Special Polar Graphs Project

Did you notice how these graphs look like flowers? We're going to make bouquets! And then we're going to put them on a poster in vases so that my room can look pretty. And then we're going to add math quotes that celebrate math, because I thought that would be great/cheesy. YAY!

Each person is your group is responsible for two flowers (written from polar math equations). One of the two flowers you draw MUST be a rose. Each flower will have a proportionally sized leaf (written from trigonometric math equations with limited domains). Within your group, each of the following flowers must be included:

- 3 petals
- 4 petals
- 8 petals
- 12 petals
- limacon with inner loop
- limacon without inner loop or cardioid

The flowers all have different equations. On your poster, you'll make sure that you write the equation on the flower itself so that people know what they're looking at. On the back of the poster, you'll write down the name of each group member and write down the two equations they used for their flowers. The flowers are to be neatly drawn and colored in. The flowers must be placed in a vase. You will include an inspiring math quote that celebrates the beauty of mathematics. Math quotes that reference the general population that thinks "another day has passed without using algebra" will receive negative credit. Yes, you read that correctly. The poster overall needs to look neat and nice. The poster portion of the project will be 20% of your final project grade.

For the individual portion of the project, you will include a formal mathematical write-up of one of your flowers (the write-up must be of the rose) and its leaf. You will include the equation of your flower graphed on rectangular and polar graph paper. You will also include a leaf that is drawn from sine equations which have various transformations and limited domains (a reference leaf is provided that you can adjust...your leaf must be different from the reference leaf to receive credit!) The leaf will be made from three sine equations, one for the top half, one for the bottom half, and one for the "detail" in the middle. The intervals for the polar graph paper and leaf are already set. You may scale the rectangular graph however you'd like. On your formal write-up you will write a number on each petal to describe the order it was drawn in (from the graphing of the equation). The individual portion of the project will be 80% of your final project grade.

This project is worth a quiz grade. And is due by **Friday, December 18th**. LATE ASSIGNMENTS WILL NOT BE ACCEPTED.

Special Polar Graphs Project Rubric

Group Project Rubric:

	4 points	3 points	2 points	1 point
Flowers included: • 3 petals • 4 petals • 8 petals • 12 petals • limacon with inner loop • limacon without inner loop or cardioid • NO TWO FLOWERS ARE IDENTICAL (based on their equation) • (other variations of petals are optional and not required)	Includes all 7 criteria	Includes 5-6 of the criteria	Includes 3-4 of the criteria	Includes 2 or less of the criteria
Equation of each flower is written on one of the petals	All 8 flowers have equations	At least 6 flowers have equations	Only 4 or 5 flowers have equations	3 or less flowers have equations
Each flower has a leaf	All 8 flowers have leaves	At least 6 flowers have leaves	Only 4 or 5 flowers have leaves	3 or less flowers have leaves
On the back of the poster each person's name is written with the two equations used for their flowers	They are all written			They are not written
Flowers are arranged in a bouquet and put in a vase	Yep			Nope
Flowers and leaves are neat and are colored-in	Yep	Mostly	Ehh...	Nope
Inspiring **math** quote is included	Quote celebrates beauty of mathematics			Quote makes a mockery of mathematics
Overall design looks nice	Yep	Mostly	Ehh...	Nope

Individual Project Final Draft

Leaf:

