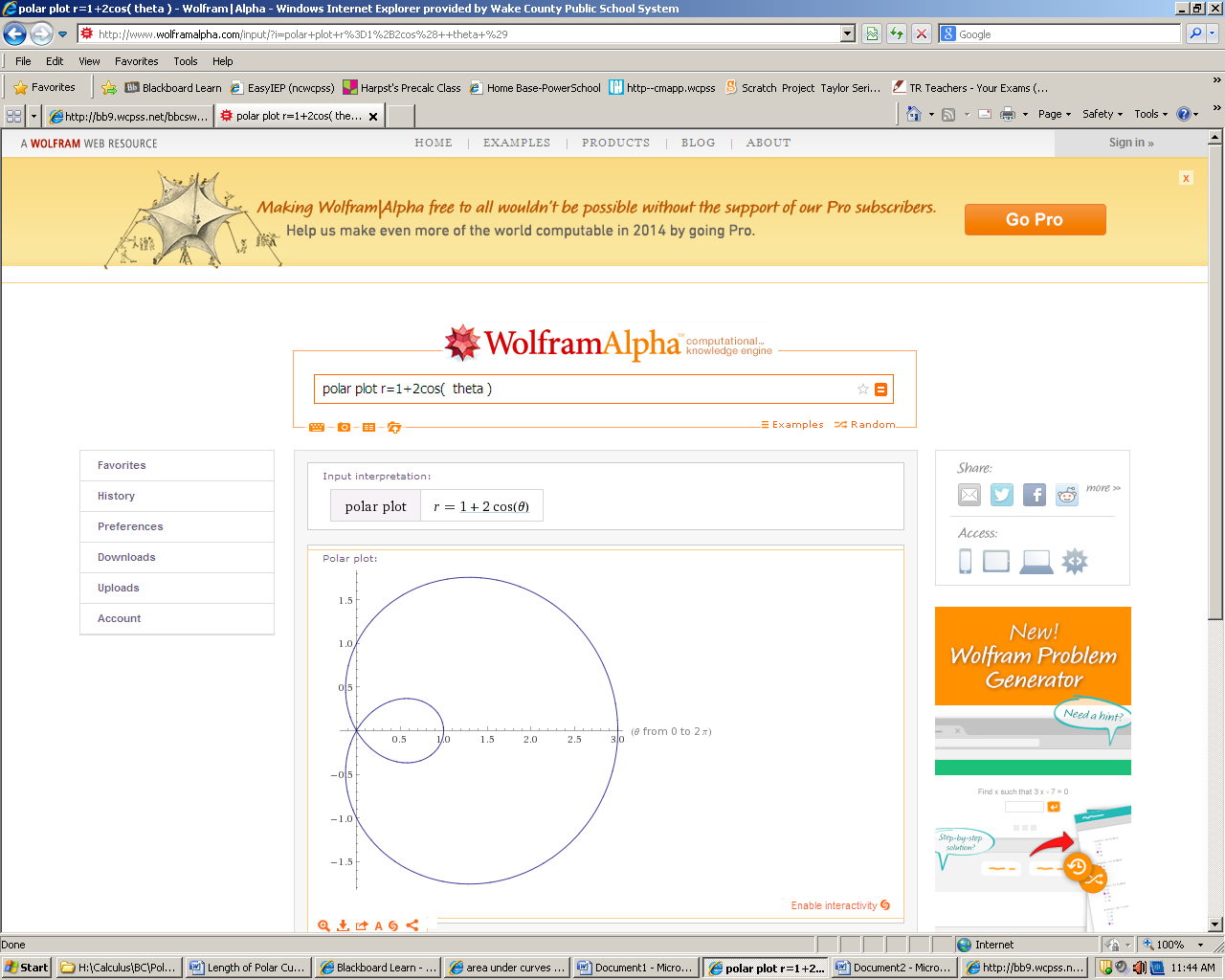
Example 3: Find the area inside

Use symmetry; find the area of one petal, them multiply by 4.



Example 4: Find the area inside the small loop of





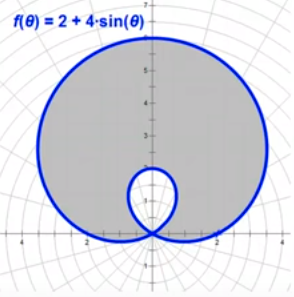
Homework: Sec 9.5 p.676 #1-17 odd

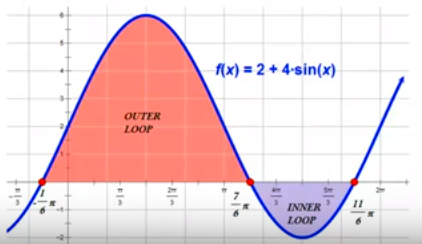
Remember to find the area between curves

on a rectangular grid:

Example 5: Find the area inside , but outside .

As with areas between Cartesian curves, find the intersection of the curves.

Example 6: Find the area between the loops of



Be careful! = inner + outer loop . The inner loop lays on top of outer loop.

Example 7:

Find the area enclosed by and .

This is a piecewise area problem!

Try:

1. Find the area of the region inside and outside .

2. Find the area of the region inside and

Homework: Sec 9.5 p.676 #12, 14, 19 – 25odd, 37 - 45 odd, 77, 78