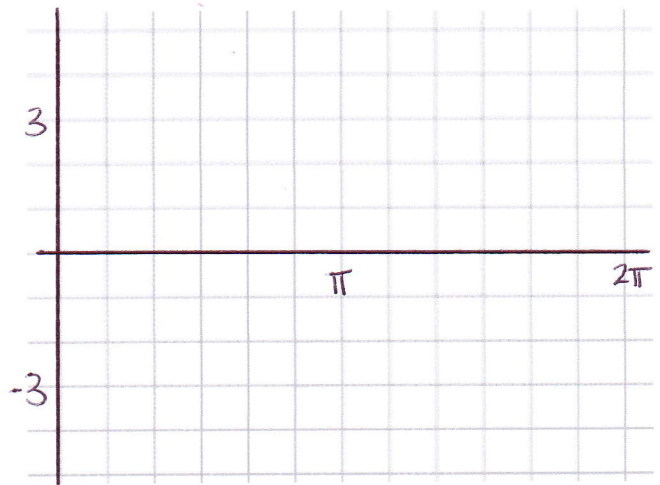Top of leaf equation: _____

Top of leaf domain: _____

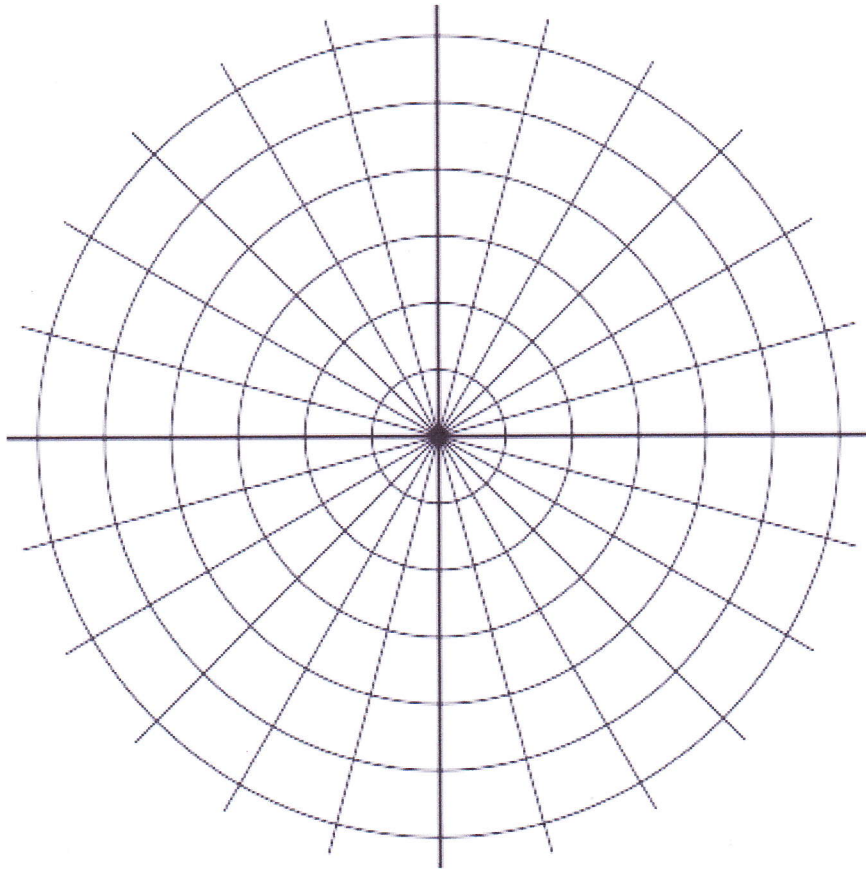Bottom of leaf equation: _____

Bottom of leaf domain: _____

Leaf detail equation: _____

Leaf detail domain: _____

Flower*:

*graph paper with the rectangular graph should be stapled to this sheet.

Individual Project Rubric:

	4 points	3 points	2 points	1 point
Two flowers were completed (at least one is a rose): • The flowers have differing numbers of petals/size of radii if they are both roses. • Each flower has a proportionally sized leaf.	All criteria satisfied	Missing 1 item	Missing 2 items	Missing more than 2 items
Equation of the graded flower is a rose.	Yep			Nope
Rectangular graph of the flower includes: • x-axis intervals labeled and accurate • y-axis intervals labeled and accurate • correct curvature (not Charlie Brown) • arrows • graph completed from 0 to 2π	Includes all 7 criteria	Includes 5-6 of the criteria	Includes 3-4 of the criteria	Includes less than 2 of the criteria
Rectangular graph is accurately drawn (amplitude, period, vertical shift)	Yes	Mostly	Ehh…	Nope
Polar graph of the flower includes: • angle intervals are labeled • order of the petals is written in • correct curvature (petals are drawn accurately and are not overly skinny or overly fat)	Includes all 3 criteria	Includes 2 criteria	Includes 1 criteria	
Polar graph is accurately drawn (placement of petals and radius)	Yes	Mostly	Ehh…	Nope
Leaf is drawn according on provided scale: • Equation for the top of the leaf is written with limited domain and is accurate • Equation for the bottom of the leaf is written with the limited domain and is accurate • Equation for the leaf detail is written with the limited domain and is accurate	Yes	Mostly	Ehh…	Nope

20% (Group Score: _____)+ 80% (Personal Score: _____) = Final Score: _____